

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
85981	0	0	0	0	Suggest that Chapter 14 touches on the SDGs in various ways, however it lacks recognition of the importance of SDG 12 (Sustainable consumption and production). Unsustainable consumption and production is a catalyst for environmental degradation and climate change. It is an increasing focus under UNEP/UNEA and is likely going to be a focus topic for the next major Summit on the Human Environment – Stockholm +50 in 2022.	Noted. This is more of an issue for Chapter 5 than for us. That deals with issues of sustainable consumption.	Government of Australia	Department of Industry, Science, Energy and Resources	Australia
84207	0	0	0	0	Readers may need some explanation on how "long-term global goal", which is under the UNFCCC, and "long-term goals" under the Paris Agreement differs. (the latter includes essentially the same "long-term global goal", which is the temperature goal, but the Paris Agreement has other goals)	Noted. We include text on this when describing the Paris Agreement, section 14.3.	Madoka Yoshino	United Nations University Institute for the Advanced Study on Sustainability	Japan
31059	0				Military contributions to greenhouse gas emissions are missing from Chapter 14. The values in society that promote nationalism also promote military emissions.	Noted. This would fit into chapter 2, rather than here.	Daniel Helman	College of Micronesia-FSM	Micronesia, Federated States of
31081	0				A detailed treatment of nuclear energy is missing from Chapter 14. This ought to include information about the current plans of about 30 new nations to develop new nuclear power programs, thereby doubling the number of countries with nuclear power programs. The text ought also to include a treatment of nationalism and the risk of nuclear arms proliferation as new countries develop the technology. Some will be dishonest actors, looking to develop arms instead of energy. A pathway for the safest development of nuclear energy by these nations ought to be explicitly laid out and a new treaty ought to be promoted, banning the use of any experimental or research reactors by these new countries, and instead mandating small modular reactors. New protocols related to materials enrichment facilities also ought to be adopted. Note that Saudi Arabia is now developing nuclear materials enrichment, and whether this is strictly for its new nuclear power program remains to be seen.	Noted. The development of nuclear power is of relevance for the chapter on Energy, but not here. We do note issues of international cooperation with respect to nuclear power in our section on the energy sector.	Daniel Helman	College of Micronesia-FSM	Micronesia, Federated States of
31097	0				Chapter 14 is weak in presenting a coherent solution or family of solutions to the climate crisis in the near term. There ought to be a special section that presents a viable two year transition plan to zero anthropogenic carbon release, with several alternatives. It is unreasonable for the authors to assume that governments will be able to put this together themselves without a roadmap.	Rejected. First, this would not fit in this chapter. Second, such a roadmap would be policy prescriptive, which violates an IPCC principle.	Daniel Helman	College of Micronesia-FSM	Micronesia, Federated States of
31103	0				Chapter 14: International cooperation does a poor job in presenting the pressing case for a new climate treaty. Under the Paris Agreement, the energy transition is too slow to prevent catastrophic results from climate change.	Rejected. It is not our job to press the case for a new climate treaty. What we can do, and attempt, is to assess the performance of the current one.	Daniel Helman	College of Micronesia-FSM	Micronesia, Federated States of
31113	0				Consider adding a special section to Chapter 14: International cooperation, highlighting the particular duty that the developed world owes to the developing world due to resource extraction during colonization, and how this duty might form a basis for their funding the global energy transition.	Rejected. This would be policy prescriptive.	Daniel Helman	College of Micronesia-FSM	Micronesia, Federated States of
19675	0				[continued] This assessment can be placed in either Chapter 4 or Chapter 14, which is why the following comments are addressed to both these Chapters. The following will first address why this assessment needs to be included in the AR6 report. After this, comments will follow on the elements that should be reflected in the results of this assessment. The importance of equity in countries' mitigation efforts for achieving the Paris Agreement long-term target is emphasised throughout the report (for instance at 4-5, line 3, 4-91, line 19, as well as 14-23 line 36).	Noted. We see the issue of fairness as important, and acknowledge that ideally the literature dealing with it should be presented within AR6. We do point to this literature in section 14.3.2.3, and identify the criteria that could be used to determine what is fair. We do not, however, go into an evaluation of what exactly (according to those criteria) would in fact be viewed as fair, and do not think that Chapter 14 is the appropriate place. To the extent this is appropriate at all of the IPCC (given the level of policy prescriptiveness), we see it as an issue for Chapter 4, which looks in detail at current mitigation plans, and also within Chapter 13, which is the home to presenting the evaluation criteria for climate policies. Certainly the issue of whether a given country's policy is fair within the global context is one element of the equity dimension of policy evaluation. In terms of whether the differentiation between developing and industrialized countries within the various commitments of the Paris Agreement is fair is an issue that we do cover.	Dennis van Berkel	Urgenda Foundation	Netherlands
19677	0				[continued] In addition, the Paris Agreement Rulebook obliges parties to provide information on the fairness considerations of the level of ambition in their NDC (14-22, line 19). Chapter 14.3.2.3 concludes that due to political challenges there is little scope within the climate change regime to assess the adequacy of countries' NDCs based on agreed upon equity principles (14-25, line 12). For this reason, such assessment needs to be developed by actors outside of the regime (14-25, line 14), whereby the onus lies on the scientific community to generate methods to assess fairness (14-25, line 23). Deliberation and decision making at the country level on the fairness of a country's mitigation effort can only take place meaningfully in the presence of scientific standards on equitable mitigation levels, which is why it is critical that an assessment of these standards is included in the report.	See response to comment 19675	Dennis van Berkel	Urgenda Foundation	Netherlands
19679	0				[continued] It is particularly important in this context that the report notes that domestic and regional courts are scrutinising the adequacy of countries' contributions to achieving the Paris temperature target and that it is only in relation to a country's "fair share" that this adequacy can be assessed by courts. (14-25, line 23) Courts however cannot make this scientific assessment themselves. As the report notes in chapter 13.5.5 (13-35 line 10), courts have relied on the reporting of the IPCC for the assessment of the fairness levels of countries mitigation efforts. The report thus clearly emphasises the crucial importance of having a framework on the basis of which countries' emission levels can be assessed against equity standards, but fails to operationalise this. For this reason, such a framework on a country per country level should be included in the report.	See response to comment 19675	Dennis van Berkel	Urgenda Foundation	Netherlands
19681	0				[continued] The report currently stops at merely mentioning studies that have proposed different interpretations of equitable contributions (at 4.2.2.6, 4.5, 14.3.2.3). In contrast, the next draft should report on the studies that provide assessments of the different categories of effort sharing methods, as was done in AR5. These assessments, that were updated since AR5 exist in the literature (Climate Action Tracker and Rajamani et al, submission under review)	See response to comment 19675	Dennis van Berkel	Urgenda Foundation	Netherlands

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
19683	0				[continued] The results of the assessment should include the following: •The emission reduction ranges should be provided for 2030 and 2050. In connection with this, the individual carbon budget ranges for these countries should be provided, in order to provide countries with policy options to vary the timing of their emission reductions while staying within the emission limits that are necessary to stay below the Paris long-term target.	See response to comment 19675. Also, this suggestion would go too far in terms of policy prescriptiveness.	Dennis van Berkel	Urgenda Foundation	Netherlands
19685	0				[continued] •The report should identify fair and equitable emission reduction ranges per country that are in line with holding global warming “well below 2C” and “1.5 C”. Due to the ambiguities with regards to the interpretation of the long-term temperature goal of the Paris Agreement, the report should also provide results for a higher likelihood than 66% chance of holding warming below 2C.	See response to comment 19675. Also, this suggestion would go too far in terms of policy prescriptiveness.	Dennis van Berkel	Urgenda Foundation	Netherlands
19687	0				[continued] •The results should make a clear distinction between effort sharing methods that are based on international environmental law principles (particularly CBDR-RC and the precautionary principle) and methods that reflect countries’ practices. In connection with this, the individual ranges should be provided such that if all countries reduce at the bottom of their range, that the Paris temperature target would still be in reach. Ranges that would not be in line which this would run counter to the international law principles.	See response to comment 19675	Dennis van Berkel	Urgenda Foundation	Netherlands
19689	0				[continued] •Specifically, there is a suggestion to include a table in the Annex to Chapter 4 that provides such ranges for all countries linked to either section 4.2.2.6, 4.5, or 14.3.2.3.	See response to comment 19675. Also, this suggestion would go too far in terms of policy prescriptiveness.	Dennis van Berkel	Urgenda Foundation	Netherlands
63295	0				Overall, the chapter is very focused on UN-centric operations. So the title of the chapter is misleading as the lack of content on non-UN organizations leads the reader to think that there is nothing going on outside the UN system. This is an opportunity to also reflect the work of non-UN organizations, which do a considerable amount of work with specific industries or on specific pollutants. We recommend these also be highlighted. Examples include the Arctic Council (Arctic States have agreed to a collective goal to reduce emissions of black carbon by 25% to 33% below 2013 levels by 2025, and by and large, are on track to meet this goal); the Climate and Clean Air Coalition, Global Methane Initiative. If the intent is to focus solely on UN efforts, then we suggest re-naming the title of the chapter to help clarify that this chapter excludes discussion on non-UN organizations.	Accepted. In our revisions we have highlighted to a greater detail the non-UN bodies.	Government of Canada	Environment and Climate Change Canada	Canada
22659	0				This chapter could go deeper in the analysis of small island states. Please consider the following references: David G. 2020. "Petit Voyage océanien autour de l'île en tant qu'hérésie géographique". L'Information géographique, vol. 84, pp. 12-35. These states will then have the choice between submission to a more powerful entity or regional cooperation to ensure their food security because the international rice market is likely to be more than tight. Some countries already in 2020 are struggling to meet the demand of the international market, see David, G. Dumas, PS, Durieux, L, Sabinot C. 2015. Introduction. "Le développement durable à la dérive du monde, enjeux et défis de l'Océanie". In Blaise S, David, C et David V, dir. ; "Le développement durable en Océanie, vers une éthique nouvelle". Aix-Marseille, Presses Universitaires de Provence, coll. Espace et Développement durable, 2015, pp. 17-38. ; David, G. Existe-t-il une spécificité insulaire face au changement climatique ? , Vertigo - la revue électronique en sciences de l'environnement , 2010, HYPERLINK "http://vertigo.revues.org/10471" Volume 10 Numéro 3 décembre 2010 22 p.	Rejected. These are issues for Working Group 2, rather than WG3.	Government of France	Ministère de la Transition écologique et solidaire	France
22661	0				Chapter 14 does not include a part about ocean cooperation, and it would greatly benefit from it. A whole system is built around this very specific part of the Earth, which is sometimes the core of important cooperation (Classen et al. 2019) (Wisz et al. 2020) (European Commission, 2020) (OECD, 2020). Furthermore, ocean is sometimes greatly missing in multi-scale cooperation which can be underlined. (Brodie Rudolph et al. 2020) (IASS, 2020) (UN Environment, 2017)	Noted. We reached the conclusion that this is too tangential.	Government of France	Ministère de la Transition écologique et solidaire	France
37421	0				The maximal references to any single author in this chapter is of the Lead Author. More references, including and especially from the developing country authors be added and level of confidence of statement(s) be assessed accordingly.	Noted. We have done our best to be fair in terms of citations, and give a complete picture of the scientific literature that is out there.	Government of India	Ministry of Environment, Forests and Climate Change	India
37423	0				The sources and citations for the assessment in the chapter are hugely and overwhelmingly dominated by English language and Annex-I sources. Where non-Annex-I authors appear it is also dominated by those publishing in Annex-I country publications. This is extraordinarily biased coverage for a chapter on International Co-operation where voices of the Global South are totally occluded. Hence Chapter may be redrafted and reworked in important respects to redress this lacuna.	Noted. Our choices about what sources to reference are dictated by our judgment of their scientific quality, and not the nationality or native language of their authors. Balance within the IPCC process is ensured through the selection of LAs and CLAs from a wide range of countries.	Government of India	Ministry of Environment, Forests and Climate Change	India
43757	0				We thank the author team for their work on this chapter which already contains a large amount of important information. We would welcome in particular an emphasis of the findings of the Periodic Review. The process has shown the importance of a science-policy interface and should be highlighted as such, complemented by an outline of the specific scientific needs for the 2nd Periodic Review.	Noted. We have simply not identified literature describing the effects of the periodic review.	Government of Jamaica	Meteorological Service Division	Jamaica
14971	0				The 2013-2015 Periodic Review was instrumental in informing the Paris Agreement and its mitigation architecture. Key findings of its Structured Expert Dialogue provided the basis for the long-term temperature goal under the Agreement (compare decision 10/CP.21). This process was a key example for international cooperation and how a science policy interface can work. Its findings should be highlighted by the IPCC. It is strongly suggested to include a Box on the Periodic Review highlighting both the outcome of the 2013-2015 Review as well as the specific scientific needs for the 2nd Periodic Review.	Noted. We have simply not identified literature describing the effects of the periodic review.	Government of Saint Kitts and Nevis	Department of Environment - Ministry of Agriculture, Marine Resources, Cooperatives, Environment and Human Settlements	Saint Kitts and Nevis

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
47453	0				For most vulnerable countries like SIDS it would be greatly appreciated if regionally specific information could be better resolved, with specific examples provided on strategies, methods and tools to improve international cooperation. Please also expand on market mechanisms discussed under the UNFCCC, i.e. Article 6.	Noted but rejected. Any consideration of what individual countries could do to improve international cooperation would go far beyond our chapter's mandate. In terms of Article 6, we already devote a fair amount of space to it.	Government of Saint Lucia	Department of Sustainable Development - Ministry of Education, Innovation, Gender Relations and Sustainable Development	Saint Lucia
76173	0				Given the focus in international policy development on the related concepts net zero CO ₂ , net zero GHG, carbon neutrality and GHG neutrality, I think the chapter need to discuss these a bit more in relation to the balance concept in Art4. This is to some degree included in various places, but I suggest discussing and clarify these concepts together early in the chapter and then build on this for the rest of the chapter. There are different interpretations and ways of making the "GHG balance" concept in Art4 operational (see Fuglestedt 2018), and I suggest referring to a Box on net zero in WGI CH1, as well as WGI Ch7. See also Glossary definition of these concepts (developed by a cross WGI-WGIII group). In the current policy development and international discussions, these concepts play a central role and I think it would strengthen the chapter if you could address these concepts in a systematic manner. (It may fit in the box 14.1)	Noted. These issues are now finding their way into the Net Zero X-chapter box.	Jan Fuglestedt	CICERO	Norway
76175	0				One important issue that I hope the chapter could address (sorry if I overlooked this), is the relation between policy development and evolving science. When the Paris Agreement (PA) was written, the scientific knowledge available was assessed in AR5 and also reflected in the Structured Expert Dialog. After this time new studies, new and improved observations and data sets are available, which will be reflected in AR6. The PA does not give detailed information about exactly how key variables should be given and used. The chapter could inform the discussions on how to use updated science and concepts in the context of the ambitions and goals of the PA.	Noted. This is a really interesting issue -- how changing scientific knowledge gets reflected into international cooperative agreements -- but goes well beyond our chapter's mandate. It seems to me to really fall into a consideration of whether national targets -- individually and collectively -- are adequate. That is more of a chapter 4 issue.	Jan Fuglestedt	CICERO	Norway
76177	0				This is a well written chapter which contains much relevant and important material. I have some suggestions for more focus on a few issues, some coordination, as well as some more specific comments.	Noted	Jan Fuglestedt	CICERO	Norway
81077	0				Chapter 14 seems to be framed significantly in terms of false dichotomies. The Paris Agreement is framed largely as alternative, to be compared to the Kyoto Protocol - OK to some degree, though many aspects of the Paris Agreement would seem to imply that logically is more of a quarter-century update to the UNFCCC, fit for a more globalised and interlinked world with more globalised emissions and wealth. It is hard to see how something that substantially reduced the legal force of commitments from developed countries can be well described as a "successor" and it remains to be seen whether achieving the goals of the Paris Agreement will require the negotiating of Protocols that give outcome specificity and investability to national commitments, and/or structures adequate for investment in initially expensive sectoral transformations.	Noted. In the revised version we give more of a sense of continuity from Kyoto to Paris. Of course Paris is an agreement to add more specificity to the UNFCCC, which is what protocols often are, much like Kyoto. But the fact is that one such update ran out, and another was agreed on, so in that sense the latter was a successor. Many would describe an agreement that reduced the legal commitments from some countries in return for procedural commitments from other countries as a step forward. Others wouldn't. We deal with these issues in section 14.3.3.	Michael Grubb	UCL - Institute of Sustainable Resources	United Kingdom (of Great Britain and Northern Ireland)
81079	0				The second appearance of 'false dichotomy' is in the relationship between emissions progress/outcomes and innovation/transformation. These are plainly not alternatives, nor even separable – they are close complements. Innovation systems and transition theories are all clear that demand-pull, relative prices, and strategic expectations are important drivers of innovation – the idea that energy / low carbon innovation is driven mainly by R&D or other public investment is a myth – see Chapter 16. The Chapter I think is right that "transitions framing" has been historically weak in the international discourse and design, but it remains only one of the four core Analytic Frameworks outlined in Chapter 1, which argues that a major reason for inadequate progress to date has been the tendency of academics and discourses to focus on individual frameworks, rather than take an integrated view across them, and their complementary implications for policy.	Noted. We have updated the framing section to be more in line with chapter 1.	Michael Grubb	UCL - Institute of Sustainable Resources	United Kingdom (of Great Britain and Northern Ireland)
81081	0				On this point of complementarity between innovation and emission reduction incentives and targets, the econometric evidence is also unambiguous: targeted market interventions (like feed-in-tariffs), general energy and carbon prices all had measurable impacts on patents and cost reductions – the entry into force of the Kyoto Protocol also turns to have measurable impact on low carbon technology patenting (see the Systematic Review of Evidence on Induced Innovation: Grubb M., P.Drummond, A.Poncia, W.McDowall, D. Popp, S.Samadi, C.Penasco, K.Gillingham, S.Smolders, M. Glachant, G.Pavan, G.Hassel, E.Mizuno, E.Rubin, A. Dechezlepratre (2021). Induced innovation in energy technologies and systems a review of evidence and potential implications for CO2 mitigation, Environ. Res. Lett. https://doi.org/10.1088/1748-9326/abde07	Noted. This is all finding its way in to the new material on policy attribution. Not so much in this chapter, though we do note the effects of Kyoto more than in the SOD.	Michael Grubb	UCL - Institute of Sustainable Resources	United Kingdom (of Great Britain and Northern Ireland)
81083	0				On theme of trying to connect technical/numbers with policy and lessons (from my Entire Report comment MG23): to what extent is there connection between the trends in policy coverage covered in chapter 13, with the developments in the international climate regime? The coverage of climate legislation by 2007 seems quite focused on developed countries - to what extent may this be linked to UNFCCC leadership requirement and/or Kyoto Protocol and its entry into force in negotiations? If so say so. Is it right to say there was a surge of climate legislation associated the adoption (1997), rulebook (2001), national ratification, or entry-into-force (2005) of the Kyoto Protocol - followed by negotiations on "post-2012" regime that increased pressure globally at least until the difficult aftermath of the collapse of negotiations at Copenhagen? I know AR6 is intended to assess literature since AR5, but AR5 barely covered this - the literature on policy coverage has grown substantially, and also the apparent plateau in growth of climate in the 5-10 years until c. 2017 (when it expanded particularly in APC) suggests something significant about the impact of what happened in period when Annex I countries had mostly taken on binding commitments and were facing need to deliver on them, and widely expecting to continue having to do so. Only later did it become clear they would not be facing further legally binding commitments (timing depending on whether part of KP II). See also my text comment on literature around impact evaluation.	Noted. There were expetensive discussion of this, with the decision to place these ideas in Chapter 13, in terms of noting the international drivers for national climate policies.	Michael Grubb	UCL - Institute of Sustainable Resources	United Kingdom (of Great Britain and Northern Ireland)

Comment Id	From Page	From Line To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country	
70709	0				All the figures in the chapter are not easily readable due to their low resolution. Redrawing or enhancing resolution is required.	Accepted. They will all be improved.	Philippe Tulkens	European Union (EU) - DG Research & Innovation	Belgium
70711	0				Three implementation means of the PA, i.e. finance, tech. development and transfer, and capacity building are dealt with both in section 14.3 and 14.4, saying section 14.4 considers broader efforts under UNFCCC whereas section 14.3 focuses on efforts under the PA. However, I do not see clear distinction between 14.3 and 14.4 in terms of scope. If those three implementation means will remain separately in two sections, the rationale and distinction should be more clearly presented.	Noted. We have revised section 14.4 to better clarify that we are looking at attention throughout the UN and global regimes to the identified means of implementation described in Paris.	Philippe Tulkens	European Union (EU) - DG Research & Innovation	Belgium
70713	0				The chapter outline includes "implementing mitigation pathways" but it is not adequately touched upon in the chapter. Subsection 14.3.2.2 deals with a binding procedural obligation of the parties and simply mentions the emission gap to meet the temperature goals of the Paris Agreement. If literatures on how to bridge the gap is available and presented, it would strengthen the chapter.	Noted. We don't really see this as a chapter 14 issue. The literature on how to bridge the gap is all covered in the sectoral chapters of the report. We do not cover such issues in the required depth.	Philippe Tulkens	European Union (EU) - DG Research & Innovation	Belgium
70715	0				Considering "Transparency and accountability frameworks" is a key architectural feature of the Paris Agreement, which can increase ambitious cycle of the NDCs and facilitate meeting the goals, it will deserve more space and details.	Noted. We cover these in section 14.3.	Philippe Tulkens	European Union (EU) - DG Research & Innovation	Belgium
70717	0				"Science, Technology, and Innovation" is not listed in the chapter outline but presented in subsection 14.4.2. It introduces the role of science and technology and technology mechanism of the Paris Agreement. As one of implementation mean of the PA, technology subsection has its own value.	Noted. We interpret the comment to mean that no change is required.	Philippe Tulkens	European Union (EU) - DG Research & Innovation	Belgium
47191	0				some imprecise language, and especially on CDM presented as a basis for a new mechanism: it is not an accurate reflection of the Paris Agreement. There are no mention of ongoing negotiations.	Accepted. We have changed the text that had described the CDM as the basis for the SDM. In terms of ongoing negotiations, it is not our primary task to report on ongoing political developments, but rather to assess the science with respect to past ones.	Stuart Minchin	The Pacific Community	Australia
11973	0				The global pandemic is conspicuously absent in this chapter. Is there scope to reflect on the implications of COVID-19 (even in very tentative terms) for international cooperation on climate change? Perhaps including prospects for a more integrated perspective on human health and wellbeing and climate change/environmental degradation?	Noted. We have included the current literature that is available on this issue, and referred to this in a few places. It comes up far more prominently in Chapter 13, which considers e.g. national infrastructure plans.	Tom Pegrum	University College London	United Kingdom (of Great Britain and Northern Ireland)
52717	1	1	128	1	An issue that may be raised with the analysis is that it treats states as unitary actors in assessing compliance with international agreements. Often, changes in domestic setup causes a state to reposition itself in the international arena. How can subnational cooperation address such changes, such as retrenchment against green policies as described by Leah Stokes' Short-circuiting Policy (2020)? This comment also related to table 14.1 on pp14-15, where domestic retrenchment may be added as barriers to mitigation under the path dependency frame.	Noted. This is an interesting point, but one that falls within the scope of chapter 13, not here.	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia
52763	1	1	129	1	A question that rises from this analysis is how executive orders vs. national legislation play into achieving strong cooperation among actors in the international arena.	Noted. We don't know of any literature on this. Clearly different countries have different legal systems, and executive orders in one country could have the legal force of legislation coming out of parliament in another. This is an issue for chapter 13 rather than here.	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia
52777	1	1	128	1	Most economics and politics literature on international cooperation assume either of the two following environments: cooperative or noncooperative bargaining environment. These two setups reflect on various arguments throughout the document. It should be discussed how the assumptions of the two differ etc. at the beginning.	Noted. Issues of game theory in international cooperation come up somewhat in our section on Climate Clubs, and to a large extent have been covered in past assessment reports. We focus here on newer developments, such as framing international cooperation from a global commons perspective (which is strongly influenced by game theory) versus a transitions perspective (in which game theory does not play a role).	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia
52791	1	1	129	1	The resolution of figures and tables are occasionally too low.	Noted. They will be improved.	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia
52829	1	1	129	1	The discussions in 14.4.x and 14.5.x seem to be divorced from the path-dependency/public goods framework presented at the beginning in analyzing patterns of cooperation. The synthesis section later does not remedy this point, either.	Noted. Where the frameworks come up is in evaluating the strengths and weaknesses of different approaches. This does come up, for example, in describing the importance of sectoral agreements. The synthesis section now does return somewhat to our frameworks.	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia
83561	1	1	129	1	This chapter includes some of the most interesting, balanced and clear presentation of evidence that I have so far read in the WG3 SOD. I want to congratulate the author team for having done an excellent job, and good luck with finalising it for the FGD.	Noted and appreciated.	Joeri Rogelj	Imperial College London	United Kingdom (of Great Britain and Northern Ireland)
5569	1	1	129	30	Interesting chapter, mostly dedicated to international cooperation on Renewable energies and centered on wind and solar. I think there is place to give more information on other energies cooperation : Hydraulics, dam construction (technics and financing), and nuclear development, (for example between France and China with Taishan, France and U.K, South Korea and Emirates, etc... I have seen the word nuclear only once about IAEA (which is not an organism in charge of the promotion of nuclear, as mentioned). It's a safeguard organism.	We don't understand the comment. We devote very little space to international cooperation on renewable energy.	Michel SIMON	Retraité/ Pdt d'association	France
52715	1			150	While the report asserts to utilize recent insights from "social science theory" (p7, l 12), some major theories that guide this research in POLS/IR are omitted in analysis. For instance, the literature on rational design of international institutions (see Snidal and Koremenos 2001 (IO special issue) for starters) could help bridge some of the arguments within this report, with a specific focus on incentive compatible mechanisms. Similarly, effective design of "punishments" in international cooperation (see, for instance, Svobik 2006 - Svobik, Milan. "Lies, defection, and the pattern of international cooperation." American Journal of Political Science 50, no. 4 (2006): 909-925.) can inform much of the discussion presented in this report. Also, literature with more recent and relevant empirical content than what Olmstead and Stavins (2012) review may be of help to the report. Finally, the literature on the informative role of agreements (as opposed to their institutional roles) could substantially contribute to this report. One caveat is that many of these studies are more general and abstract, and do not necessarily focus on environmental/climate governance.	Rejected. All of these issues were covered quite extensively in AR5. We have attempted to be less textbooky on these issues, and to limit our presentation of theory to more recent developments.	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
52719	1		111		the nuts and bolts of cooperation are missing.	Noted. We are not sure what the commenter is referring to in terms of "nuts and bolts."	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia
3989	1		129		The text is very clear, complete and objective. It brings, in my understanding, fundamentally all the information pertinent to the treated subject. The section is very well written and the authors were very responsible and assertive in dealing with the subject in question. For these reasons I have nothing significant to add as I understand that the topic is being treated very clearly and completely. The authors are to be congratulated for the excellent work.	Accepted!	FABIO RUBENS SOARES	USP - Universidade de São Paulo	Brazil
29485	1	1	37	34	Conditional and unconditional NDCs are not categories under the Paris Agreement and it has no clear meaning. Rather, NDCs have conditional and unconditional targets/commitments in them(Other places this is correctly referred to as conditional/unconditional commitments). The text should be looked over to reflect this correctly.	Thank you. We have made this change.	Government of Norway	Norwegian Environment Agency	Norway
12617	1	18	1	18	Suggest clarifying that the PA has a different legal architecture than the KP. KP targets were determined through nationally determined pledges.	Agreed. We have updated the section accordingly.	Jennifer Allan	Cardiff University	United Kingdom (of Great Britain and Northern Ireland)
12615	1	23	1	23	Please indicate that the Paris Agreement is expected to lead to greater ambition. The ratchet up mechanism has yet to operate to show results	Agreed. We have incorporated these points into the final draft.	Jennifer Allan	Cardiff University	United Kingdom (of Great Britain and Northern Ireland)
51799	2	34	27	35	The conclusion here is interesting, given that >50 countries are already implementing REDD+ in its current form. How are they doing this impossible thing? Suggest to delete the sentence.	Could not find the text this relates to?	Florin Vladu	UNFCCC Secretariat	Germany
67565	2	1	82	31	By not addressing the recent, growing literature on international cooperation on supply-side policies, I find that the chapter makes a serious omission. The subject is touched briefly upon in Ch 13 (box 13.13) from a unilateral perspective; however, much of the literature discusses clubs as well as its relation to the global (Paris Agreement) process. Some recommended references: CLUBS: Asheim, G.B., T. Fæhn, K. Nyborg, M. Greaker, C. Hagem, B. Harstad, M. O. Hoel, D. Lund and K.E. Rosendahl (2019): The case for a supply-side climate treaty, Science 365 (6451), 325-327; Collier, P. and A.J. Venables (2014): Closing coal: Economic and moral incentives. Oxford Review of Economic Policy 30(3): 492–512. Newell, P. and A. Simms (2019): Towards a fossil fuel non-proliferation treaty. Climate Policy. DOI: 10.1080/14693062.2019.1636759; GLOBAL AGREEMENT: Piggot, G., P. Erickson, H. van Asselt, et al. (2018): Swimming upstream: addressing fossil fuel supply under the UNFCCC. Climate Policy 18(9): 1189–1202.	Accepted. We have included new material on supply side agreements, both within the framing section and the section on energy-sector agreements.	Taran Fæhn	Statistics Norway, Research Dep.	Norway
65601	2	20	2	20	Spell out the acronyms SRM and CDR	Done	Mônica M. C. Muelbert	UNIFESP	Brazil
7673	2		2		The chapter would benefit from a list of acronyms (I am not sure if a single list of acronyms is included for all the chapters of the report).	Noted. This is not up to the chapter authors, but a wider IPCC issue.	Pablo Moreno	International Monetary Fund	United States of America
14541	3	1	84	10	The authors are to be congratulated on this extensive piece of work. I have three outstanding overarching comments. (1) While the chapter rightly focuses on the Paris Agreement, in places this comes at the detriment of a more rounded and comprehensive assessment of the international regime and its performance over the past few decades. The chapter is in danger of giving the impression that real international cooperation on climate change only began with the PA, when in fact we have nearly 30 years of experience with the UNFCCC regime to consider (this is noted in 14.3.1, which is welcome, but then seems to get lost). In this regard, I miss a simple statement that international cooperation on climate change over the past 30 years has been insufficient. This is not a controversial statement, and can be referenced with Kinley et al 2020, and Stoddard et al (2021) Three decades of climate mitigation: why haven't we bent the global emissions curve? Annual Review of Environment and Resources, Volume 46. In press. doi: 10.1146/annurev-environ-012220-011104). Such a statement could appear upfront in the Executive Summary (p.4, In 8); accompanied by an additional paragraph in section 14.3.3; and/or at the head of 14.6.2 (synthesis). (2) I repeat my FOD comment that too much effort is expended on comparing and contrasting the KP and the PA. Figure 14.1 and Table 14.4 are dedicated to this. Of course it is important to highlight the differences, but there are also many continuities, including with the UNFCCC. Transparency provisions, financial arrangements, institutions, market mechanisms, capacity building - all have built up on past achievements (and shortcomings) in both the UNFCCC, KP and COP decisions. Plus I am sure the authors will agree with me that, politically, the PA would not have been possible without the KP (and Copenhagen and Cancun) coming before it (Sebastian Oberthür & Lisanne Groen (2020) Hardening and softening of multilateral climate governance towards the Paris Agreement, Journal of Environmental Policy & Planning, 22:6, 801-813, DOI: 10.1080/1523908X.2020.1832882). We don't need to go into great detail, but there is a real danger in setting up the PA and KP as competitors, when in fact we are talking about a regime that has evolved and learned over time. (3) There is a missed opportunity to assess the Kyoto Protocol's effectiveness. The chapter at present focuses on the PA's potential effectiveness, which is a critical, but necessarily speculative. The KP, however, could usefully be assessed for its effectiveness "ex post", given that its implementation was ongoing arguably since 2001. There are a few mentions of the KP in the section assessing the PA, but these are limited, and all in comparison to the PA. There is only one reference to the KP's environmental effectiveness (Almer and Winkler, 2017), whereas there are several more in the	Accepted. We now include an assessment of the literature on the effects of Kyoto. We also attempt to reframe the description of the UNFCCC more in terms of continuity. Among other things, we have removed what was Figure 14.1, which contrasted the two. In terms of a statement that international cooperation has been inadequate: we really do attempt to draw this idea in as well as possible in our overall assessment, but such a statement – we think – is overly simplistic. Emissions curves do appear to have bent in most of the countries with Kyoto commitments, something that is now noted in this chapter and elsewhere in the report. Chapter 4 shows clearly that this is not enough.	Joanna Depledge	Centre for Environment, Energy and Natural Resource Governance (CEENRG), University of Cambridge	United Kingdom (of Great Britain and Northern Ireland)
82545	3	1	3	3	Recommend including a citation to this cities-specific nonstate actor point and also including an example. While transnational city networks have bolstered the number of targets and commitments cities have made, e.g. on NAZCA, there is not much academic literature on the cause-effect relationship between such networks, targets and concrete low carbon tech adoption and emissions reductions. Sentence in reference: "Cooperation is occurring at multiple governance levels, including cities, with trans-national partnerships and alliances involving non-state and sub-state actors playing a growing role in stimulating low-carbon technology diffusion and emissions reductions."	Accepted. We have expanded on the section looking at cities, including a reference on their effectiveness in driving emissions reductions. The executive summary points to this.	Constable Kerry	Oxford University School of Geography	United States of America

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
12109	3	1	4	28	The Cross-Working Group Box 4: Solar Radiation Modification contains some important matters for consideration by the international community, not least among many of the processes, agreements, approaches and clusters of actors described in the Chapter. It therefore seems inappropriate that there is no reference to the analysis in the Box here in the Executive Summary.	Accepted. We have included a point on SRM.	Paul Rouse	Carnegie Climate Governance Initiative (C2G) - The Carnegie Council for Ethics and International Affairs	United Kingdom (of Great Britain and Northern Ireland)
19807	3	8	3	12	Reword "International ... agreement" as follows: "International cooperation through public climate finance or international carbon markets helps countries achieve long-term mitigation targets through development and diffusion of low carbon technologies, often at the level of individual sectors, which can simultaneously lead to significant benefits in the areas of sustainable development and equity (medium evidence, medium agreement)". Reason: term "believe" is generating doubts. Moreover, the key means of international cooperation need mentioned in the Executive Summary.	Accepted. We have changed the wording.	Axel Michaelowa	University of Zurich	Switzerland
19489	3	8	3	8	An expression like "is not believed to be" is unclear. It may mean that the assessment concludes that it is, or that the assessment concludes that there is a belief in actors minds that it is. Please clarify.	Accepted. We have changed the wording.	Markku Rummukainen	Lund University	Sweden
63297	3	9	3	9	We recommend changing the formulation to "when it directly and indirectly supports", or delete "directly": it doesn't matter whether the support is direct (e.g. providing) or indirect (e.g. mobilizing, incentivizing, etc) so long as the support gets there. See also comment 15 above.	Accepted. We have removed the word.	Government of Canada	Environment and Climate Change Canada	Canada
85983	3	16	3	16	Suggest rephrasing to correct inaccuracies, current drafting reads as if the Paris Agreement itself has been finalised. Proposed text: 'International cooperation under the UN climate regime has taken an important new direction with the entry into force of the 2015 Paris Agreement.'	Accepted. We have changed the wording.	Government of Australia	Department of Industry, Science, Energy and Resources	Australia
19491	3	17	3	17	The use of "but" could express a negative sentiment, that this is a "bad" development. Is this a result of the assessment or should the wording here reflect the fact. In the latter case, perhaps "...goal. A different architecture was agreed in the Paris Agreement..."	Accepted. We have reworded this.	Markku Rummukainen	Lund University	Sweden
63299	3	19	3	24	These two sentences, when read together, imply that commitments under the Paris Agreement do *not* have common metrics. This is incorrect. The NDC accounting guidance in decision 4/CMA.1 (Annex II, para 1), and the transparency guidelines in 18/CMA.1, require Parties to use common metrics in their national inventories and NDC accounting.	Accepted. We have removed "common metrics."	Government of Canada	Environment and Climate Change Canada	Canada
19493	3	21	3	24	It would seem off-base to state that the commitments in the Paris Agreement are procedural as they do give the basis for commitments and mechanisms for increasing ambition and assessment. The commitments also have a legal force. A "by contrast" is furthermore an expression that may be too specific, as the comparison of the two legal instruments would seem to be limited to the emission targets aspect. The agreements are broader than that.	Accepted. We have added the word "primarily" before "procedural."	Markku Rummukainen	Lund University	Sweden
19495	3	25	3	26	This is unclear whether the authors intend to say that the consideration of CBDR has evolved in a "good" direction or a "bad" direction, between the KP and the PA. The meaning here is a bit elusive and should be clarified. Also, reference should reasonably also be made to "Respective Capabilities", not only CBDR.	Noted: we are ambivalent with respect to the first point. We have added RC to the CBDR.	Markku Rummukainen	Lund University	Sweden
85985	3	27	3	38	Suggest update to correct inaccuracies. The Paris Agreement NDC process is built on the 5 year set and review cycle in line with the Global Stocktake, a mechanism that is entirely ignored in this paragraph: "The strongest critique of the Paris Agreement is that it lacks a mechanism to review the adequacy of individual Parties' Nationally Determined Contributions (NDCs), and that collectively current NDCs are inconsistent in their level of ambition with achieving the Paris Agreement's temperature goal (robust evidence, high agreement). These are met with counter arguments, either suggesting that the incentives created under the Paris Agreement are insufficient to lead to the necessary changes, or that these changes will not occur in time (medium evidence, medium agreement). The extent to which countries increase the ambition of and effectively implement their NDCs will depend in part on the successful implementation of the support mechanisms in the Paris Agreement, and in turn will determine whether the goals of the Paris Agreement are met. (14.3, 14.4)"	Accepted. We have rewritten this text.	Government of Australia	Department of Industry, Science, Energy and Resources	Australia
19497	3	27	3	36	What is the substantive basis of the "views" and whose views are referred to here - what is put forward in the scientific literature or said by different actors. A firm assessment of how well the PA will work would seem to require a longer period to see than what has been available to assess in the literature by the WGIII literature cut-off dates. Just to say state different arguments would seem to be a thin basis to make such statements, not least in an Executive Summary as here. Also, the "adequacy" of individual countries NDCs would seem to be rather difficult to judge based on objective grounds. Writing about adequacy here risks being prescriptive.	Accepted. We have noted that the different views are in part grounded in different theories of change and respective framings.	Markku Rummukainen	Lund University	Sweden

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
60359	3	27	3	38	This paragraph (or a new one) could include what the Paris Agreement has achieved so far (not only if it will achieve its own goals). (1) It has incentivised a set of new national pledges. The temperature increase expected from action and pledges by targets has decreased over the last 10 years, an effect that could be attributed to the Paris Agreement (Climate Action Tracker https://climateactiontracker.org/publications/global-update-paris-agreement-turning-point/ , grey literature). Our temperature estimate for "pledges and targets", which include the NDCs under the Paris Agreement, has decreased from 3.5°C (estimated in 2012) to 2.6°C (estimated in 2020). (2) It established and mainstreamed the net zero goal, which transforms actor behaviour: The Paris Agreement includes the goal of net zero greenhouse gas emissions. This goal has now translated into targets of a variety of actors. 127 countries consider or have adopted the goal covering two thirds of GHG emissions (https://climateactiontracker.org/publications/global-update-paris-agreement-turning-point/). The number of regions, cities and businesses with such a goal has doubled in a year (https://newclimate.org/2020/10/22/navigating-the-nuances-of-net-zero-targets/). Without the Paris Agreement this would not have happened. It has transformed the common understanding on how to tackle climate change.	Accepted. We have included the idea that it may have already led to change.	Niklas Höhne	NewClimate Institute	Germany
46301	3	28	3	31	The gap between NDCs and the NDCs' actual implementation should be mentioned as a concern as cited for example in Chapter 4 Cross Chapter Box 3 (page 21 lines 34-38) in the analysis of emerging literature on current policies and NDC commitments.	Accepted. We now include this concern.	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany
58303	3	29	3	29	Nationally Determined Contributions is lower cased in the Paris Agreement.	Accepted. We have changed this.	Government of United States of America	U.S. Department of State	United States of America
19499	3	39	3	42	The "is intended" and "however" is difficult to interpret here. As the writing now stands, the idea that comes across is that the Paris Agreement is flawed, which would seem to be a strange (or at least premature) conclusion. The NDCs, for example are an instrument that adds value also nationally.	Noted. We have deleted this text so the comment is moot.	Markku Rummukainen	Lund University	Sweden
70719	3	39	3	42	This point is an "also", not a "however" - Paris and sectoral/ regional/ national action are complementary	Accepted. We have reworded.	Philippe Tulkens	European Union (EU) - DG Research & Innovation	Belgium
11975	3	41	3	42	Suggestions to add: "...in particular regions, sectors and industries, types of emissions, and at the sub- AND TRANSNATIONAL level!"	Accepted. We have included this.	Tom Pegram	University College London	United Kingdom (of Great Britain and Northern Ireland)
58305	3	43	3	43	Are the quotes around "climate clubs" necessary? Quotes are not used elsewhere in Chapter 14.	Accepted. We have removed the quotes.	Government of United States of America	U.S. Department of State	United States of America
347	3	46	3	46	It is not clear why only release of mercury is reported. Usually mercury is included in the broader category of POPs (persistent air pollutants).	Noted. The reason is that decreasing mercury pollution in turn leads to a decrease in the use of coal, and hence lower CO2.	Sandro Fuzzi	ISAC CNR	Italy
86271	3	46	3	47	SO2 has also been reduced to limit transboundary pollution which lead to a warmin. Maybe the sentence is a bit naive, there are co-benefits but also side effects wich can not be ignored.	Noted. Reducing SO2 has been associated with a shift from coal to gas, which in turn lowers CO2 emissions.	Sophie Szopa	LSCE	France
19805	4	2	4	3	Replace "...playing ... emissions reductions" by "achieving mixed results in term of effectiveness". Reason: The empirical literature on effectiveness of trans-national partnerships and alliances involving non-state and sub-state actors finds a rather low effectiveness.	Rejected. There are conflicting results on this, with the balance suggesting some results. We use medium confidence to describe this.	Axel Michaelowa	University of Zurich	Switzerland
18517	4	8	4	10	This is an essential point and I'd move this whole paragraph to sit early on p3	Accepted. We have moved it to the beginning.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)
14543	4	8	4	15	(1) I am not convinced that the evidence provided in chapter 14 supports the finding that international cooperation "is proving effective". Some nuance or caveat is needed, eg "is starting to prove effective", "shows signs of becoming effective", "is making progress towards effectiveness", or "has been effective in some ways". This should be coupled with an acknowledgement that international cooperation has made insufficient progress over the past 3 decades (see overarching comment above, suggesting two references for this), (2) Some limited environmental effectiveness is demonstrated here by reference to the AFOLU and non-CO2 sectors. However, there are other positive indicators. These include the important finding in SPM B2, to the effect that "a growing number of countries have entered a period of sustained GHG emission reductions in the absence of economic crisis", a point further elaborated in B2.4. Another important metric is the spread of climate legislation, targets and strategies, as documented in chapter 13. B5 finds that "there has been a substantial growth in climate policy and corresponding institutional arrangements at national and sub-national level". Chapter 13 provides evidence that this is linked to "international negotiation events" (KP entry into force, run-up to CPN, PA adoption). These provide important evidence of emerging environmental effectiveness of the climate regime.	Accepted. We have substantially revised the chapter in order to provide the evidence base to support this statement.	Joanna Depledge	Centre for Environment, Energy and Natural Resource Governance (CEENRG), University of Cambridge	United Kingdom (of Great Britain and Northern Ireland)

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
80227	4	11	4	18	<p>First order draft said: "In some areas, such as reducing non-CO2 emissions from the AFOLU sector or promoting and managing technologies for negative emissions and solar radiation modification, international cooperation is currently having little to no effect (robust evidence, high agreement)."</p> <p>Second order draft has no more explicit mention of SRM: "In relation to environmental effectiveness, while overall greenhouse gases (GHGs) have continued to rise through at least 2018, there are some areas where international cooperation has already had an effect, such as reducing many countries' CO2 emissions from the AFOLU sector, as well as emissions of some non-CO2 greenhouse gases (medium evidence, medium agreement). In other areas where effectiveness can be assessed – transformative potential, distributive outcomes, economic performance, and institutional strength – international cooperation is having a positive effect, but one that is as yet too weak to achieve the objectives of the Paris Agreement (medium evidence, medium agreement)."</p> <p>COMMENT We recommend specifying that international cooperation is emerging in the area of SRM.</p> <p>There are indications of emerging international cooperation with respect to Solar Radiation Management. In November 2019, the Scientific Assessment Panel of the Montreal Protocol passed a decision to include "An assessment of information and research related to solar radiation management and its potential effect on the stratospheric ozone layer" in the Terms of Reference for the 2022 Ozone Assessment. This was approved by nearly all parties, including the United States.</p> <p>• United Nations Environment Programme (2019), Thirty-first Meeting of the Parties to the Montreal Protocol on Substances That Deplete the Ozone Layer, "Potential areas of focus for the 2022 quadrennial assessment reports of the Scientific Assessment Panel, the Environmental Effects Assessment Panel and the Technology and Economic Assessment Panel," UNEP/OzL.Pro.31/CRP.12, http://conf.montreal-protocol.org/meeting/mop/mop-31/crp/English/MOP-31-CRP12.En.docx</p>	Accepted. We now note SRM in the executive summary.	Kelly Wanser	SilverLining	United States of America
58307	4	14	4	14	AFOLU needs to be defined here at first instance instead of below on page 14.	Accepted. We have reworded.	Government of United States of America	U.S. Department of State	United States of America
19809	4	15	4	15	<p>Insert after "... medium agreement": "The Kyoto Protocol is found to have effectively reduced emissions compared to a business as usual scenario (high evidence, high agreement)"</p> <p>Reason: There is relevant literature new since AR5 or not cited there showing effectiveness of the Kyoto Protocol including Kim Y, Tanaka K, Matsuoka S (2020) Environmental and economic effectiveness of the Kyoto Protocol. PLoS ONE 15(7): e0236299.; Maamoun, N. (2019). The Kyoto protocol: Empirical evidence of a hidden success. Journal of Environmental Economics and Management, 95, 227-256; Miyamoto, M., & Takeuchi, K. (2019). Climate agreement and technology diffusion: Impact of the Kyoto Protocol on international patent applications for renewable energy technologies. Energy Policy, 129, 1331-1338; Grunewald, N. and I. Martinez-Zarzoso (2016), Did the Kyoto Protocol fail? An evaluation of the effect of the Kyoto Protocol on CO2 emissions, Environment and Development Economics 21, 1-22; Aichele, R. and Felbermayr, G. (2013), The Effect of the Kyoto Protocol on Carbon Emissions. J. Pol. Anal. Manage., 32: 731–757. Only one article (Almer, C., & Winkler, R. (2017). Analyzing the effectiveness of international environmental policies: The case of the Kyoto Protocol. Journal of Environmental Economics and Management, 82, 125-151) finds low effectiveness..</p>	Accepted. We have now included this literature in the chapter and pull this finding into the executive summary.	Axel Michaelowa	University of Zurich	Switzerland
85987	4	19	4	22	Suggest changes seek to improve accuracy of sentence, that some NDCs have components which are conditional, and it is these that are sometimes tied to support, as follows: "A large number of developing countries NDCs have components or additional actions that are contingent on receiving assistance with respect to finance, technology development and transfer, and capacity building."	Accepted. Nice suggestion, which we have used.	Government of Australia	Department of Industry, Science, Energy and Resources	Australia
70721	4	19	22	4	At the beginning of the sentence add: "While the Paris Agreement does not foresee conditionality for actions in developing countries" and then continue "a large number of developing countries' NDCs are contingent on receiving assistance with respect to finance, technology development and transfer, and capacity-building, to an extent greater than what has been provided to date". The substantive point is that the Paris Agreement strikes a fine balance across many areas including mitigation, adaptation and "means of implementation" (finance, capacity building and technology transfer). The support foreseen under the Paris Agreement is the subject of its articles 9-11, not the resource requirements written by countries unilaterally in their NDC submissions.	Noted. We make this point, with a reference, in the main text (14.4.1), and yet it is not of central enough importance to make it into the executive summary.	Philippe Tulkens	European Union (EU) - DG Research & Innovation	Belgium
14545	4	20	4	20	"contingent" should probably read "conditional"	Accepted. The two words mean basically the same thing, but there's no reason not to use conditional.	Joanna Depledge	Centre for Environment, Energy and Natural Resource Governance (CEENRG), University of Cambridge	United Kingdom (of Great Britain and Northern Ireland)
27923	4	21	4	21	After "capacity building", replace "to an extent greater" with "that should increase substantially".	Rejected. We understand the point., and yet the phrasing that you suggest is policy prescriptive.	Eleni Kaditi	Organization of the Petroleum Exporting Countries, OPEC	Austria
85399	4	22	4	22	Sectoral and sub-global cooperation is providing critical support, and yet there is room for further progress. In some cases, notably with respect to aviation and shipping, sectoral agreements have adopted climate mitigation goals that require more ambitions to contribute to fall far short of what would be required to achieve the temperature goal of the Paris Agreement. Moreover, there are cases where international cooperation may be hindering mitigation efforts, with evidence that trade and investment agreements, as well as agreements within the energy sector, impede national mitigation efforts.	Noted. We make all of these points in the executive summary.	Neil Dickson	ICAO	Canada

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
52721	4	25	4	28	Various forms of international cooperation underpin the current regime. Being specific about what types of international cooperation "may be hindering mitigating efforts" would give a more precise summary of the following discussion in the chapter.	Accepted. We have replaced the word "with" with "namely" in ordewrt to be more specific.	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia
27925	4	27	4	27	After "mitigation efforts", add "while there is a need for reliable and affordable access to modern energy for achieving the SDGs in developing countries".	Noted. Such a statement goes beyond the mandate of our chapter. It is something covered strongly in chapters 4 and 17.	Eleni Kaditi	Organization of the Petroleum Exporting Countries, OPEC	Austria
47593	5	3	5	3	Such cooperation includes multilateral global cooperative agreements between amongst nation states - bilateral is between	Accepted.	Deshni Nadar	Environmental Consultant	Qatar
70723	5	8			While Ch.13 uses 'subnational', Ch.14 uses both 'sub-national' and 'sub-state'. Intra-chapter and cross-chapter consistency of terminology is requested.	Accepted. Changed sub-state to sub-national.	Philippe Tulkens	European Union (EU) - DG Research & Innovation	Belgium
47595	5	9	5	11	By definition of the EU - cooperation within the Union would not be considered 'international' but 'regional'	Accepted. Deleted 'international'	Deshni Nadar	Environmental Consultant	Qatar
70725	5	9	5	11	Ch.13 does not adequately cover international cooperation within the EU. Ch. 13 and 14 should discuss further each other how much of international cooperation within the EU would be covered by which chapter.	This is within the scope of Chapter 13.	Philippe Tulkens	European Union (EU) - DG Research & Innovation	Belgium
52723	5	20	5	20	form -- forms	Accepted.	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia
70727	5	21	5	33	The Paris Agreement may not resemble the Kyoto Protocol, but it is not correct to suggest it is not oriented towards target-setting and monitoring. NDCs must meet certain criteria set out in Article 4, while Article 13 establishes an Enhanced Transparency Framework with biennial reporting for all Parties.	Accepted. Language finessed	Philippe Tulkens	European Union (EU) - DG Research & Innovation	Belgium
52725	5	23	5	23	what does "this" exactly refer to?	Accepted. Clarified.	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia
14547	5	23	5	24	(1) Given that the UNFCCC is a framework convention, it seems a bit odd to describe the PA as setting an overall framework under it. I would rephrase to: "... which now sets the overall approach for..." (2) I don't agree that the PA "fundamentally reshapes the intention" of international cooperation on climate - the same ultimate objective, and exactly the same principles, apply to all treaties. I would therefore delete "fundamentally" and "intention and"	Accepted.	Joanna Depledge	Centre for Environment, Energy and Natural Resource Governance (CENNRG), University of Cambridge	United Kingdom (of Great Britain and Northern Ireland)
46303	5	24		28	This sentence could be read as implying that the Paris Agreement is not intended towards setting individual targets by each party. Although the parties not being obliged to achieve their NDCs, they are from a procedural perspective nevertheless obliged to set an individual target within their NDC (and being it only to mention mitigation related measures).	Accepted. Language finessed	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany
52727	5	33	5	33	What does "synthetic" exactly mean here?	Accepted. Language changed.	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia
47597	5	36	5	36	global 'common' problem	Rejected. Usage of 'commons' here is correct.	Deshni Nadar	Environmental Consultant	Qatar
65603	5	2	5	2	Consider including land since the chapter barely addresses marine and coastal (Ocean and cryosphere) related issues.	Noted. We address land-related issues in sections on the AFOLU sector.	Mônica M. C. Muelbert	UNFESP	Brazil
65605	5	2	5	33	International cooperation is very important under Climate Change but this chapter, as the Report draft as a whole, does not integrate very well the three Special Reports in the Sixth Assessment (AR6) as well as IPBES thus lacking connection/construction. The aspects of international cooperation regarding marine ecosystems (and their services), drivers, extreme events and their impact on the land component have not been integrated to the main points in this chapter. The role of marine and coastal environments in food security, services and coastal development also represent important aspects of climate change acessment since AR5 and are important in mitigating climate change. There is very litte connection with biodiversity aspects under the international scene, particularly in regards to marine and costal areas as well as integration with the actions and goals for the UN Decade of Ocean Science for Sustainable Development. The UN is a big stakeholder on Global and Climate Change in the international scenario.	Noted. We highlight overlaps with the CBD. Issues associated with climate impacts and extreme events on ecosystem services are more appropriately addressed in WG2, as they are rarely directly relevant for issues of mitigation.	Mônica M. C. Muelbert	UNFESP	Brazil
82899	5	23	5	23	I thought the chapter underplayed UNFCCC activities other than Paris. Long-term temperature goal, second periodic dialogue etc. Katowice committee of experts on "just transition", standing committee on finance, SBSTA, SBI etc etc.	Accepted. We have expanded treatment of UNFCCC things outside of the Paris Agreement, most notably an assessment of the effectiveness of the Kyoto Protocol. We have also expanded a Table to highlight key features of the UNFCCC to illustrate continuities and differences between the treaties. As for UNFCCC processes, SBI, SBSTA etc, there is no literature on these. We would merely be paraphrasing what is on the UNFCCC website, we didn't think this would be useful.	Jim Skea	Imperial College London	United Kingdom (of Great Britain and Northern Ireland)
58309	6	1	6	1	Insert "as well" following "do"	Rejected. We prefer "do and" - punchier.	Government of United States of America	U.S. Department of State	United States of America
15301	6	14	6	20	Misrepresentation. The Paris agreement was not driven by the need to get developing countries to reduce emissions because they were not doing so. The NAMAs submitted by developing countries at COP18 are mitigation commitments. Therefore, it is suggested to delete the misrepresentation in Line17 "engage developing countries in emissions reductions,".	Accepted. Clarified.	Government of China	China Meteorological Administration	China
12619	6	14	6	20	The Paris Agreement is not a wholly new approach. It uses existing institutions. It uses the Copenhagen/Cancun pledge & review system. The text for article 6.4 is cut and pasted from the Kyoto Protocol (which also was a pledging system). The performance of these institutions thus far can give important clues about whether the PA will be effective. This section (14.1.2.1) overstates the "newness" of the PA (see Allan 2019, Dangerous Incrementalism of the Paris Agreement)	Accepted. Language nuanced to mute the suggestion of 'newness'	Jennifer Allan	Cardiff University	United Kingdom (of Great Britain and Northern Ireland)

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
9211	6	14	6	20	This description is wrong. The Paris Agreement is not driven by the fact that developing countries do not reduce emissions and require developing countries to reduce emissions. NAMAs submitted by COP18 developing countries are mitigation commitments. It is recommended to delete the underlined part: This new approach, as discussed below (Section 14.3.1.1), is driven by the need to engage developing countries in emissions reductions, extend mitigation commitments to those developed countries that had rejected or withdrawn from the Kyoto Protocol, and to respond to the rapidly changing geopolitical context (Section 14.3.1.2).	Accepted. Clarified.	Yongxiang Zhang	National Climate Center	China
8261	6	15	6	20	Please mention the legal binding/non binding aspect of the Paris Agreement and what UN could enforce and not. This would support the readers ability to assess how successful the agreement is and why	These aspects have been discussed at length in 14.3.	Frida Zahlander	DanChurchAid	Denmark
46305	6	21	6	41	Please also refer to the earlier stated positive interaction of reaching SDGs and mitigation by adding "Failures to address the sustainable development agenda, especially goals concerning equity and justice also have an effect on national mitigation efforts" or a similar message. Rationale: In chapter 1, page 4, not only the importance of mitigation in order to achieve the SDGs is described, but also vice versa: Failures to address the SDGs may also have a negative impact to achieve climate goals (see also ch14, p.21 line 7-9). Consider to refer directly to 2030 Agenda stating "Climate change is one of the greatest challenges of our time and its adverse impacts undermine the ability of all countries to achieve sustainable development." to strengthen the message of this paragraph.	Accepted. Brief sentence added.	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany
58311	6	22	6	23	Plural vs singular verbs needs to be consistent in this sentence -- i.e., "exacerbate", "accentuates", and "worsens"	Accepted. Corrected. Thanks.	Government of United States of America	U.S. Department of State	United States of America
47599	6	26	6	26	which offer 'an' aspirational narrative	Accepted. Corrected. Thanks.	Deshni Nadar	Environmental Consultant	Qatar
52729	6	26	6	26	"an aspirational" instead of a "aspirational"	Accepted. Corrected. Thanks.	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia
47601	6	29	6	31	Sentence not understandable in context and do we want to elude to logic and belief given that we have hard evidence of the link between environment, economy and society. Recommend rephrasing sentence or omitting all together.	Accepted. Corrected. Thanks.	Deshni Nadar	Environmental Consultant	Qatar
52731	6	29	6	30	Their/them possibly refer to all 17 SDGs? A clarification would facilitate correct interpretation of the sentence. (you may carry the comment for later uses of they/them/this in the paragraph.	Accepted. Corrected. Thanks.	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia
58313	6	33	6	33	Is it accurate to say that the Paris Agreement and SDGs are "inextricably linked"?	Accepted. Changed to 'closely'.	Government of United States of America	U.S. Department of State	United States of America
65607	6	42	6	42	SROCC in not the "Oceans Report" it is IPCC Special Report on the Ocean and Cryosphere in a Changing Climate, so include Oceans AND Cryosphere on your section title. It should read "14.1.2.3 IPCC Special Reports	Accepted. Changed. Thanks.	Mônica M. C. Muelbert	UNFESP	Brazil
70731	6	42	6	42	Ocean in its singular form. SROCC is the Special Report on the Ocean and Cryosphere in a Changing Climate. And ocean is in its singular form.	Accepted. Changed. Thanks.	Philippe Tulkens	European Union (EU) - DG Research & Innovation	Belgium
70729	6	13			Another noteworthy development is Sendai Framework for Disaster Risk Reduction, which is inextricably linked with loss and damage and SD. Hence, introduction of Sendai Framework would be beneficial.	Noted. We see this as far more closely linked to issues of vulnerability and adaptation, which are WG2 terrain.	Philippe Tulkens	European Union (EU) - DG Research & Innovation	Belgium
22475	7	11	7	11	The evaluation of cooperation is contingent to the inequality of revenue between individuals inside a country, but even more between countries, both on practical issues of assent to decisionmaking and on carbon budget and speed of change issues. This is treated at length in chapter 17 and in the linkage with SDGs. This reference to this (or other) chapters would be useful here. In addition, for example, the question: "Is the world capable of sustaining the 1,5°C path with the present state of inequalities" could be at least mentioned as a research issue.	Noted. We have included a reference to chapter 17.	Government of France	Ministère de la Transition écologique et solidaire	France
47603	7	17	7	18	Scholars have long framed climate mitigation as a problem of managing a global commons or public good - do not understand this sentence. Is it intended to say global cooperation for public good?	Noted. We rephrased the sentence.	Deshni Nadar	Environmental Consultant	Qatar
75659	7	17	7	26	I would suggest introducing the 2 framing aspects (global commons/public good and technological transition) in the first sentence of this paragraph. Otherwise it is not clear to which 2nd framing aspect the section is referring to. I only found out about the second framing aspect (technological transition) in page 8, line 21/22.	Noted. We rephrased the first sentence.	Karla Solis	Peru	Germany
47605	7	24	7	24	new forms of cooperation are 'valuable'. Recommendation to replace valuable with 'required'	Accepted.	Deshni Nadar	Environmental Consultant	Qatar
47607	7	25	7	25	Recommendation: embedded in 'processes' of sustainable development more generally	Accepted.	Deshni Nadar	Environmental Consultant	Qatar
52733	7	25	7	25	"embedded in the process" instead of "embedded in process"	Accepted.	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia
52735	7	35	7	35	"only a fully multilateral binding agreement ..." - remove as this is a policy prescriptive	Noted. We rephrased the sentence.	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia

Comment Id	From Page	From Line To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country	
12709	7	36	7	39	(Context) In this sentence, along the line of framing climate change mitigation as public goods/global commons, the authors explain the free-ride as an impediment of reaching an optimum multilateral binding agreement for climate change mitigation. Also, 'implementing such a global agreement' instead of 'reaching such a global agreement' is impeded by countries' incentive to free-ride. (Suggestion) I hope that the author can explicitly mention that 'free ride' is a market failure problem in the case of public goods. Also, I hope that 'reaching' can be replaced by 'successfully implementing'. The original sentence can be re-written as follows: "Implementing such a global agreement successfully is impeded by countries' incentive to free-ride, namely benefit from other countries' abatement efforts while failing to abate themselves, which is a market failure problem that happens with the public goods of climate change mitigation". (Reason) In lines 24-26 in p.8, along the line of framing climate change mitigation as transitions, there goes a sentence saying "the guiding questions are not concerned with market failures - and indeed evolutionary economics does not start from a general hypothesis of efficient markets~". In the prior section before this sentence, there is no mentioning on the term 'market failure', and all of a sudden this term pops up.	Accepted.	Chaewoon Oh	Green Technology Center	Republic of Korea
16625	7	36	7	39	(Context) In this sentence, along the line of framing climate change mitigation as public goods/global commons, the authors explain the free-ride as an impediment of reaching an optimum multilateral binding agreement for climate change mitigation. Also, 'implementing such a global agreement' instead of 'reaching such a global agreement' is impeded by countries' incentive to free-ride. (Suggestion) I hope that the author can explicitly mention that 'free ride' is a market failure problem in the case of public goods. Also, I hope that 'reaching' can be replaced by 'successfully implementing'. The original sentence can be re-written as follows: "Implementing such a global agreement successfully is impeded by countries' incentive to free-ride, namely benefit from other countries' abatement efforts while failing to abate themselves, which is a market failure problem that happens with the public goods of climate change mitigation". (Reason) In lines 24-26 in p.8, along the line of framing climate change mitigation as transitions, there goes a sentence saying "the guiding questions are not concerned with market failures - and indeed evolutionary economics does not start from a general hypothesis of efficient markets~". In the prior section before this sentence, there is no mentioning on the term 'market failure', and all of a sudden this term pops up.	See comment 12709.	Government of Republic of Korea	Korea Meteorological Administration (KMA)	Republic of Korea
48269	7	36	7	39	Is this really the reason for impediments? Kyoto, Copenhagen, etc. largely failed because of the inability to decide responsibility and whether certain countries "owed" more for historical contributions to climate damage.	Noted.	Susana Hancock	University of Oxford	United States of America
12711	7	39	7	42	(Question) At the end of the sentence starting with "Numerical models", there goes "in the absence of transfers". I am not sure what the author means with this phrase of "in the absence of transfer". In the absence of transfers of 'what'? (Suggestion) I hope that author can clarify this sentence.	Noted. We have rephrased this sentence.	Chaewoon Oh	Green Technology Center	Republic of Korea
30587	7	39	7	42	Germain et al. (2003) and Chander (2017) might be quoted such as after Barrett (1994) in line 39 because they seem to be not in the framework of "numerical models" like Lessman et al. (2013) which is based on integrated assessment models.	Accepted.	Government of Japan	Climate Change Division - Ministry of Foreign Affairs	Japan
16627	7	39	7	42	(Question) At the end of the sentence starting with "Numerical models", there goes "in the absence of transfers". I am not sure what the author means with this phrase of "in the absence of transfer". In the absence of transfers of 'what'? (Suggestion) I hope that author can clarify this sentence.	See comment 12711	Government of Republic of Korea	Korea Meteorological Administration (KMA)	Republic of Korea
82901	7	40	7	40	not sure Annex C covers these	Accepted.	Jim Skea	Imperial College London	United Kingdom (of Great Britain and Northern Ireland)
12713	7	42	8	8	(Suggestion 1: regional/sectoral/club approaches due to free-riding problem of a fully multilateral binding agreement?) Regarding the sentence starting with "For this reason", the author mentioned the benefits of regional or sectoral agreements 'for this reason' of free-riding problem. I think there is a logical jump here. In this sentence, the author just explains the scholarly focus on regional/sectoral agreements because they provide benefits to solve the free-riding problem. However, if I read the referenced literatures, the reason why much attention is laid on 'regional or sectoral agreements' as building blocks/climate clubs is because i) climate change is a grand problem (smaller problems can be solved by smaller partnerships or sectoral agreements), ii) one integrated multilateral top-down bargaining under the UNFCCC is not easy, iii) there is a diplomatic deadlock during negotiation, etc. Of course, the prevention of free-riding can be one of benefits of sectoral/regional/club approaches, yet it is not a major source. I hope that the author can re-consider re-writing this part. (Question & suggestion: Both multilateral and club approaches are the ways to produce public goods and solve a free-riding problem) In this section, the author sets and frames 'climate change mitigation' as a public goods. Then, the author sets the 'free-riding' as a market failure in the provision of public goods. Then, what should be 'the way' to solve the problem of free-riding from the perspective of 'international cooperation of this chapter'? The author seems to explain only the regional/sectoral/club approaches are the way to solve free-riding problem. I think there are two approaches to solve free-riding problem. One is a self-imposed intervention by participants in the form of a UN-based comprehensive multilateral binding agreement. The other is club approaches (sectoral/regional agreements) as a complement to the multilateral binding agreement. I hope that the author can consider and reflect this.	Noted. We have tried to incorporate these thoughts.	Chaewoon Oh	Green Technology Center	Republic of Korea
22477	7	42	7	43	the term "contributions" should be placed before the brackets	Accepted	Government of France	Ministère de la Transition écologique et solidaire	France

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
16629	7	42	8	8	(Suggestion 1: regional/sectoral/club approaches due to free-riding problem of a fully multilateral binding agreement?) Regarding the sentence starting with "For this reason", the author mentioned the benefits of regional or sectoral agreements 'for this reason' of free-riding problem. I think there is a logical jump here. In this sentence, the author just explains the scholarly focus on regional/sectoral agreements because they provide benefits to solve the free-riding problem. However, if I read the referenced literatures, the reason why much attention is laid on 'regional or sectoral agreements' as building blocks/climate clubs is because i) climate change is a grand problem (smaller problems can be solved by smaller partnerships or sectoral agreements), ii) one integrated multilateral top-down bargaining under the UNFCCC is not easy, iii) there is a diplomatic deadlock during negotiation, etc. Of course, the prevention of free-riding can be one of benefits of sectoral/regional/club approaches, yet it is not a major source. I hope that the author can re-consider re-writing this part. (Question & suggestion: Both multilateral and club approaches are the ways to produce public goods and solve a free-riding problem) In this section, the author sets and frames 'climate change mitigation' as a public goods. Then, the author sets the 'free-riding' as a market failure in the provision of public goods. Then, what should be 'the way' to solve the problem of free-riding from the perspective of 'international cooperation of this chapter'? The author seems to explain only the regional/sectoral/club approaches are the way to solve free-riding problem. I think there are two approaches to solve free-riding problem. One is a self-imposed intervention by participants in the form of a UN-based comprehensive multilateral binding agreement. The other is club approaches (sectoral/regional agreements) as a complement to the multilateral binding agreement. I hope that the author can consider and reflect this.	See comment 12713.	Government of Republic of Korea	Korea Meteorological Administration (KMA)	Republic of Korea
48271	7	46	8	8	Can there be a discussion on trade and sanctions? We have other ways of mitigating free riders that fit into the economic markets of the Paris Agreement.	Noted. We have a brief discussion in the section 14.4.2. See also Section 13.5.1.3 CHECK!!!	Susana Hancock	University of Oxford	United States of America
70733	7	7	7	7	Ocean in its singular form. SROCC is the Special Report on the Ocean and Cryosphere in a Changing Climate. And ocean is in its singular form.	Accepted. Thanks.	Philippe Tulkens	European Union (EU) - DG Research & Innovation	Belgium
65609	7	8	7	10	Check the references for the IPCC reports. IPCC 1.5 °C is IPCC 2019 as IPCC-SROCC, so should be 2019a and 2019b consistent with the whole Report DRAFT. IPCC Land Report is IPCC 2018. Check the proper citation. What is the reference "—, 2020: Climate Change and Land. 1–15 pp." on page 103, line 12?	Accepted. We are working on perfecting our citations.	Mônica M. C. Muelbert	UNIFESP	Brazil
72875	7	11	13	5	Can we succeed in a 1.5°C or even a 2°C with the present state of inequalities? Suggestions, mention this issue as a major research goal for the next period.	Suggestions for future research are discussed in section 14.7. We don't highlight this issue, as its connection to international cooperation is not clear.	Antoine BONDUELLE	EE-Consultant	France
48669	7	30			Suggest including reference to sources that explore the conceptual limitations or problems of framing climate change as a 'tragedy of the commons' - eg see Anthony Patt, Beyond the tragedy of the commons: Reframing effective climate change governance, Energy Research and Social Science, vol 34, 2017	Noted. There is a reference to this source.	Lorraine Elliott	The Australian National University	Australia
47609	7	36	8	8	Recommendation to include the issue of equity within the point of 'free-riding'. This bears context on the West having to do more in terms of mitigation having caused the current climate change we are experience. If countries that have not caused the current climate change are 'free-riding' then they should NOT be subject to judgement or scrutiny.	Noted. This is an interesting point, and yet is not central to the framing issue. It does however arise in later section (within 14.3) on fairness issues.	Deshni Nadar	Environmental Consultant	Qatar
63301	7	40	71	43	The text should be clarified to highlight the need for new measures to be adopted, rather than that they need to be included in the revised strategy. The strategy itself is an approach to doing work, not the place where new measures will sit. Implementation of measures occurs in parallel to carrying out of the IMO Strategy.	Comment not understood in reference to the page and line numbers given.	Government of Canada	Environment and Climate Change Canada	Canada
75661	7	41	7	43	I would suggest using chronological or alphabetical order to refer to bibliography...e.g. German et al. 2003 starts with 2003 and finishes with 2017 (Chander)...the next reference lists Stavins et al. 2014. and finishes with 2008 (Froyn and Hovi).	Accepted. We are working to do this for all references.	Karla Solis	Peru	Germany
11977	7		10		The focus on path dependencies/transitions is also reflected in a growing literature on climate change as a complex or "super wicked" problem (e.g. Levin et al. 2012). Bernstein and Hoffmann (2019) provide a useful framing of carbon lock-in as a fractal phenomenon requiring simultaneous action at multiple scales to enable transformative pathways. As such, the "path dependency/transitions" framing also implies a shift in the scale of intervention, from preferably global to explicitly multi-level. [This could also provide additional clarification to the table on pp. 9-10.]	Noted. We have removed a great deal of detail on the transitions framing, instead referring to the cross-chapter box	Tom Pegrarn	University College London	United Kingdom (of Great Britain and Northern Ireland)
11979	7		10		Although this section makes some references to literature that emphasises the need for a wider regime shift, much of the language used is very "techno-rational." Technological developments on their own do not guarantee a green transition (e.g. Geels 2005) but must be supported by wider changes in socio-economic systems. It seems appropriate to refer consistently to the "socio-technical" transition (or similar) rather than simply "technological transition" (including in the table on pp. 9-10).	Noted. We have removed a great deal of detail on the transitions framing, instead referring to the cross-chapter box	Tom Pegrarn	University College London	United Kingdom (of Great Britain and Northern Ireland)
12621	7	27	7	34	Two points here: Hardin does not discuss climate; his paper discusses population and English commons (briefly on the latter, in a section that is empirically incorrect on the law at the time). He was a known eugenicist and white supremacist. The paper is not relevant to the IPCC and should not be endorsed by it. Second, there is work that highlights the limits of the commons framing for climate change (in particular, free riding). See Aklin, M., & Mildnerberger, M. (2020). Prisoners of the wrong dilemma: why distributive conflict, not collective action, characterizes the politics of climate change. Global Environmental Politics, 20(4), 4-27.; Colgan, J., Green, J. F., & Hale, T. (2020). Asset revaluation and the existential politics of climate change. International Organization, Forthcoming.; Bernstein, S., & Hoffmann, M. (2019). Climate politics, metaphors and the fractal carbon trap. Nature Climate Change, 9(12), 919-925.	We agree completely. Indeed this section was intended to highlight the limits of the commons framing. In revising, we have taken this into account.	Jennifer Allan	Cardiff University	United Kingdom (of Great Britain and Northern Ireland)

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
12715	8	15	8	16	(Question: Misaligned incentives?) There is a sentence going "While the public goods and global commons framing identifies misaligned incentives as the primary barrier to mitigation taking place at a pace that would be globally optimal". Before this sentence coming, this section only dealt with 'free-riding problem' on the public goods of climate change mitigation. My first question: Does the author equates 'misaligned incentives' with 'free-riding problem'? If I look at the Table 14.1 in p.9, the author sets the 'misalignment of incentives, free-riding' as barriers to mitigation, from which I presume that the author does not equate them. Therefore, I hope that the author can explain what it means by 'misaligned incentives' before this sentence comes out.	Noted. We have rephrased this sentence.	Chaewoon Oh	Green Technology Center	Republic of Korea
16631	8	15	8	16	(Question: Misaligned incentives?) There is a sentence going "While the public goods and global commons framing identifies misaligned incentives as the primary barrier to mitigation taking place at a pace that would be globally optimal". Before this sentence coming, this section only dealt with 'free-riding problem' on the public goods of climate change mitigation. My first question: Does the author equates 'misaligned incentives' with 'free-riding problem'? If I look at the Table 14.1 in p.9, the author sets the 'misalignment of incentives, free-riding' as barriers to mitigation, from which I presume that the author does not equate them. Therefore, I hope that the author can explain what it means by 'misaligned incentives' before this sentence comes out.	See comment 12715.	Government of Republic of Korea	Korea Meteorological Administration (KMA)	Republic of Korea
16635	8	24	8	27	(Critique: Clearer indication of two economic theories) In this chapter, the author approaches 'climate change mitigation' with two framings of 'public goods' and 'technological transitions'. The author explains this technological transition framing on the basis of evolutionary economics. Here, the author mentioned that "the guiding questions are not concerned with market failure - and indeed evolutionary economics does not start from a general hypothesis of efficient markets - but rather the processes that accelerate or postpone changes in economic production and consumption systems". Regarding this sentence, first, in the previous paragraphs before this sentence, there is no word on efficient market or market failure. Second, in neo-classical economics, public intervention is attempted/allowed in the case of market failure. In evolutionary economics, public intervention is attempted /allowed in the case of 'market failure and system failure' or 'system failure only'. Thus, strictly speaking, I am not sure if the sentence saying "evolutionary economics does not start from a general hypothesis of efficient markets" is correct. (Please, refer to Schmidt (2018). Market failure vs. system failure as a rationale for economic policy? A critique from an evolutionary perspective. Journal of Evolutionary Economics, 28, 785–803) (Suggestion) I hope that sentence in line 24 to 27 can be changed as follows: "Unlike the public goods framing which is based on neo-classical economics that concerns public goods creating market failure, the roots of technological transition framing can be found in evolutionary economics that concerns path dependent processes leading to system failure and explores the process accelerating or postponing changes in economic production and consumption systems".	See 12719.	Government of Republic of Korea	Korea Meteorological Administration (KMA)	Republic of Korea
20011	8	37			the working "government has a role to play" is quite misleading and contradicts chapter 13 on the importance of governments - a "decisive" or a "key" role would highlight that market mechanisms do not solve the climate problem	Accepted. We have rephrased the sentence.	Manuela Dr. Troschke	Scientists for Future Germany	Germany
29563	8	41	8	43	This could be modified; fossil fuel plants can be retrofitted with e.g. CCS technology to make them emission neutral. Is this omitted because this is considered too expensive?	Noted. We have rephrased the sentence.	Government of Norway	Norwegian Environment Agency	Norway
52737	8	45	8	45	path-dependant --- path-dependent	Accepted	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia
48571	8	1	8	8	I would like to suggest looking into Aklin and Mildenberger discussion on free-riding that was published in Global Environmental Politics (Michaél Aklin, Matto Mildenberger; Prisoners of the Wrong Dilemma: Why Distributive Conflict, Not Collective Action, Characterizes the Politics of Climate Change. Global Environmental Politics 1 November 2020; 20 (4): 4–27. doi: https://doi.org/10.1162/glep_a_00578). Since the section discusses about free-riding, it is also important to highlight that it is possible to explain patterns of climate policy making at an international level without going back to free-riding.	Accepted. We have referenced this source, as part of including the political analytic approach.	Raul Salas Reyes	University of Toronto	Canada
47611	8	15	8	15	public goods and global commons framing - recommend outlining context of use of this terminology in glossary as majority new-comers to the environmental sector will be reading this report.	Noted. There will be a cross-chapter box on this issue for newcomers.	Deshni Nadar	Environmental Consultant	Qatar
12717	8	24	8	25	(Question: guiding questions?) What do you mean by 'guiding questions' in the sentence that goes "here the guiding questions are not concerned with market failure". Before this meeting, there seems to be no indication of 'guiding questions'.	Accepted. We have rephrased this.	Chaewoon Oh	Green Technology Center	Republic of Korea

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
12719	8	24	8	27	(Critique: Clearer indication of two economic theories) In this chapter, the author approaches 'climate change mitigation' with two framings of 'public goods' and 'technological transitions'. The author explains this technological transition framing on the basis of evolutionary economics. Here, the author mentioned that "the guiding questions are not concerned with market failure - and indeed evolutionary economics does not start from a general hypothesis of efficient markets - but rather the processes that accelerate or postpone changes in economic production and consumption systems". Regarding this sentence, first, in the previous paragraphs before this sentence, there is no word on efficient market or market failure. Second, in neo-classical economics, public intervention is attempted/allowed in the case of market failure. In evolutionary economics, public intervention is attempted /allowed in the case of 'market failure and system failure' or 'system failure only'. Thus, strictly speaking, I am not sure if the sentence saying "evolutionary economics does not start from a general hypothesis of efficient markets" is correct. (Please, refer to Schmidt (2018). Market failure vs. system failure as a rationale for economic policy? A critique from an evolutionary perspective. Journal of Evolutionary Economics, 28, 785–803) (Suggestion) I hope that sentence in line 24 to 27 can be changed as follows: "Unlike the public goods framing which is based on neo-classical economics that concerns public goods creating market failure, the roots of technological transition framing can be found in evolutionary economics that concerns path dependent processes leading to system failure and explores the process accelerating or postponing changes in economic production and consumption systems".	Noted. We have rewritten this section, and this comment is no longer relevant.	Chaewoon Oh	Green Technology Center	Republic of Korea
16633	8	24	8	25	(Question: guiding questions?) What do you mean by 'guiding questions' in the sentence that goes "here the guiding questions are not concerned with market failure". Before this meeting, there seems to be no indication of 'guiding questions'.	Noted. We have rewritten this section, and this comment is no longer relevant.	Government of Republic of Korea	Korea Meteorological Administration (KMA)	Republic of Korea
48273	8	27	8	30	Might be interesting to take this to the global level. Countries can learn from each other, e.g. the argument that the US's historical contribution to GHG emissions covers greater areas of the world than just the US. China, therefore, doesn't need to emit as much because it can learn from/accelerate its green trajectory by learning from the experiences and technology of the United States.	accepted. We have included a reference to this issue of learning.	Susana Hancock	University of Oxford	United States of America
47455	8	40	8	42	Another factor here is that the cost of finance is often lower for established technologies than for new ones, hence there is a clear role for governments in facilitating access to low cost finance. Another reason for government intervention is to resolve any regulatory impediments to putting new technologies in place. Please expand!	Accepted. We have included a reference to this issue of finance.	Government of Saint Lucia	Department of Sustainable Development - Ministry of Education, Innovation, Gender Relations and Sustainable Development	Saint Lucia
70735	8	46	8	48	It is not clear whether policy architecture of tech. transition framing means operating within economic sectors or across separate economic sectors. Rephrasing for clarity is highly requested.	Accepted. We have explicitly addressed this issue.	Philippe Tulkens	European Union (EU) - DG Research & Innovation	Belgium
75663	8	6	8	8	I would suggest adding examples for the thresholds and climate catastrophes that could reduce free-riding incentives. This will allow to illustrate best what this final sentence of this paragraph refers to.	Rejected. We have reduced much of the text on free-riding.	Karla Solis	Peru	Germany
52739	8	40	9	4	This paragraph's contribution to the overall aim of the chapter is unclear.	Noted. We have rewritten a great deal of this section.	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia
48275	9	20	9	20	The use of developed and developing, is this terminology still acceptable?	Accepted	Susana Hancock	University of Oxford	United States of America
12177	9	40	9	40	The two framings in the table could usefully be complimented with a hybrid framing brining the two together.	Noted. We have highlighted that both framings can be complementary.	Paul Rouse	Carnegie Climate Governance Initiative (C2G) - The Carnegie Council for Ethics and International Affairs	United Kingdom (of Great Britain and Northern Ireland)
58315	9	10	9	10	Table 14.1 doesn't provide any more useful information beyond what was described in the text. Recommend deleting.	Accepted. We delete the table.	Government of United States of America	U.S. Department of State	United States of America
19811	9	25	9	25	Insert after "... this report (1.4)" as follows: "The majority of the literature (see e.g. Kirchner et al. 2019, or Twinnereim and Mehling 2018) stresses that even high carbon prices are insufficient to overcome the cost differential between high and low carbon technologies and need to be complemented by other policies." New reference: Kirchner, Mathias; Schmidt, Johannes; Wehrle, Sebastian (2019): Exploiting Synergy of Carbon Pricing and Other Policy Instruments for Deep Decarbonization, Joule 3, p. 891–898. Twinnereim, Endre, Mehling, Michael (2018): Carbon pricing and deep decarbonisation, Energy Policy 121, p.185–189.	Noted. We have removed this piece of text.	Axel Michaelowa	University of Zurich	Switzerland
19813	9	26	9	36	The paragraph argues that assessing the effectiveness of international collaboration by the emissions level is flawed, as transformative impact would only occur later. This would however not allow to assess effectiveness at all, as the contribution to transformation can be seen differently if purely framed in qualitative terms. One observer would see transformational benefits completely different from another, dependent e.g. on political/ideological worldview. Operationalization of what means "transformational" has been extremely difficult in practice, e.g. under the Green Climate Fund. The paragraph should be revised to reflect a clear, quantitative assessment of effectiveness.	Noted. We highlight that there are multiple views on how to assess effectiveness. This is simply a feature of this literature.	Axel Michaelowa	University of Zurich	Switzerland
52741	9	26	9	26	emissions levels: falling emission levels? Capped emission levels?	Accepted	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
81095	9	26	9	36	This seems to me a flawed interpretation of the nature and implications of evolutionary economics (unless one is locked in some kind of theoretical ideological battle). In evolutionary economics, markets and pricing still have a crucial, though different role; they act in an evolutionary way, helping to promote successful innovations and provide buyers and hence financial resources for them, based on comparative advantage and market scale. Obviously, market scale for clean tech is likely to be affected (positively) by emission targets, and pricing instruments to the extent that these are used to implement them: pricing instruments also provide a public revenue stream which can and often has been used to support innovation because that is politically preferable in terms of both acceptance, and avoiding increase in general taxation. So again the chapter seems to be setting up false dichotomies. See ... regarding political linkages of prices and innovation, and the Three Domains / Three pillars exposition of the logical linkages between classical and evolutionary economics, and markets and innovation (Grubb, M., J-C Hourcade, K.Neuhoff (2015), The Three Domains structure of energy-climate transitions. Technological Forecasting and Social Change, 98, 290-302. doi:10.1016/j.techfore.2015.05.009Grubb M.J., W.McDowell and P.Drummond (2017), On order and complexity in innovations systems: Conceptual frameworks for policy mixes in sustainability, transitions, Energy Research and Social Sciences, Vol.33:pp21-34	We have removed this paragraph, and instead refer to the cross chapter box	Michael Grubb	UCL - Institute of Sustainable Resources	United Kingdom (of Great Britain and Northern Ireland)
70737	9	28	9	29	Difficult to agree to 'emissions levels may be a misleading indicator of progress'. It may mislead progress in the short- and mid-term in the tech. transitions framing but emissions level is the ultimate indicator to measure the effectiveness of mitigation efforts.	Noted. We highlight that it can be a misleading short-term indicator of progress towards long-term goals.	Philippe Tulkens	European Union (EU) - DG Research & Innovation	Belgium
12721	9	40	9	40	(Suggestion: Title change) In the Table 14.1, the current title says 'key implications of alternative framings on international cooperation'. Firstly, the subject of framing is 'climate change mitigation'. International cooperation is an intervening action to tackle barriers of climate change mitigation under two framing. Secondly, what does the author mean by 'alternative'? There are two framings, which I believe are complementary. Thus, I suggest that this title can be changed as follows: "Key implications of two framings on climate change mitigation and international cooperation forward" or "Key implications of international cooperation under two framings on climate change mitigation".	Noted. We have removed the table.	Chaewoon Oh	Green Technology Center	Republic of Korea
16637	9	40	9	40	(Suggestion: Title change) In the Table 14.1, the current title says 'key implications of alternative framings on international cooperation'. Firstly, the subject of framing is 'climate change mitigation'. International cooperation is an intervening action to tackle barriers of climate change mitigation under two framing. Secondly, what does the author mean by 'alternative'? There are two framings, which I believe are complementary. Thus, I suggest that this title can be changed as follows: "Key implications of two framings on climate change mitigation and international cooperation forward" or "Key implications of international cooperation under two framings on climate change mitigation".	Noted. We have removed the table.	Government of Republic of Korea	Korea Meteorological Administration (KMA)	Republic of Korea
72193	10	27	10	29	Using trade sanctions to stabilize climate clubs is problematic for two reasons. First, carbon tariffs can be detrimental in itself (e.g. Böhringer et al. 2015 as cited). But second and more importantly, if outsiders of a climate club react with retaliatory tariffs (an option that is assumed away in Nordhaus 2015 and Al Khourdajie and Finus 2020) this could also destabilize climate coalitions if these are not large enough (Hagen, A. and J. Schneider (2017) Boon or Bane? Trade Sanctions and the Stability of International Environmental Agreements, Oldenburg Discussion Papers in Economics V-403-17) and even a trade war would not be a credible threat to e.g. coerce the US back into the Paris Agreement (Böhringer, C. and T. F. Rutherford (2017). Paris after Trump: An Inconvenient Insight. Oldenburg Discussion Papers in Economics, V – 400-17). I think this qualification is important here as the option of climate clubs is highlighted so prominently in this report.	Noted. Thank you for your comment. We explain now that Al Khourdajie and Finus (2020) allow outsiders to react by increasing their taxes, but not by retaliating with tariffs that are unrelated to differences in emission taxes. That is, tariffs can only be used to compensate for higher domestic emission taxes. On the other hand, the debate about inducing the US back to the Paris agreement is not so relevant anymore at this stage. We did not include the references that you mentioned as they are not published yet. If they are published before the cut-off-date, we will consider Hagen and Schneider (2017).	Achim Hagen	Humboldt-Universität zu Berlin	Germany
63303	10	31	11		There is not enough context in the table to understand what is being presented. Recommend, at least, providing a short description of each of the studies listed. What organizations are being examined? Aakre et al. seems to imply something about Arctic Council and black carbon and methane, but not enough details to understand.	We edited the table within the confines of space limitations and added information.	Government of Canada	Environment and Climate Change Canada	Canada
52743	10	31	11	0	Table 14.2 /// TM2-FASST & C-DICE: what type of family of models do these two fall under? Game theoretic? Decision theoretic? Empirical?	Noted. Thank you for your comment. We now explain in more detail the models that you mention while taking into account space limitations.	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia
48277	10	0	11	0	The US has rejoined the Paris Agreement, so this needs to be altered. However, the US's departure certainly impacted its trajectory and possibly set precedent, but the country is back in.	We acknowledge the short formal departure of the USA from membership in the Paris Agreement. The threat of withdrawal did spur a literature on the stability of climate mitigation clubs which we review in this section.	Susana Hancock	University of Oxford	United States of America
72877	10	2	11	38	Maybe the chapter could introduce the idea of a "climate bubble" to describe the integration of neighbouring countries with similar development.	Thank you. See response to comment 22479	Antoine BONDUELLE	EE-Consultant	France
72879	10	2	11	38	Another issue that could be raised is the joint investment for projects in Chile of massive solar H2 production. What status or governance might have such arrangements to as to speed up change? What relevance does the experience of the Kyoto Mechanisms bring for infrastructure development?	Thank you for the suggestion. These issues do not fall, strictly sensu, under the rubric of climate clubs and may be better raised in the chapter on climate finance	Antoine BONDUELLE	EE-Consultant	France
22479	10	2	10	2	The 14.2.2 ("climate clubs") is already relevant to regional entities such as the EU. Maybe the chapter could open the idea of a "climate bubble" to describe the integration of neighbours is such groupings goes beyond single policies or economic trading. For example, Norway with linked electric and gas grids is already part of such a bubble, that goes beyond what is described here. Such grid arrangement may soon include green hydrogen from joint investments. Maybe this wider scope could be added to this paragraph, a very important development on the dynamics of the transition. This idea is not included in para.14.4.4 on ETS which have a more limited scope.	Thank you for the suggestion. Climate "bubbles" under the Kyoto Protocol refer to different collaborative arrangements than covered here; in addition, later in the chapter, many other international collaborative arrangements are empirically reviewed in 14.5	Government of France	Ministère de la Transition écologique et solidaire	France

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
47391	10	2	11	28	It may not exactly fall under the term 'climate clubs', but the following studies quantified the potential GHG impact of selected international cooperative initiatives, which might be interesting to touch upon (perhaps in-depth discussion can be left to Chapters 4 and 13): Lui, S., Kuramochi, T., Smit, S., Roelfsema, M., Hsu, A., Weinfurter, A., et al. (2021). Correcting course: the emission reduction potential of international cooperative initiatives. <i>Clim. Policy</i> 21, 232–250. doi:10.1080/14693062.2020.1806021. Roelfsema, M., Harmsen, M., Olivier, J. J. G., Hof, A. F., and van Vuuren, D. P. (2018). Integrated assessment of international climate mitigation commitments outside the UNFCCC. <i>Glob. Environ. Chang.</i> 48, 67–75. doi:10.1016/j.gloenvcha.2017.11.001.	Both pieces of literature are valuable measurements of the additional effect of initiatives taken beyond those of nationstates. They do not address the question why actors coalesce to undertake such action - which is the focus of this section. These measurement will undoubtedly make a valuable contribution to chapter 4 (which deals with measurement issues)Detlef Sprinz08/Jul/21	Takeshi Kuramochi	NewClimate Institute	Germany
47393	10	2	11	28	Related to my previous comment, it is not entirely clear when people use the term "climate clubs" and when they use "(international) cooperative initiatives" such as New York Declaration on Forests or CCAC. "Climate clubs" are perhaps more often used for e.g. group of countries that collectively apply border carbon tax adjustments, but I might be wrong. Perhaps a description on definitions would be helpful.	Climate clubs have, so far, only been used to account for rational, incentive-driven climate action among states. Conceptually, they could be broadened to include transnational and subnational actors, yet modeling has not yet advanced to this stage.	Takeshi Kuramochi	NewClimate Institute	Germany
14539	10	3	10	3	With regard to the increase in climate legislation since 2007, it is surely relevant to note that this mostly concerns roll out of legislation in "developing countries". As the original source, Iacobuta et al (2018) note, "More than 75% of Annex I Parties already had climate legislation in place in 2007, likely reflecting, in most cases, efforts to implement their legally binding targets under the Kyoto Protocol, which entered into force in 2005".	The observation is very valuable, yet climate clubs are about contingent actions undertaken based on the action (or inaction of others). We have streamlined the para to more sharply offer a definition of climate clubs. National legislation may (or may not) be contingent on actions taken by other countries; legislation per se does not necessarily lead to enhanced climate action as it, legally speaking, reflects codification.	Joanna Depledge	Centre for Environment, Energy and Natural Resource Governance (CEENRG), University of Cambridge	United Kingdom (of Great Britain and Northern Ireland)
72191	10	31	11	1	The information in Table 14.2 concerning border tax adjustments in Nordhaus 2015 is confusing. He uses uniform percentage tariffs instead of border carbon adjustments.	The text has been adjusted in accordance with Nordhaus'es terminology	Achim Hagen	Humboldt-Universität zu Berlin	Germany
11981	10		11		As stated in this section, the underlying logic for "climate clubs" stems from the conventional global commons framing. But this relatively narrow understanding of sub- and non-state contributions to global mitigation action is arguably not the only "recent development" to be highlighted. We can also see a shift of framing here, broadly consistent with the growing interest in enabling complex socio-technical "transitions", as highlighted in the previous section. This is reflected in literature on climate "experimentation" and orchestration (Bulkeley & Broto 2013; Abbott 2017) and complex governance (Kreienkamp & Pegram 2020) but also recent developments under the UNFCCC (such as the establishment of the Climate Action portal) that seek to "catalyse" action from a diversity of actors (Hale 2016). The emphasis is not so much on building the broadest-possible coalition but on diversity, innovation, and dynamism (recognisant of the fact that many experiments will in fact fail). As with the broader transitions framing, the aim is not always immediate production of a global public good or club good but the enabling of horizontal and vertical (multi-level) diffusion or reinforcement of innovation and the gradual shifting of preferences to bring action on all levels in alignment with the Paris Agreement (all of which is of course much more challenging to measure).	This is correct, but does not deal directly with climate clubs per se (which have now been defined more clearly in para 1 of the section); yet see also Section 14.2.1	Tom Pegram	University College London	United Kingdom (of Great Britain and Northern Ireland)
46307	10	19	10	19	Please add after "sanctions": "or WTO-consistent border adjustments" COMMENT: border adjustments are part of World Trade Reality, in case they put a price on consumption they are WTO consistent and neutral for global competition, thus not all forms discussed can be characterized as "sanctions". Literature on WTO consistent BCAs proposals: Ismer et al 2016, DIW, Discussion Papers 1579, Inclusion of Consumption into Emissions Trading Systems: Legal Design and Practical Administration, https://www.diw.de/documents/publikationen/73/diw_01.c.534388.de/dp1579.pdf ; Alternative suggestion: Indicate that there are border adjustment proposals that are to be distinguished from "carbon club proposals" in a narrow sense.	Taken into account. We have nuanced the sentence to avoid the impression that all trade measures have a sanctioning effect. As the suggested literature does not deal with climate clubs, this has been integrated in Section 14.5.1.3 on trade agreements.	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany
12723	10	0	10	0	(Suggestion) in the table 14.1, 'Path dependency' should be moved to the column on barriers to mitigation. The phenomena of path dependency include lock-in, network effects, and existing infrastructure. Therefore, the content in the column on barrier can be indicated like this: "Path dependency (lock-in, network effects, existing infrastructure)".	Noted. We have removed the table.	Chaewoon Oh	Green Technology Center	Republic of Korea
16639	10	0	10	0	(Suggestion) in the table 14.1, 'Path dependency' should be moved to the column on barriers to mitigation. The phenomena of path dependency include lock-in, network effects, and existing infrastructure. Therefore, the content in the column on barrier can be indicated like this: "Path dependency (lock-in, network effects, existing infrastructure)".	Noted. We have removed the table.	Government of Republic of Korea	Korea Meteorological Administration (KMA)	Republic of Korea
12623	11	11	11	20	The discussion of building blocks approaches to trade is not as relevant to climate change, given the existence of the PA. this is also a small strand of the literature. If this is kept, it is worth nothing the counterargument that there is a regime complex in place that creates incentives for competition and reverberation among multiple bodies working on climate change, which undermines the likelihood of a forming a single, overarching agreement from building blocks	Noted. Thank you for your comment. We now clarify that the existence of the Paris Agreement may render this discussion less relevant.	Jennifer Allan	Cardiff University	United Kingdom (of Great Britain and Northern Ireland)
52747	11	15	11	16	Can't a global agreement co-exist with smaller bilateral agreements in a final state? Many other policy areas governed internationally experience such a dual setup.	Accepted. We now mention this possibility.	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
12725	11	2	11	38	(Suggestion: Only positive side of building blocks approach? Conditions for bottom-up/building blocks approach) This section seems to delineate only the positive side of the club approach or building blocks approach. If we read the relevant literatures, the successful or positive contribution of these clubs and building blocks approaches should be accompanied by some certain conditions. For example, Sabel and Victor (2015) mentioned that this bottom-up approach will only work if it is supported by 'institutions' promoting joint exploration of possibilities. This means there should be an institution with the function of coordinating and linking numerous clubs. Therefore, I hope that the author can look up the relevant literatures again and insert the conditions required for the success of club/building blocks/bottom-up approach.	Sabel & Victor (2015) outline the merits of experimental governance, yet only show that it worked for the Montreal Protocol. What will "work" for climate change can only be assessed in the future.	Chaewoon Oh	Green Technology Center	Republic of Korea
16641	11	2	11	38	(Suggestion: Only positive side of building blocks approach? Conditions for bottom-up/building blocks approach) This section seems to delineate only the positive side of the club approach or building blocks approach. If we read the relevant literatures, the successful or positive contribution of these clubs and building blocks approaches should be accompanied by some certain conditions. For example, Sabel and Victor (2015) mentioned that this bottom-up approach will only work if it is supported by 'institutions' promoting joint exploration of possibilities. This means there should be an institution with the function of coordinating and linking numerous clubs. Therefore, I hope that the author can look up the relevant literatures again and insert the conditions required for the success of club/building blocks/bottom-up approach.	duplicate; see response above 16641	Government of Republic of Korea	Korea Meteorological Administration (KMA)	Republic of Korea
16643	11	2	11	38	(Suggestion: Climate clubs as a building blocks approach in economics? Another look from the perspective of fragmentation) In this section, scholarly approaches on climate clubs take a modeling analysis, and these scholarly approaches mainly focus on emission trading clubs, technology clubs, etc. Meanwhile, climate clubs have been dealt with in the scholarly area of international politics as well. Previous studies see that the emergence of climate clubs as 'institutional fragmentation'. The emergence of the US-initiated club, the Asia-Pacific Partnership on Clean Development and Climate, in 2006 raised the scholarly concern on institutional fragmentation from the UN-based top-down governance (McGee and Taplin 2006; van Asselt 2007; Oh and Matsuoka 2017). Then, the Japan's climate club, the East Asia Low Carbon Growth Partnership, in 2011 also exerted concern on institutional fragmentation due to its normative contestation with the Kyoto Protocol (Oh and Matsuoka 2015). Of course, institutional fragmentation does not always hold a negative connotation. Institutional fragmentation can be synergistic, cooperative, or conflictive, and global climate change governance is found to be cooperatively fragmented (Biermann et al. 2009). The way to move toward synergistic fragmentation is possible by In this context, the exploration of institutional fragmentation in global technology initiatives, emission trading systems, and unilateral trade measures led to the possibility of changing role of the UNFCCC not just as a top-down institution but as an orchestrator of various initiatives and clubs (van Asselt and Zelli 2014). <References> - Biermann, F., Pattberg, P., van Asselt, H., and Zelli, F. (2009). The fragmentation of global governance architectures: a framework for analysis. <i>Global Environmental Politics</i> , 9(4), 14-40. - McGee, J., & Taplin, R. (2006). The Asia-Pacific Partnership on Clean Development and Climate: A Complement or Competitor to the Kyoto Protocol. <i>Global Change, Peace and Security</i> , 18(3), 173-192. - van Asselt, H. (2007). From UN-ity to diversity? The UNFCCC, the Asia-Pacific Partnership, and the future of international law on climate change. <i>Carbon and Climate Law Review</i> , 1(1), 17-28. - van Asselt, H. and Zelli, F. (2014). Connect the dots: managing the fragmentation of global climate governance. <i>Environmental Economics and Policy Studies</i> , 16, 137-155. - Oh, C. and Matsuoka, S. (2017). The genesis and end of institutional fragmentation in global governance on climate change from a constructivist perspective. <i>International Environmental Agreements: Politics, Law and</i>	duplicate; see response to 12727	Government of Republic of Korea	Korea Meteorological Administration (KMA)	Republic of Korea
52745	11	2	11	2	co-called -- so-called?	corrected	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia
48279	11	24	11	27	The US has rejoined the Paris Agreement, so this needs to be altered. However, the US's departure certainly impacted its trajectory and possibly set precedent, but the country is back in.	The text was amended	Susana Hancock	University of Oxford	United States of America
48281	11	24	11	27	Climate clubs assume good intentions. A leader like Trump or Bolsonaro is not going to be as inclined to buy-in for the collective benefit.	Sprinz et al. (2018) and Saelen et al (2020) already cover the potential impact of Trump	Susana Hancock	University of Oxford	United States of America
58317	11	25	11	25	This sentence is inaccurate. The United States did not exit the Paris Agreement until 4 November 2020, and announced its official withdrawal on 4 November 2019. Thus, in 2018, the U.S. had only announced its INTENTION to withdraw. The sentence needs to be rewritten to reflect this timeline.	The text was amended	Government of United States of America	U.S. Department of State	United States of America
52749	11	32	11	32	"numerically" - does not convey information to the reader as is. Add more details (regression? Trend analysis? Etc.) or omit.	"numerically" was deleted	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
12727	11	2	11	38	<p>(Suggestion: Climate clubs as a building blocks approach in economics? Another look from the perspective of fragmentation) In this section, scholarly approaches on climate clubs take a modeling analysis, and these scholarly approaches mainly focus on emission trading clubs, technology clubs, etc. Meanwhile, climate clubs have been dealt with in the scholarly area of international politics as well. Previous studies see that the emergence of climate clubs as 'institutional fragmentation'. The emergence of the US-initiated club, the Asia-Pacific Partnership on Clean Development and Climate, in 2006 raised the scholarly concern on institutional fragmentation from the UN-based top-down governance (McGee and Taplin 2006; van Asselt 2007; Oh and Matsuoka 2017). Then, the Japan's climate club, the East Asia Low Carbon Growth Partnership, in 2011 also exerted concern on institutional fragmentation due to its normative contestation with the Kyoto Protocol (Oh and Matsuoka 2015). Of course, institutional fragmentation does not always hold a negative connotation. Institutional fragmentation can be synergistic, cooperative, or conflictive, and global climate change governance is found to be cooperatively fragmented (Biermann et al. 2009). The way to move toward synergistic fragmentation is possible by In this context, the exploration of institutional fragmentation in global technology initiatives, emission trading systems, and unilateral trade measures led to the possibility of changing role of the UNFCCC not just as a top-down institution but as an orchestrator of various initiatives and clubs (van Asselt and Zelli 2014).</p> <p><References> - Biermann, F., Pattberg, P., van Asselt, H., and Zelli, F. (2009). The fragmentation of global governance architectures: a framework for analysis. <i>Global Environmental Politics</i>, 9(4), 14-40. - McGee, J., & Taplin, R. (2006). The Asia-Pacific Partnership on Clean Development and Climate: A Complement or Competitor to the Kyoto Protocol. <i>Global Change, Peace and Security</i>, 18(3), 173-192. - van Asselt, H. (2007). From UN-ity to diversity? The UNFCCC, the Asia-Pacific Partnership, and the future of international law on climate change. <i>Carbon and Climate Law Review</i>, 1(1), 17-28. - van Asselt, H. and Zelli, F. (2014). Connect the dots: managing the fragmentation of global climate governance. <i>Environmental Economics and Policy Studies</i>, 16, 137-155. - Oh, C. and Matsuoka, S. (2017). The genesis and end of institutional fragmentation in global governance on climate change from a constructivist perspective. <i>International Environmental Agreements: Politics, Law and</i></p>	<p>Taken into account. The section now include a reference to the literature on fragmentation in the context of a point about forum shopping, though noting that these concerns mainly emerged in a pre-Paris context. The relevant sources provided by the reviewer have been incorporated.</p>	Chaewoon Oh	Green Technology Center	Republic of Korea
48671	11	2			<p>section 14.2.2 on climate clubs - include reference to the ways in which climate clubs can also encourage 'forum shopping' - eg see Kenneth W Abbott 'The transnational regime complex for climate change', <i>Environment and Planning C: Government and Policy</i> 2012, volume 30, pages 571 – 590</p>	<p>Taken into account. We have mentioned the risk of forum shopping, and cited relevant literature. However, Abbott's points on forum shopping are mainly in the context of carbon offsetting rather than climate clubs, so this reference has not been included.</p>	Lorraine Elliott	The Australian National University	Australia
7675	12	3	13	6	<p>In page 12, lines 2 and 3 seem refer to an enumeration of the criteria for assessing the effectiveness of international cooperation (they are later summarized in table 14.3, in page 13). Line 3 refers to a "First" element, but the rest of the text does not identify the second or subsequent ones (the subsequent criteria are developed from line 22). The drafting would benefit from enumerating the criteria when they are referred to in the text (alternately, the "First" in line 3 could be omitted or substituted for "The", for instance).</p>	<p>Accepted. Removed the word "First"</p>	Pablo Moreno	International Monetary Fund	United States of America
14621	12	5	12	5	<p>The full title of the Montreal Protocol should be given here, or at least an abbreviated one that indicates we are talking about stratospheric ozone depletion.</p>	<p>Accepted. We have done the latter with the first reference to Montreal.</p>	Joanna Depledge	Centre for Environment, Energy and Natural Resource Governance (CENRG), University of Cambridge	United Kingdom (of Great Britain and Northern Ireland)
47613	12	11	12	12	<p>Lines 11-12 is repetitive of lines 5-6. Consider revising.</p>	<p>Accepted. We have eliminated the first reference.</p>	Deshni Nadar	Environmental Consultant	Qatar
22481	12	11	12	12	<p>We recommend to clarify by how the Montreal Protocol was successful in comparison to other known protocols</p>	<p>Accepted. We have clarified that it was environmentally effective.</p>	Government of France	Ministère de la Transition écologique et solidaire	France
3815	12	11	12	12	<p>The sentence repeats what has already been written on the Montreal Protocol in the previous paragraph</p>	<p>Accepted. We have eliminated the first reference.</p>	Raiser Kilian	Hertie School	Germany
70739	12	12	12	15	<p>It is not clear why 'bottom-up' characteristics of the Paris Agreement is highlighted in the subsection of assessment criteria while 'bottom-up' or 'top-down' is not a criterion to assess the effectiveness of international cooperation.</p>	<p>Accepted. We note the differences in architecture are the relevant factor here impeding generalizations of results.</p>	Philippe Tulkens	European Union (EU) - DG Research & Innovation	Belgium
48283	12	13	12	15	<p>its economics are also entirely different.</p>	<p>Noted. We don't include, for reasons of space.</p>	Susana Hancock	University of Oxford	United States of America
52751	12	16	12	16	<p>what does "this" exactly refer to? The way "this" connects to the rest of the sentence is also unclear.</p>	<p>Accepted. we have clarified that "this" is about differences in architecture.</p>	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia
3817	12	18	12	18	<p>I think the value of drawing lessons from analogous non-environmental treaty regimes could be highlighted here. For example see Raiser et al., forthcoming, "Beyond Pledge and Review: learning from analogies to the Paris Agreement's review mechanisms" - the paper studies the performance of analogous review mechanisms in the trade, finance, human rights and labour regimes, drawing lessons for the Paris Agreement.</p>	<p>Noted. We don't include, for reasons of space.</p>	Raiser Kilian	Hertie School	Germany
48673	12	31	12	32	<p>Adjust wording to recognise that distributive justice is only one component of equity in climate change governance (equity also incorporates principles of procedural and recognition justice; see comments at note 14 above</p>	<p>Accepted. We have included the idea.</p>	Lorraine Elliott	The Australian National University	Australia
52753	12	32	12	32	<p>Who are these agents specifically? Are we confining ourselves to governments only?</p>	<p>We have removed the term agents.</p>	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia
52755	12	32	12	33	<p>The sentence starting with "Finally" can instead constitute the start of the following paragraph.</p>	<p>Accepted.</p>	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
48675	12	32			query definition of distributive justice that focuses only on 'agents' - those who do not have agency (that is, are not 'agents') are often the victims of distributive injustice and harms that are not of their own making	Accepted. We have removed the term agents.	Lorraine Elliott	The Australian National University	Australia
47615	12	35	12	35	Regulative quality includes guidance and signalling - recommend to replace with: 'A regulatory and compliance approach includes guidance and signally'.	Rejected. We are not talking about governance approaches, but features of an assessment criteria.	Deshni Nadar	Environmental Consultant	Qatar
48285	12	37	12	38	And consequences?	Noted. We think this implicit.	Susana Hancock	University of Oxford	United States of America
14549	12	40	12	41	I am surprised to see Kinley et al (2020) quoted here in the context of non-binding recommendations. I don't see this argument in their paper.	Accepted. We have replaced with Victor (2010), which does make that argument.	Joanna Depledge	Centre for Environment, Energy and Natural Resource Governance (CEENRG), University of Cambridge	United Kingdom (of Great Britain and Northern Ireland)
47617	12	41	12	42	Recommendation to include how issues of data protection and commercial sensitivity of information collected through mandatory reporting will be handled by authorities. More especially data for voluntary reporting purposes if there is a push for transparency.	Accepted. Added a note to protecting data.	Deshni Nadar	Environmental Consultant	Qatar
48677	12	41			re accountability suggest reference to Teresa Kramarz and Susan Park, Accountability in Global Environmental Governance: A Meaningful Tool for Action? Global Environmental Politics, 16:2 (2016)	Accepted. We have added it.	Lorraine Elliott	The Australian National University	Australia
37271	12		12		New mention - One more assessment criteria for international cooperation shall be Technological Outcome.	Rejected. This is implied within transformative potential.	Arun kumar Nayak	Bhabha Atomic Research Centre Trombay Mumbai	India
37275	12		12		reward for technology development, reward for personal doing significant work on this front.	Rejected. We are not sure what you mean.	Arun kumar Nayak	Bhabha Atomic Research Centre Trombay Mumbai	India
48715	13	6	47	15	There is too much discussion on Paris Agreement.	This is a value judgment with which we do not agree. We consider it important to discuss the Paris Agreement in depth, given it represents the only multilaterally negotiated outcome that has been reached since AR5.	Linda Yanti Sulistiawati	Universitas Gadjah Mada	Indonesia
47619	13	11	13	11	capturing broad convergence among states 'based' on an objective, a set of principles,...	Rejected. Convergence on an objective (not based on an objective...)	Deshni Nadar	Environmental Consultant	Qatar
12729	13	12	13	17	(Suggestion) Regarding the sentence starting with "The UNFCCC", the party categorization of Annex I, Annex II, and non-Annex I is dealt with. I hope that this sentence can be re-written.	Accepted. Re-written to simplify the sentence structure	Chaewoon Oh	Green Technology Center	Republic of Korea
16645	13	12	13	17	(Suggestion) Regarding the sentence starting with "The UNFCCC", the party categorization of Annex I, Annex II, and non-Annex I is dealt with. I hope that this sentence can be re-written.	Accepted. Re-written to simplify the sentence structure	Government of Republic of Korea	Korea Meteorological Administration (KMA)	Republic of Korea
58319	13	12	13	17	This description equates "Annex I" with developed countries and "non-Annex I" with developing countries. This is not how those annexes are defined by the UNFCCC itself.	Rejected. While this is not how these categories are defined in the UNFCCC, the UNFCCC uses the terms developing countries and developed countries, and these terms have come to be understood in the literature and in subsequent COP decisions as representing the understanding we reflect here.	Government of United States of America	U.S. Department of State	United States of America
11983	13	12	13	15	This sentence is a bit convoluted and hard to read.	Accepted. Re-written to simplify the sentence structure	Tom Pegram	University College London	United Kingdom (of Great Britain and Northern Ireland)
14551	13	13	13	13	There is debate over whether the aim articulated in Article 4.2(a) and (b) constitutes a stabilisation goal, or not. The wording is "returning" emissions to 1990 levels by 2000, not necessarily to keep them at that level. Perhaps best to stick more closely to the UNFCCC wording, so "...developed country Parties with a goal to return, individually or jointly, their GHG emissions to 1990 levels by 2000"	Accepted. Changed. Thanks.	Joanna Depledge	Centre for Environment, Energy and Natural Resource Governance (CEENRG), University of Cambridge	United Kingdom (of Great Britain and Northern Ireland)
22483	13	15	13	16	a reference to the article of C. Voigt should be made as she identifies the different kind of legal obligations in the UNFCCC: VOIGT (C.), « State responsibility for climate change damages, Nordic Journal of International Law, vol. 77, 2008, pp. 1-22.	Rejected. Thanks for this. However, we are highlighting primarily on literature since AR5.	Government of France	Ministère de la Transition écologique et solidaire	France
63305	13	19	13	20	We recommend deleting "in that only Parties to the UNFCCC can be Parties to the later instruments". The Paris Agreement and the KP were open for signature and ratification, acceptance or approval by Parties to the Convention, but any country may accede to the PA or KP. That is, they do not need to be Parties of the UNFCCC.	Rejected. This comment represents an unconventional understanding of the provision, as well as the 'nested' nature of the UNFCCC, KP and PA treaties. There is no Party to the KP or PA that is not also a party to the UNFCCC.	Government of Canada	Environment and Climate Change Canada	Canada
22485	13	19	13	20	The sentence starting with "Both the 1997 Kyoto Protocol" should be more precise in explaining that KP and Paris Agreements are distinct treaties and that Parties to UNFCCC are not automatically Parties to these instruments. For example stating that: "Both the 1997 Kyoto Protocol and the 2015 Paris Agreement are distinct treaties (as States need to ratify them in order to become Parties), but they are 'related legal instruments' in that only Parties to the UNFCCC can be Parties to these latter instruments".	Accepted and clarified.	Government of France	Ministère de la Transition écologique et solidaire	France
58321	13	21	13	21	Delete "concretises the general obligations in the UNFCCC for developed countries". Could replace with: "The KP creates obligations specifying GHG emissions..."	Accepted.	Government of United States of America	U.S. Department of State	United States of America
14553	13	21	13	24	Annex B should be stated as "broadly" corresponding to Annex I. (Belarus and Turkey aren't in Annex B)	Accepted.	Joanna Depledge	Centre for Environment, Energy and Natural Resource Governance (CEENRG), University of Cambridge	United Kingdom (of Great Britain and Northern Ireland)
22487	13	24	13	26	This part should explain the reasons and needs for the opening of negotiations on a new global agreement: completing on how and why the KP has been insufficient	This section indicates instruments and milestones. 14.3.3. engages in a comparative exercise in relation to merits/insufficiencies of Kyoto and Paris.	Government of France	Ministère de la Transition écologique et solidaire	France
52757	13	4	13	5	Table 14.3 presents criteria as binary (yes/no). Later analyses treat these criteria as scales. Therefore, the questions here could be reworded within a "to what extent" construction rather than "does X do Y" construct. Not a single piece in the literature will answer these questions with a simple yes or no.	Accepted. We have done this.	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia
82903	13	6	13	6	As previously said, non-Paris aspects of UNFCCC underplayed?	Noted. Particularly, we have highlighted an assessment of the Kyoto Protocol.	Jim Skea	Imperial College London	United Kingdom (of Great Britain and Northern Ireland)

Comment Id	From Page	From Line To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country	
12159	13	12	13	32	The draft implies that dedicated SRM governance is required. This is not considered appropriate in much of the governance literature which points toward a polycentric model (patchwork) being the most appropriate model. This issue should be explored. As drafted the reader would be led to believe that a some form of dedicated SRM governance is necessary, required and possible. Suggest reviewing the literature on this further and revising to reflect the debate in the literature. E.g. FLORIN, M.-V., ROUSE, P., HUBERT, A.-M., HONEGGER, M. & REYNOLDS, J. L. 2020. International governance issues on climate engineering - Information for policymakers. International Risk Governance Centre (IRGC). Lausanne, Switzerland: EPFL Scientific Publications https://innocence/record/277726 .	Noted. We don't see where we have implied that such governance needs to be dedicated exclusively to SRM. We do note that no such governance currently exists. But our fourth criterion for SRM governance places it within a wider context.	Paul Rouse	Carnegie Climate Governance Initiative (C2G) - The Carnegie Council for Ethics and International Affairs	United Kingdom (of Great Britain and Northern Ireland)
22489	14	5	14	9	the agreement on REDD+ was also seen as a major success of the Copenhagen Conference and of the Copenhagen Accord, see : Earth Negotiation Bulletin, Summary of the copenhagen climate change conference, 2009, vol. 12, n° 459.	Rejected. This section is only highlighting the major developments	Government of France	Ministère de la Transition écologique et solidaire	France
58323	14	3	14	3	Replace "agreement" with "outcome" or "understanding"	Accepted. Reverted to Bali language.	Government of United States of America	U.S. Department of State	United States of America
46309	14	5	14	5	In Copenhagen, Parties informally agreed to the goal of limiting global warming to below 2 °C, not to 2 °C. The Copenhagen Accord also included a reference to consider limiting the temperature increase to below 1.5 degrees, https://unfccc.int/process-and-meetings/conferences/past-conferences/copenhagen-climate-change-conference-december-2009/copenhagen-climate-change-conference-december-2009 .	Accepted. Changed. Thanks.	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany
14555	14	6	14	6	It should not be inadvertently implied that the Copenhagen Accord constituted the first time that reporting and verification had formed part of the climate regime. I therefore suggest "establishing new terms..."	Accepted. Changed. Thanks.	Joanna Depledge	Centre for Environment, Energy and Natural Resource Governance (CEENRG), University of Cambridge	United Kingdom (of Great Britain and Northern Ireland)
46311	14	7	14	8	Please delete "public and private finance" and add the following sentence: "This funding will come from a wide variety of sources, public and private, bilateral and multilateral, including alternative sources of finance." (UNFCCC decision 2/CP.15 para 8)	Accepted. Changed. Thanks.	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany
58325	14	7	14	7	Replace with the following text: "... in the context of meaningful mitigation actions and transparency on implementation, setting a goal of mobilizing jointly \$100 billion a year by 2020 to address the needs of developing countries, from a wide variety of sources, public and private, bilateral and multilateral, including alternative sources of finance..."	Accepted, and changed in part on finance sources. Transparency referred to earlier. And, we do need to paraphrase and not merely cut and paste text from all the COP decisions.	Government of United States of America	U.S. Department of State	United States of America
15303	14	11	14	13	The original statement is not policy neutral. In order to highlight the EU's role in pushing countries to reach agreement after the Copenhagen Accord, the description of China as a "veto player" in the Copenhagen Accord is incorrect. 1. This conclusion does not tally with the facts and fundamentally denies the contributions and efforts of the Chinese government in the UNFCCC. 2. As far as the word veto player is concerned, as seen from its original meaning, any party in the negotiation is a veto player. There are too many ambiguities in naming individual countries here. 3. We do not deny the EU's active role in the climate change negotiation process, but it is wrong to presuppose denial of China's contribution. 4. The statement is not supported by the literature. It is suggested to delete "and explored compromises with veto players, such as China and the United States".	Accepted. Sentence deleted.	Government of China	China Meteorological Administration	China
9213	14	11	14	13	In order to highlight the EU's role in promoting the consensus among countries after the Copenhagen Agreement, the original text describes China as the "veto player" in reaching the Copenhagen Agreement. This statement is incorrect. 1) This conclusion is inconsistent with the facts and fundamentally denies the contribution and efforts of the Chinese government in UNFCCC. 2) From the point of view of the use of the term veto player, from the original point of view, any party in the negotiation is a veto player. Here There are too many ambiguities in naming individual countries. 3) It does not deny the active role of the EU in the climate change process, but it is wrong to deny China's contribution, and there is no documentary support. It is recommended to delete the sentence "and explored compromises with veto players, such as China and the United States".	Accepted. Sentence deleted.	Yongxiang Zhang	National Climate Center	China
14557	14	14	14	15	Yes, but note that negotiations on the KP's second commitment period had already been launched at MOP 1/COP 11 in Montreal in 2005. Perhaps add "in line with negotiations launched in 2005". Because of course we would never have even got to Copenhagen, let alone Paris, if parallel negotiations on the KP hadn't been ongoing, together with the AWGLCA negotiations on the future of the UNFCCC.	Accepted	Joanna Depledge	Centre for Environment, Energy and Natural Resource Governance (CEENRG), University of Cambridge	United Kingdom (of Great Britain and Northern Ireland)
22491	14	20	14	21	"Collectively...": This statement is unclear because it is formulated in the present tense ("are on track") whereas it is stated that pledges were to be attained in 2020.	Accepted. Changed. Thanks.	Government of France	Ministère de la Transition écologique et solidaire	France
9215	14	27	14	28	This statement is not accurate. It is recommended to delete "The Doha amendment entered into force in January 2021."	Changed.	Yongxiang Zhang	National Climate Center	China
58329	14	28	14	28	Replace "January 2021" with "December 2020". Doha entry into force was 12/31/20.	Changed.	Government of United States of America	U.S. Department of State	United States of America
14559	14	28	14	28	The Doha Amendment entered into force on 31 December 2020. (It's symbolically important that this happened while CP2 was still effective, and indeed the secretariat went to some lengths to encourage parties to accept the amendment in time to enable this).	Changed.	Joanna Depledge	Centre for Environment, Energy and Natural Resource Governance (CEENRG), University of Cambridge	United Kingdom (of Great Britain and Northern Ireland)
22493	14	29	14	32	Even if the statement is true, it seems to overshadow some of its reasons, such as the withdrawals of countries	Noted, thanks. We are attempting to stay neutral here.	Government of France	Ministère de la Transition écologique et solidaire	France
22495	14	31	14	31	Clarify by adding "for the first commitment period" after "their targets"	Accepted. Changed. Thanks.	Government of France	Ministère de la Transition écologique et solidaire	France

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
63309	14	33	14	33	Suggest changing this sentence in light of different interpretations of the relationship between the Paris Agreement and the Convention (for example, Canada does not view the Paris Agreement as being under the Convention.) It would be better to say, for example, "are part of the UN climate regime first established by the UNFCCC"	Noted. However the Durban Platform that launched the negotiations towards the Paris Agreement uses the language "under the Convention".	Government of Canada	Environment and Climate Change Canada	Canada
2497	14	33	14	33	We suggest a transition between line 32 and 33. It seems that the vision is an historicist presentation of the climate regime that stopped at Doha and then that discusses the differences between PK and PA. It would help understanding to finish with historical approach at least until the COP in Paris. It may also be exposed briefly other important milestones (For example Warsaw framework for REDD+ : with reference to relevant section), or talk about the Durban Plateform and the change in the negotiation process to create consensus).	Noted. We do have space constraints so have limited this section to key milestones.	Government of France	Ministère de la Transition écologique et solidaire	France
58331	14	33	14	33	Delete "under the umbrella of" and replace with "adopted under"	Accepted. Changed. Thanks.	Government of United States of America	U.S. Department of State	United States of America
12625	14	33	14	43	The balance here is off, and overstates the differences of the Paris Agreement from previous agreements. The cited works acknowledge the similarities between the PA and previous agreements (especially the Copenhagen accord). See Allan, J. I. (2019). Dangerous incrementalism of the Paris Agreement. Global Environmental Politics, 19(1), 4-11. These works also over state the differences with the Kyoto Protocol. The KP targets were not multilaterally negotiated. There were negotiations, but they failed. Instead, countries submitted their pledges / targets and they were accepted in the last hour without discussion	Noted, thanks. We do not claim the KP targets were multilaterally negotiated, just that they were entered into the multilateral negotiation process, which they were, unlike the PA targets.	Jennifer Allan	Cardiff University	United Kingdom (of Great Britain and Northern Ireland)
14561	14	33	14	36	While recognising that this "decisive break" characterisation is the mainstream view, it shouldn't be stated as a fact, and there are others who disagree, pointing to continuities between the treaties, eg in terms of reporting and review, and other institutional arrangements. This nuance can be easily accommodated. I suggest something like: "Although.... UNFCCC, they are generally seen as representing fundamentally different approaches.... 2016). The Paris Agreement has often been characterised as a "decisive break" from the Kyoto Protocol, in particular (ref.). Others, however, point to continuities within the regime, for example, in terms of rules for reporting and review, and crossover and use of common institutional arrangements (Allan, J.I (2019), Depledge, 2017). The reference to Allan is: Allan, J. I. (2019). Dangerous incrementalism of the Paris Agreement. Global Environmental Politics, 19(1), 4-11.	Accepted in part. Thanks.	Joanna Depledge	Centre for Environment, Energy and Natural Resource Governance (CEENRG), University of Cambridge	United Kingdom (of Great Britain and Northern Ireland)
8431	14	36	14	43	This specific paragraph introduces "top-down" and "bottom-up" terms. Although these terms became familiar after Paris Agreement was adopted, people use these terms in different definitions and understanding. Therefore, these terms may be taken up once in the main text, but I do not think it is constructive to repeat using these words many times, such as in Table 14.4 and in page 20 lines 2-4. As for diversity of understanding of the terms, some use "top-down" "bottom-up" to explain how emission reduction target levels were determined in the negotiation. Some others use these terms to explain how the emission target figures are governed in the treaties. The current sentence in lines 41-43 is based on types of obligation, and I find logic of this paragraph as a whole is a little confusing, or inconsistent. I understand Lavanya writes in some of her publications as "combination of bottom-up and top-down, or hybrid" and I wonder if that is a third category, different from simple "bottom-up". In any case, as long as there are some who disagree (Depledge 2017?), I think it is not good to use these terms throughout the chapter as if they gained common understanding. Merely arguing whether "top-down""bottom-up" expression is correct or not is not constructive. I feel the two terms can be used if they can facilitate analyses to find strengthes and weaknesses depending on architecture of multilateral agreements.	Accepted in part. Thanks.	Yasuko Kameyama	National Institute for Environmental Studies	Japan
22499	14	38	14	38	Suggestion to add "and were subject to ratification and entry into force to take effect" after "negociation process,"	Noed, however this is true for all aspects of the treaty, so it would be odd to add it in here.	Government of France	Ministère de la Transition écologique et solidaire	France
58333	14	38	14	38	Why is 'nationally determined' in quotes? Recommend deleting them.	Accepted. Changed. Thanks.	Government of United States of America	U.S. Department of State	United States of America
421	14	41	14	43	This sentence suggests a distinction between "substantive" and "procedural" obligations. While such a distinction makes sense in some legal fields, it is unclear how it applies or what precisely it entails in relation to climate law (or international law in general). Is a Party's obligation to pursue measures aimed at achieving the objective of its NDC a "procedural" obligation or a "substantive" obligation? What difference does it make? I suspect that this qualification only reflects an implicit value judgment. See on this topic: Jutta Brunnee, Procedure and Substance in International Environmental Law (2019) 450 Collected Courses of the Hague Academy of International Law, who shows - to put it simply - that the distinction is not useful in the context of international environmental law. Therefore I would suggest to remove the words "substantive" and "procedural".	Noted, thanks. However, this is subject to an academic debate, which we do not have the space to engage in here. We have indicated that this is a view some hold.	Benoit Mayer	The Chinese University of Hong Kong	China
423	14	41	14	43	An obligation is, by definition, binding, and something binding is, by definition, an obligation. Obligations of conduct, too, are legally binding (or else they would not deserve to be called "obligations"). I suggest therefore to remove the word "binding" in its two occurrences in this sentence.	Accepted, and changed, but this is also a matter of debate. It is however superfluous usage here, so removed.	Benoit Mayer	The Chinese University of Hong Kong	China
22501	14	41	14	42	the sentence could be more precise adding at the end of it in brackets : "substantive obligations of results (through quantified GHG emissions)".	Noted, however, we would also need to be precise about the PA, and that would be wordy.	Government of France	Ministère de la Transition écologique et solidaire	France
58335	14	45	14	45	Delete "developed country"	Accepted. Changed. Thanks.	Government of United States of America	U.S. Department of State	United States of America

Comment Id	From Page	From Line To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country	
58337	14	46	14	47	Delete "with some flexibilities ... and developing countries that need it in light of their capacities" and replace with "although LDCs and SIDS may prepare and communicate strategies, plans, and actions for low greenhouse gas emissions development reflecting their special circumstances". This latter language is from Article 4.6. The current reference here to "developing countries that need it in the light of their capacities" is used exclusively in the context of Article 13 (transparency) and has nothing to do with the procedural obligations relating to NDCs.	Accepted in part. Thanks.	Government of United States of America	U.S. Department of State	United States of America
22503	14	47	14	47	This phrase relates to the transparency system not strictly the NDCs. It might be wiser to restructure this putting all of the issues related to the Paris Agreement in a separate sentence "Differentiation under the Paris Agreement is expressed in different ways in different articles and makes no reference to the annexes to the Convention - hence some obligations such as the require to prepare, communicate and communicate successive NDCs apply to all parties, with some flexibility for LDCs and SIDS to reflect their special circumstances, similarly the rules on transparency also apply to all parties whilst providing built-in flexibility in its implementation to those developing countries that need it in the light of their capacities, on the other hand obligations in terms of finance are more clearly differentiated between developed and developing countries. The expression of the principle of common but differentiated responsibilities and respective capabilities from the Convention was completed by the notion of national circumstances in the Paris Agreement to better reflect the dynamic evolution of parties's circumstances."	Noted, thanks. We do discuss differentiation in different sections. We do not have the words to elaborate on it here. We have amended this text, however, to address the core point.	Government of France	Ministère de la Transition écologique et solidaire	France
63307	14	17	14	41	While this section contains a detailed discussion on indicators of equity, we note there is no corresponding discussion on indicators of "highest possible ambition", which is much more relevant to discussions on NDCs. The equity discussion also appears to be singularly focused on equity between states, while ignoring equity within states and intergenerational equity.	Noted, however this section reflects the literature on equity, and most of that literature is focused on equity between states.	Government of Canada	Environment and Climate Change Canada	Canada
58327	14	11	14	15	Delete the lines "Following the Copenhagen Accord..." to the end of the paragraph. What is the purpose of this section? Is it the role of IPCC to be doing political science on the history of climate negotiations?	Accepted. Sentence deleted.	Government of United States of America	U.S. Department of State	United States of America
8429	14	10	14	11	On line 10, it reads ", with 85 countries entering pledges to reduce their emissions by 2020" but this is false. The original sentence in Christensen and Olhoff 2019 says "... to reduce their emissions or constrain their growth up to 2020". In addition, on line 11, the citation says (2019a) but in the reference list there is only one reference for these authors in 2019 so it should be (2019). In any case, information in the reference list is incomplete.	Accepted. Changed. Thanks.	Yasuko Kameyama	National Institute for Environmental Studies	Japan
10039	14	4		16	Internal policies, in fact, often act as obstacles to greenhouse abatement action. On the contrary, international cooperation unfold opportunities to learn and leverage literacy in encouraging carbon reduction efforts. Therefore, it is necessary to consider additional criteria for assessing the effectiveness of international cooperation, namely whether international cooperation provides a more positive and massive impetus to the internal (domestic) policy shift in support of carbon reduction efforts towards effectiveness in climate change mitigation. The additional criterium is in line with that of Patt and Lilliestam (2018) where policy effectiveness plays a pivotal role in the progress on achieving the GHG emission level (Chapter 14, page 14-9, line 7 – 9). The sentence at page 14-4 line 15 – 16 should thus accordingly be changed into, says: In other areas where effectiveness can be assessed – transformative potential, distributive outcomes, economic performance, and institutional strength, as well as policy shift – international cooperation is having a positive effect, but one that is as yet too weak to achieve the objectives of the Paris Agreement	Accepted. We now include the effect of international cooperation on policy adoption.	Government of Indonesia	Ministry of Environment and Forestry	Indonesia
467	14	42	14	43	I would suggest to add another reference, an article that looks at what obligations of conduct imply in the context of the Paris Agreement: Benoit Mayer, 'Obligations of conduct in the international law on climate change: A defence' (2018) 27(2) Review of European, Comparative and International Environmental Law 130-140.	Agreed. We added this reference.	Benoit Mayer	The Chinese University of Hong Kong	China
14563	15	2	15	4	It's important not imply that Annex I Parties could use the CDM, JI and IET to fulfill "all" of their targets, and therefore avoid domestic action. The Marrakesh Accords specifically refer to "supplemental to domestic action" and to domestic action accounting for a "significant element" of the effort to meet targets. So perhaps just amend to read "to fulfill some of their GHG targets".	Accepted. Changed. Thanks.	Joanna Depledge	Centre for Environment, Energy and Natural Resource Governance (CEENRG), University of Cambridge	United Kingdom (of Great Britain and Northern Ireland)
58339	15	6	15	7	Delete "subject to rules relating to integrity and accounting that are yet to be agreed" and replace with "subject to guidance and rules that are yet to be adopted." The rationale here is that (1) there is both "guidance" (for 6.2) and rules (for 6.4), and (2) the specific scope of what is addressed in the guidance and rules is not yet finalized.	Accepted in part. The text suggested has been incorporated. While the content is yet to be finalized, commentators have written about the thematic content of the rules (integrity and accounting) - this is referred to in the article cited.	Government of United States of America	U.S. Department of State	United States of America
22505	15	12	15	12	maybe specify here that Paris agreement lies on transparency process (based on informational flows, etc) in order to make parallelism with the statement made on the Kyoto Protocol.	Noted, this is covered in the last sentence in this paragraph.	Government of France	Ministère de la Transition écologique et solidaire	France
48549	15	14	16	14	The article 6 of the Paris Agreement, "recognizes the importance of integrated, holistic and balanced non-market approaches being available to Parties to assist in the implementation of their nationally determined contributions". In this regard, the table 14.4 must include reference of market and non-market approaches, both are equally important.	Accepted. Added.	Fany Ramos Quispe	Environmental Engineers Association of La Paz	Bolivia
85989	15	14	14	15	Suggest edits to the timetable in table 14.4 notes for the Paris Agreement, such that it aligns with the Paris Agreement text as well as the further outlines of the process detailed in this chapter: "Initial NDCs for timeframes from 2020 running through 2025 or 2030 with Parties to communicate NDCs every five years."	Noted, but not clear what the suggested change is.	Government of Australia	Department of Industry, Science, Energy and Resources	Australia

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
52759	15	14	15	15	What is the key difference in the objectives of KP and PA with respect to sustainable development?	Noted, but too much detail for this Table	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia
58341	15	14	15	14	The ultimate objective of Article 2 of the UNFCCC is the objective of the KP and Paris. The Paris Agreement has three goals in Article 2.1 that can also be cited. The authors should not try to recharacterize these, but should rather just use the words from the agreements.	Noted, and accepted in part. The language from the Agreements is used where succinct, but a high-level overview cannot cut and paste text for Agreements.	Government of United States of America	U.S. Department of State	United States of America
58343	15	14	15	14	In "Coverage of mitigation-related commitments" row, "Developed country parties" should be deleted under KP and it should just refer to the Annexes. The KP does not define the Annexes as "developed country parties".	Accepted	Government of United States of America	U.S. Department of State	United States of America
58345	15	14	15	14	In "Targets" row, under Paris Agreement, either delete everything after "NDCs" or alternatively use a direct quote from the Paris Agreement. Article 4.3 was carefully negotiated and the IPCC shouldn't rearrange or recharacterize the language.	Accepted, in part. Deleted characterization as "normative expectations" but retained references to highest possible ambition, CBDRRC-ILDCN and progression, which are in Article 4.3.	Government of United States of America	U.S. Department of State	United States of America
58347	15	14	15	14	In "Loss and damage" row, replace text with an exact quote from Article 8.3. Again, the authors shouldn't be recharacterizing the carefully chosen language from the agreement.	Noted, and accepted in part. The language of 'Cooperation and facilitation to enhance understanding, action and support' is exactly the language in 8.3. More generally we cannot in a table attempting to provide high level oversight of key continuities and differences, cut and paste text from the treaties. Some attempt to summarize is called for, although we take the point about 'recharacterization'.	Government of United States of America	U.S. Department of State	United States of America
12627	15	14	16	1	New NDCs are not submitted every five years. Countries with 10 year time frames can update their NDCs at the five year mark if they so choose. Very few countries have 5 year time frames, so there will be very few new NDCs at the five year mark	Noted, and amended.	Jennifer Allan	Cardiff University	United Kingdom (of Great Britain and Northern Ireland)
12629	15	14	16	1	Implementation as a line only mentions markets - perhaps it should be relabelled. The PA column should mention the 6.4 mechanism in the same way as the KP mechanism, since the text is the same. It should be noted that Article 6 has yet to be operationalized and negotiations are ongoing.	Noted, but we do need to summarize, and there are short-hands (CDM etc) for Kyoto mechanisms in the literature. Added reference to ongoing negotiations.	Jennifer Allan	Cardiff University	United Kingdom (of Great Britain and Northern Ireland)
8433	15	14			Table 14.4. Based on my comment above, I think ('top-down') and ('bottom-up' or 'hybrid') should both be deleted. If they are not going to be deleted, then, at least, ('top-down') should come after "common metrics" because "based on national offers submitted to the multilateral negotiation process" is not top-down, but bottom-up part of Kyoto negotiation process. Similarly, ("bottom-up") should be inserted after "contributions" and "hybrid" should come after "progress".	Accepted, deleted.	Yasuko Kameyama	National Institute for Environmental Studies	Japan
14565	15	15	16	1	I reiterate my comment on the FOD that this table should also include the UNFCCC, in order to increase its usefulness and accuracy. At the moment, for example, the implication is that developing countries weren't subject to transparency/reporting and review provisions until the PA (bc they are rightly not included in the KP entry). Most of the other categories were also covered, at least in general terms, in the UNFCCC. A table with entries for the UNFCCC, KP and PA would give a better overview of how the regime has evolved over time.	Accepted, included.	Joanna Depledge	Centre for Environment, Energy and Natural Resource Governance (CEENRG), University of Cambridge	United Kingdom (of Great Britain and Northern Ireland)
14567	15	15	15	15	Technically the UNFCCC objective doesn't refer to sustainable development (but rather, to economic development proceeding in a sustainable manner) The PA objective is also in pursuit of the UNFCCC ultimate objective.	Accepted. Changed. Thanks.	Joanna Depledge	Centre for Environment, Energy and Natural Resource Governance (CEENRG), University of Cambridge	United Kingdom (of Great Britain and Northern Ireland)
425	15		15		Table 14.4, fifth row ("Target"), third column (Paris Agreement), suggests that the targets contained in NDCs are "non-binding contributions". I disagree with this. Article 4(2), in its second sentence, creates an obligation (of conduct) for Parties to take measures aimed at achieving the objectives of their NDCs. These objectives, therefore, are legally binding, at least in a sense. (Few if any obligations are absolute in the sense that a breach of an obligation would necessarily be implied by the non-achievement of the target; an obligation of conduct is simply one that makes it a bit easier for a State to justify non-achievement of the target without having to prove the existence of circumstances precluding wrongfulness). Moreover, it is unclear what "normative expectations" mean. The text above mentioned the existence of an "obligation of conduct", which is the correct characterisation of the provision.	Noted, and this is nuanced in the text. The Table is a high-level overview. But language nuanced.	Benoit Mayer	The Chinese University of Hong Kong	China
63311	15		15		The 'Architecture' row in Table 4 implies that commitments under the Paris Agreement do *not* have common metrics. This is incorrect. The NDC accounting guidance in decision 4/CMA.1 (Annex II, para 1), and the transparency guidelines in 18/CMA.1, requires Parties to use common metrics in their national inventories and NDC accounting.	Accepted, changed.	Government of Canada	Environment and Climate Change Canada	Canada
22507	15		15		Table 14.4 and Figure 14.1 are summarizing a lot of common information. It is a bit redundant. It would be clearer to use one figure to summarize all of these informations. In this case reformulate the two associated paragraphs in one.	Accepted. Figure 14.1 deleted, and Figure 14.4 extended, also to include a column on UNFCCC.	Government of France	Ministère de la Transition écologique et solidaire	France
22509	15		15		Table 14.4 : First row "objective" 3rd column : It is not correct to present as mitigation. The PA sets temperature goals, several goals related to mitigation (peak and decline, neutrality) but also an adaptation goal and a goal to make financial flows consistent with low greenhouse gas emissions and climate-resilient development as well as sustainable development and equity.	Noted, but all goals are referenced in the text	Government of France	Ministère de la Transition écologique et solidaire	France
22511	15		15		Table 14.4 : row "Targets" 3rd column : suggestion to add at end "and encouragement to formulate long-term low greenhouse gas development strategies"	Accepted. Changed.	Government of France	Ministère de la Transition écologique et solidaire	France
22513	15		15		Table 14.4 : row "Timetable" 3rd column : concerning the term "new", there is an ongoing debate whether it needs strictly to be a "new" NDC every five years.	Accepted, changed.	Government of France	Ministère de la Transition écologique et solidaire	France
1495	15	23	15	23	Add Kongsager 2018 to the cited reference "(Bayramoglu et al. 2018; Kongsager 2018)" • Kongsager, R. (2018). Linking Climate Change Adaptation and Mitigation: A Review with Evidence from the Land-Use Sectors. <i>Journal: Land</i> (7)4, 158. https://doi.org/10.3390/land7040159	We can't figure out what to do with this, because the SOD contained no line 23 on page 15.	RICO KONGSAGER	University College Copenhagen	Denmark
63313	15		15		CBDR-RC-NC is not a standalone feature of NDCs. Rather, it is a modifier of the ambition and progression features. Therefore, this sentence should read "...highest possible ambition and progression, reflecting CBDR-RC-NC"	Agreed. We added this.	Government of Canada	Environment and Climate Change Canada	Canada

Comment Id	From Page	From Line To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country	
51791	16	1	16	1	Table 14.4 includes "encouragement of REDD+" under implementation. However, this is too short-hand to capture Article 5 of the PA, and the encouragement also to all Parties, including developed country Parties, in Article 5.1. Suggest to rephrase to include that all Parties should take action to conserve and enhance, as appropriate, sinks and reservoirs of greenhouse gases as referred to in Article 4, paragraph 1(d), of the Convention	Noted, but the entire table is intended to be short-hand. If we cut and paste text out of the Paris Agreement it would not serve the purpose of providing a high-level overview	Florin Vladu	UNFCCC Secretariat	Germany
58349	16	1	16	1	For "Implementation" row, suggest deleting it outright. These really don't encompass the range of different implementation actions. And a lot of implementation is simply domestic action.	Noted, but this is just representative. National implementation added in the context of UNFCCC	Government of United States of America	U.S. Department of State	United States of America
14569	16	2	16	11	I would delete this paragraph (and the following figure, addressed in my next comment), on the grounds that it does not add any further insight to that already presented, and is misleading. It is incorrect to speak of "allocating" and "allocation". National emission reduction responsibilities under the KP were not "allocated" in any formal way. The "at least 5%" referred to in KP Article 3.1 is not a top-down target, but rather a bottom-up summation of the emission objectives tabled by the Annex I Parties and listed in Annex B. The argument here about a fundamental distinction in the "forms of the mechanisms" is rather vague and unconvincing; it also contributes to the over-emphasis of the chapter on describing the PA and underlining its differences with the KP. I am not persuaded that "mechanisms" were more centralised under Kyoto than Paris. I elaborate on this in my comment on Figure 14.1 (also explained in my comment on the equivalent figure TS34). Overall, both this paragraph and the accompanying figure should be deleted.	Accepted. Figure 14.1 deleted, and Figure 14.4 extended, also to include a column on UNFCCC.	Joanna Depledge	Centre for Environment, Energy and Natural Resource Governance (CEENRG), University of Cambridge	United Kingdom (of Great Britain and Northern Ireland)
48287	16	10	16	11	I know Paris is still relatively new, but with the incoming NDCs, is it possible to include initial observations about trajectory of success?	Noted, discussed in 14.3.3	Susana Hancock	University of Oxford	United States of America
22515	16		16		Table 14.4 : row "implementation" 3rd column : add "and non-market" after "market based approaches"	Accepted, changed.	Government of France	Ministère de la Transition écologique et solidaire	France
22517	16		16		Table 14.4 : row "compliance" 3rd column : Suggestion to reformulate as "committee to promote compliance and facilitate implementation"	Accepted, changed.	Government of France	Ministère de la Transition écologique et solidaire	France
48289	17	0	17	0	This figure is hard to read, blurry text.	Accepted. Figure deleted.	Susana Hancock	University of Oxford	United States of America
15305	17	1	17	8	The original statement is not policy neutral. Figure 14.1 is incorrect in its classification of the attributes of obligations related to finance. In Figure 14.1, financing should be a Party action under both the Convention and the Paris Agreement. Therefore, the oval purple finance boxes representing the funding obligations under the Convention/KP, respectively, should refer to the obligations of Annex II countries rather than all Parties, and should be placed in the third quadrant on the left. The square purple finance boxes representing the funding obligations under the Paris Agreement should be put in the first quadrant.	Accepted. Figure deleted.	Government of China	China Meteorological Administration	China
58351	17	1	17	1	Does Figure 14.1 clarify anything?	Accepted. Figure deleted.	Government of United States of America	U.S. Department of State	United States of America
12631	17	1	17	1	the figure misrepresents several aspects. 1. What does decentralized mean - decentralized in terms of each country operates independently? The term should be defined and literature references (although I am not aware of any literature making this distinction. If the reading above is correct, national reporting is still national reporting, so the KP column should also be decentralized 2. REDD is not recognized in the PA and there are no agenda items or work programmes for REDD anymore. 3. non-state and sub-state actors are not in the PA (perhaps this figure refers to the broader regime?). I think this figure is confusing more than illuminating	Accepted. Figure deleted.	Jennifer Allan	Cardiff University	United Kingdom (of Great Britain and Northern Ireland)
14571	17	1	17	8	Figure 14.1 is flawed and I would recommend deletion for the following reasons.(1) All four categories - decentralised, centralised, allocation of effort, enhancement of effort - are misleading and unhelpful. The use of the category "Allocation of effort", in particular, does not chime with the reality of the international regime. No attempt to formally "determine and allocate countries' relative mitigation efforts" (figure legend) has ever taken place. The UNFCCC establishes a carefully worded "aim" for Annex I Parties to return their GHG emission levels to 1990 by 2000, but this is "individually or jointly", not at country level. Annex I Parties took on emission targets under the KP, but these were tabled by the countries themselves, with limited negotiations around the margins, and explicitly no use of "Allocation of effort" instruments" If you mean the differentiation of roles and commitments between Annex I and non-Annex I Parties, then this should be clearer, and does not represent "allocation of effort" as commonly understood. (2) It is not clear to me what "the intermediate cumulative emissions target for Annex I countries" refers to. Is this a reference to the "at least 5%" in the KP? If so, then this reference is incorrect if framed in the context of "allocation" of effort. The 5% figure consists of the bottom-up *summation* of the individual emission targets, not a pre-determined top-down global goal, that was then used to allocate individual country targets. (3) It is not clear to me why accounting and reporting is categorised as centralised/allocation of effort for the UNFCCC/KP, but decentralised/enhancement of effort under the Paris Agreement. The PA system builds entirely upon the UNFCCC transparency system. It might be stronger, but I don't see a qualitative difference in terms of centralisation/enhancement/allocation of effort here. Same for the compliance mechanisms. Both the KP and PA systems are centralised, according to the definition supplied in the legend; one is stronger than the other, but I don't think that's the point the figure is trying to make. (4) I have the same issue with LULUCF and market-based mechanisms. Decentralised/centralised is not a useful distinction. Market-based mechanisms under the KP were not decentralised - they were founded on quite strong rules and procedures, including committees and centralised registration systems, based with the climate regime organs. LULUCF commitments were also subject to standardised rules and methodologies.	Accepted. Figure deleted.	Joanna Depledge	Centre for Environment, Energy and Natural Resource Governance (CEENRG), University of Cambridge	United Kingdom (of Great Britain and Northern Ireland)

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
83539	17	1	17	8	I would have expected the Periodic Review of the Paris Agreement long term global goal also to feature in the Information&Review category.	Figure deleted.	Joeri Rogelj	Imperial College London	United Kingdom (of Great Britain and Northern Ireland)
47633	17		19		I just have a suggestion related to figures 14-1 and 14-2. I think that both of them are not clear enough. Maybe, you could review them. Thanks!	Accepted. Figure 14.1. deleted.	Pamela Ruiz Martínez	UNID	Mexico
58353	17	10	17	20	Shorten the first paragraph of Section 14.3.1.2 or merge parts of it with the following paragraph.	Noted, thanks,	Government of United States of America	U.S. Department of State	United States of America
8263	17	10	17	20	When mentioning the veto-power of some nations, it would add a value to the Negotiation Context to also explain the objective behind the veto, and its criticism (and how it affects the power dynamics of the international collaboration in the UN system)	Noted. We did not have room to add this.	Frida Zahlander	DanChurchAid	Denmark
8435	18	4	18	4	White House, not Whitehouse.	Accepted.	Yasuko Kameyama	National Institute for Environmental Studies	Japan
12633	18	13	18	32	LMDCs are missing. ALBA members mostly went to LMDC (rather than AILAC overtaking - perhaps better phrased as AILAC became a dominant voice of the region)	LMDCs have been referred to this section. Accepted changed reference to AILAC.	Jennifer Allan	Cardiff University	United Kingdom (of Great Britain and Northern Ireland)
82905	18	23	18	23	only spelled out at line 30-31	Accepted. Corrected.	Jim Skea	Imperial College London	United Kingdom (of Great Britain and Northern Ireland)
15307	18	24	18	26	The original statement is not policy neutral. The statement in the sentence "Yet, the 'complex and competing' identities of India and China, with differing capacities, challenges and self-images, have also led to tensions in the negotiations (Ciplet and 26Roberts 2017; Rajamani 2017)." does not tally with the facts. The tension between China and India during the negotiations is an unsubstantiated statement and is not something that should be included in a scientific report. It is suggested to verify the literature and delete this sentence.	Accepted, in part. Deleted 'led to tensions'.	Government of China	China Meteorological Administration	China
9217	18	24	18	26	"However, the "complex and competing" identities of India and China, as well as different capabilities, challenges and self-images, have also led to tensions in the negotiations (Ciplet and Roberts, 2017; Rajamani, 2017)" The statement in this paragraph is inconsistent with the facts. If the author thinks this is an important conclusion, it is recommended to add the conclusion of objective evaluation of the literature, or delete the statement that is inconsistent with the facts. .	Accepted, in part. Deleted 'led to tensions'. This is a conclusion reflected in the literature.	Yongxiang Zhang	National Climate Center	China
48679	18	27		29	include specific mention of AOSIS (Alliance of Small Island States) given that other like-minded groups are referred to by their acronyms	Accepted.	Lorraine Elliott	The Australian National University	Australia
82907	18	28	16	28	1.5 isn't the long-term goal?	Accepted	Jim Skea	Imperial College London	United Kingdom (of Great Britain and Northern Ireland)
84201	18	29	18	32	Suggest adding brief explanation on what "decisive role" the AILAC played.	Accepted.	Madoka Yoshino	United Nations University Institute for the Advanced Study on Sustainability	Japan
48291	18	30	18	31	We need to know what ALBA means the first time it is used (for example, above, in 23 if not used earlier)	Accepted. Added	Susana Hancock	University of Oxford	United States of America
14573	18	31	18	32	This reference should be cited here: Guy Edwards, Isabel Caveller Adarve, María Camila Bustos & J. Timmons Roberts (2017) Small group, big impact: how AILAC helped shape the Paris Agreement, Climate Policy, 17:1, 71-85, DOI: 10.1080/14693062.2016.1240655	Accepted. Added	Joanna Depledge	Centre for Environment, Energy and Natural Resource Governance (CEENRG), University of Cambridge	United Kingdom (of Great Britain and Northern Ireland)
9219	18	33	18	39	The expression is difficult to understand. What is moral leadership? It is recommended that the author give a definition and use a logical and clear statement to state it.	Rejected. The term is widely used and understandable. It would detract from the flow to elaborate it, and it entails extra words.	Yongxiang Zhang	National Climate Center	China
9221	18	35	18	35	It is recommended to change "the US, EU, and China" to "parties".	Rejected. The sentence only makes sense in the context of identifying particular parties. The statement is policy neutral.	Yongxiang Zhang	National Climate Center	China
22519	18	41	18	41	((It is in the context ..."): for a clearer section on negotiation context, it would be useful to include elements of this paragraph at the beginning, then follow with the paragraphs starting line 1 and line 13. Indeed, in the previous section differences between PK and PA are exposed. Thus it is better to make a transition saying that this differences in architecture result form a change in geopolitical context (emergence of a multipolar world as stated in paragraph line 41), and then explain the creation and composition of this new multipolar context (paragraphs starting line 1, and 13). On an another aspects, elements in the paragraph starting line 33 could be included in the one starting line 13 as it reiterate some of its statements and precise others.	Noted, thanks. But we think the current structure flows well.	Government of France	Ministère de la Transition écologique et solidaire	France
48293	19	0	19	0	Figure too blurry to read	Changed.	Susana Hancock	University of Oxford	United States of America
22521	19	1	19	1	This section misses discussion on the question of the impact of the the implementation of response measures. There is a provision in article 4.15 to take into consideration these issues in the implementation of the Agreement, and the Rulebook includes provisions on the operation of the Forum and the Katowice Committee of Experts on the Impacts of the Implementation of Response Measures to address several areas including just transition, economic diversification, and questions around modelling and identification of impacts.	This will be addressed at the next stage.	Government of France	Ministère de la Transition écologique et solidaire	France

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
8453	19	1	25	41	The Chapter should mention that the customary 'no-harm' principle, conceived of by the ICI as a principle according to which states must prevent activities within their jurisdiction from causing extraterritorial environmental harm, applies to the regulation of greenhouse gas emissions because they are interfering with the global climate system. As a helpful complement to (the invaluable) treaty-based obligations, this principle should help put pressure on states and lead them to reduce their GHG emissions. Conventional obligations (in particular those arising from the UNFCCC, Kyoto Protocol, Paris Agreement, and the related decisions of the parties to those treaties) must be interpreted in the light of the customary-law obligation, which can result in additional obligations. In practice, conventional and customary due-diligence obligations mutually feed and shed light on one another. The 2016 award in the South China Sea case perfectly reflects the mutually reinforcing relationship that can hold between these different kinds of international obligation: in this instance, the Tribunal found that the no-harm principle 'informs the scope of the general obligation in Article 192' of the UN Convention on the Law of the Sea (South China Sea (Philippines v. China) (Award of 12 July 2016) 170 ILR 1, 564 [941]). See Benoit Mayer, "The Relevance of the No-Harm Principle to Climate Change Law and Politics" (2016) 19 Asia-Pacific Journal of Environmental Law 79-104; S. Maljean-Dubois, "Climate litigation", Max Planck Encyclopedia of International Procedural Law [MPEIPro], 2018.	Accepted. Added	Sandrine MALJEAN-DUBOIS	CNRS/ Aix-Marseille University	France
85991	19	3	19	3	The number of parties to the Paris Agreement should be updated to the latest number as of at least December 2020. It is currently 190.	Accepted. Changed.	Government of Australia	Department of Industry, Science, Energy and Resources	Australia
86061	19	3	19	3	Update number of Paris Agreement parties to date from 189 to 191	Accepted.Changed.	Stuart Bruce	KPMG; International Chamber of Commerce Energy and Environment Committee Co-Chair; IUCN Energy Transition Project Co-Chair	United Kingdom (of Great Britain and Northern Ireland)
22523	19	4	19	4	"in the early part of its four-year ..." in fact the legal form was barely an issue during the final year of negotiations, the question being subsumed into debates on how legally to capture mitigation actions	Accepted, in part. Language nuanced.	Government of France	Ministère de la Transition écologique et solidaire	France
63315	19	15	19	21	There is a discussion of human rights obligations under the Paris Agreement, but the rights of Indigenous peoples is missing from this framework and should be added.	Accepted. Reference added.	Government of Canada	Environment and Climate Change Canada	Canada
15309	19	15	19	23	Figure 14.2, which involves the connotation of the NDC clause, is not totally correct. It is important to be faithful to the original text in interpreting the Paris Agreement. 1. Article 3 of the Paris Agreement addresses nationally determined contributions (NDC), which includes mitigation, adaptation, finance, technology, capacity building, and transparency. Instead, the Figure connotes that Article 3 contains NDC and means of implementation, which is not accurate; in addition, the arrows in the Figure indicate the linkage, and Article 8 (loss and damage) of the Paris Agreement is not included in Article 3 (NDC). The original text of Article 3 reads: As nationally determined contributions to the global response to climate change, all Parties are to undertake and communicate ambitious efforts as defined in Articles 4, 7, 9, 10, 11 and 13 with the view to achieving the purpose of this Agreement as set out in Article 2. The efforts of all Parties will represent a progression over time, while recognizing the need to support developing country Parties for the effective implementation of this Agreement. 2. In the note to Figure 14.2, "(1) an 'ambition cycle' that expects parties' successive NDCs, informed by five-yearly global stocktakes (Art 14)". But in the original text of Article 14, it is the Party rather than NDC that is informed, since there is a need for a process in which a party decides on its own. It is suggested to amend it to "(1) an 'ambition cycle' that expects parties' successive NDCs, Parties informed by five-yearly global stocktakes (Art 14)" — The original text of Article 14.3 of the Paris Agreement reads: The outcome of the global stocktake shall inform Parties in updating and enhancing, in a nationally determined manner, their actions and support in accordance with the relevant provisions of this Agreement, as well as in enhancing international cooperation for climate action.	Accepted. Added transparency box under Article 3. The link to Loss and Damage has been removed. The language around Article 14 NDCs has been changed.	Government of China	China Meteorological Administration	China
9223	19	15	19	23	The content of Figure 14.2 is incorrect, referring to the connotation of the NDC clause. 1) According to Article 3 of the Paris Agreement, NDC includes mitigation, adaptation, funding, technology, capacity building, and transparency. The connotation of the figure in the figure is: Article 3 contains NDC and implementation means, which is not accurate; in addition, the arrow in the figure indicates the connection, and Article 3 (NDC) does not contain Article 8 (loss and damage). Original Article 3: Article 3 As nationally determined contributions to the global response to climate change, all Parties are to undertake and communicate ambitious efforts as defined in Articles 4, 7, 9, 10, 11 and 13 with the view to achieving the purpose of this Agreement as set out in Article 2. The efforts of all Parties will represent a progression over time, while recognizing the need to support developing country Parties for the effective implementation of this Agreement. 2) The annotation part of Figure 14.2 "(1) an 'ambition cycle' that expects parties' successive NDCs, informed by five-yearly global stocktakes (Art 14)" in the original article of Article 14, the informed is Party, not NDC. A process in which a party decides on its own. It is suggested to amend it to "(1) an 'ambition cycle' that expects parties' successive NDCs, Parties informed by five-yearly global stocktakes (Art 14)" "Paris Agreement" 14.3 original text: The outcome of the global stocktake shall inform Parties in updating and enhancing, in a nationally determined manner, their actions and support in accordance with the relevant provisions of this Agreement, as well as in enhancing international cooperation for climate action.	Accepted. As above.	Yongxiang Zhang	National Climate Center	China

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
29565	19	17	19	17	We suggest deleting "the umbrella of". The final text should read: "Figure 14.2 Key elements of the Paris Agreement under the UNFCCC". We would also suggest changing the figure in this respect.	Accepted. Changed.	Government of Norway	Norwegian Environment Agency	Norway
58355	19	17	19	17	For Figure 14.2, under "Goals", should add Article 7.1 (global goal on adaptation) and delete "Implemented to reflect equity and CDBRRC in the light of diff. national circumstances" as the latter is not a goal.	Accepted, in part. Added reference to Article 7.1 adaptation goal. Retaining reference to CDBRRC. We do not suggest that equity and CDBRRC are goals. They are the context for interpretation for the goals. And, the text is taken from Article 2.2.	Government of United States of America	U.S. Department of State	United States of America
58357	19	17	19	17	In Figure 14.2, "Means of implementation" should be deleted and replaced with "Support".	Accepted.	Government of United States of America	U.S. Department of State	United States of America
14575	19	20	19	20	Should read "nationally determined contributions" (not commitments :)	Accepted. Thanks!	Joanna Depledge	Centre for Environment, Energy and Natural Resource Governance (CENRG), University of Cambridge	United Kingdom (of Great Britain and Northern Ireland)
58359	19	26	19	26	Delete 'nationally determined contributions' and use "NDC" instead.	Accepted. Thanks!	Government of United States of America	U.S. Department of State	United States of America
84203	19	28	19	28	Global stocktake is written as "the Global Stocktake" in the Paris Agreement. It s referred to as "a periodic global stocktake" and is not commonly referred to in plural terms (global stocktakes). Suggest rephrasing.	Noted, thanks.	Madoka Yoshino	United Nations University Institute for the Advanced Study on Sustainability	Japan
63317	19		19		Several comments on Figure 14.2: - It places the Paris Agreement "under the umbrella of the UNFCCC" whereas this is not a view that all Countries share. - It also puts adaptation under NDCs, which is inconsistent with the Paris Agreement. Rather, adaptation should go one level further up, between NDCs (mitigation) and support (not "means of implementation").	Accepted, in part. Deleted 'the umbrella' - however, the Durban Platform that launched negotiations towards the Paris Agreement made it clear that the outcome would be "under the Convention". And, Article 7 (adaptation) is listed under Article 3, so our characterization is consistent with the Paris Agreement.	Government of Canada	Environment and Climate Change Canada	Canada
22525	19		19		Figure 14.2 : On a substantial aspect, each square have a different color, which harms the understanding of the figure. There shall be an harmonization of color between square belonging to same categories. For example, Finance, Technology, CB shall be in the same color as they are discussed int same section of the chapter as supplementary means of implementation.	Accepted. Thanks.	Government of France	Ministère de la Transition écologique et solidaire	France
50351	19		19		figure 14.2 has low quality. It should be noted that there are low quality figures in the IPCC Chapters as usual.	Noted.	Government of Iran	Islamic Republic of Iran Meteorological Organization (IRIMO)	Iran
1449	19		19		figure 14.2 has low quality	Noted.	Hamideh Dalaei	climatologist at Islamic Republic of IRAN Meteorological Organisation	Iran
3207	19		19		figure 14.2 has low quality. It should be noted that there are low quality figures in the IPCC Chapters as usual.	Noted.	Hamideh Dalaei	climatologist at Islamic Republic of IRAN Meteorological Organisation	Iran
43445	19		19		figure 14.2 has low quality. It should be noted that there are low quality figures in the IPCC Chapters as usual.	Noted.	sadegh zeyaeayan	Head of national center for forecasting and weather hazards management of Islamic Republic of Iran Meteorological Organization (IRIMO)	Iran
63319	20	7	20	28	Section 14.3.2.1 would benefit from a reference to the rights of Indigenous peoples, which are also mentioned in the preamble of the Agreement, alongside human rights and other issues.	Accepted.	Government of Canada	Environment and Climate Change Canada	Canada
22527	20	7	20	7	Section 14.3.2.1 : There should have a separate sub-section for preamble and objectives because of preamble and articles of a treaty have distincts formal value and functions.	Noted. Agreed, and we do address the preamble separately in this section.	Government of France	Ministère de la Transition écologique et solidaire	France
70741	20	7	21	43	The objectives and purposes of the Paris Agreement, UNFCCC, and international cooperation are not clearly presented and rather confusing. Clear presentation of objectives and purposes of the PA and UNFCCC followed by the roles of international cooperation would enhance the understanding of the subsection by the readers.	Noted, but the structure has gone through multiple iterations and comments, so we do not wish to change it now.	Philippe Tulkens	European Union (EU) - DG Research & Innovation	Belgium
58361	20	8	20	8	Delete "the interpretive". Not all elements of a preamble are agreed to be interpretive context for an agreement.	Rejected. According to accepted treaty law, the preamble is interpretative context for the Agreement.	Government of United States of America	U.S. Department of State	United States of America
58363	20	11	20	11	Suggest deleting "Human Rights Council". Did the Council as a body take a position that a "rights-based approach" should be integrated in the climate change regime?	Rejected. Resolutions to this effect.	Government of United States of America	U.S. Department of State	United States of America
58365	20	15	20	15	After parties, add "when taking action to address climate change". This is important for context of what the preambular paragraph says.	Accepted.	Government of United States of America	U.S. Department of State	United States of America
58367	20	16	20	21	Delete sentence starting with "The 'respective obligations'..." The assertion here is not stated in the Paris Agreement and it is not for the IPCC to interpret what obligations are referred to. Moreover, "respective obligations" signifies that Parties in fact have different relevant obligations depending upon which human rights treaties they have joined, and thus a blanket statement as to what obligations are referred to misses the point of what the provision states.	Accepted, in part. Language nuanced.	Government of United States of America	U.S. Department of State	United States of America
27927	20	18	20	18	After "right to health", add "right to development".	Accepted.	Eleni Kaditi	Organization of the Petroleum Exporting Countries, OPEC	Austria
4141	20	21			should say McAdam (not Mcadam)	Corrected.	Jane McAdam	University of New South Wales	Australia
58369	20	25	20	26	Delete "Notwithstanding opportunities to mainstream and operationalise human rights in the climate regime" and replace with "Notwithstanding proposals from some Parties and stakeholders to address human rights under the climate regime Post-Paris"	Accepted.	Government of United States of America	U.S. Department of State	United States of America
63321	20	29	20	30	This framing appears misworded: the purpose of the Agreement is to strengthen the global response to climate change. References to enhancing the implementation of the Convention, including its objective, are worded in Article 2.1 as a side-effect, rather than the main purpose of the Agreement.	Noted, but we are following the language of the Article titled 'purpose'.	Government of Canada	Environment and Climate Change Canada	Canada

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
63323	20	36	20	39	We note that the structured expert dialogue occurred under the Convention, rather than the Paris Agreement. As a result, this sentence is out of context with the rest of the section, which focuses on the Paris Agreement.	Noted, but it relates to the global goal.	Government of Canada	Environment and Climate Change Canada	Canada
84205	20	36	20	39	The second periodic review is not of the UNFCCC (the COP decision on the periodic review specifically states that it is not a review of the Convention) and there is also a typo. Suggest replacing "the second periodic review of the UNFCCC (the first was held between 2013-215)" to "the second periodic review of the long-term global goal under the UNFCCC (the first was held between 2013-2015)"	Accepted.	Madoka Yoshino	United Nations University Institute for the Advanced Study on Sustainability	Japan
76179	20	40	20	46	This is an important point, and I wonder if you could elaborate a bit more on this. Both in light of the classification done in WGIII Ch3, the perspective of the SR1.5, the 1.5 and 2 C crossing times given in WGI Ch4 - as well as studies in the literature.	Following up with Jan. Will implement at the next stage	Jan Fuglestedt	CICERO	Norway
48295	20	44	20	45	How does this happen with the incoming NDCs? Those are underwhelming and put us nowhere near the needed target. Is there the ability to make climate plans more stringent as well as to relax them?	Noted, but not clear what the suggestion is.	Susana Hancock	University of Oxford	United States of America
11985	20		21		In addition to the inclusion of human rights, preambular language on "ensuring the integrity of all ecosystems" is also noteworthy as it provides opportunities to mainstream biodiversity concerns into the work of the UNFCCC. This is important because narrow forest-based solutions for climate change mitigation (e.g. monoculture reforestation projects) are not always aligned with biodiversity goals (Seddon et al 2019) and may even be detrimental to mitigation efforts (Di Sacco et al 2021).	Accepted	Tom Pegram	University College London	United Kingdom (of Great Britain and Northern Ireland)
79853	20	7	20	7	Regarding context, objective and purpose, there is an article "under review" in Nature Climate Change at the moment (will be published hopefully soon). The article elaborates on the means and scope of Art 2.1c. It basically shows the new meaning of finance and its purpose of climate-consistent finance flows which relies on action and support to transform the global financial system. It is the first peer-reviewed article of its kind that analyses the ambiguousness of PAs long-term financial-goals. The working title so far is: "Climate-consistent finance as a pretty penny for climate action". Maybe the mentioned literature fits as well in another sub-section such as 14.3.3. or 14.4.1 Finance. Thanks for having a neutral view for taking the reference into considerations.	Noted, but unclear what reference is being referred to.	Michael König	FS UNEP Centre	Germany
63325	21	2	21	5	The following line may be misinterpreted: "The finance and adaptation goals are not quantified in the Paris Agreement, but the temperature goal and the pathways they generate will enable a quantitative assessment of the resources necessary to reach these goals, and the nature of the impacts requiring adaptation." There is no decision by Parties within the UNFCCC to quantify the resources required to reach these goals, and the text should be carefully written to avoid inferring that this should be done.	Accepted.	Government of Canada	Environment and Climate Change Canada	Canada
15311	21	2	21	5	In the sentence "The finance and adaptation goals are not quantified in the Paris Agreement, but the temperature goal and the pathways they generate will enable a quantitative assessment of the resources necessary to reach these goals, and the nature of the impacts requiring adaptation (Rajamani and Werksman 2018).", the statement of the finance target of the Paris Agreement is wrong. There is a quantitative finance target in the Paris Agreement, which is 100 billion US dollars per year (see FCCC/CP/2015/L.9/Rev.1). It is suggested to modify the statement or delete the reference.	Noted, language nuanced.	Government of China	China Meteorological Administration	China
58371	21	2	21	4	Text after "but the temperature goal" pre-judges any policy outcomes that Parties may not have agreed to. Otherwise this states as fact that we will be able to do a quantitative assessment of resources needed to meet the adaptation goal -- which is something that has not been agreed is technically feasible.	Accepted. Language nuanced.	Government of United States of America	U.S. Department of State	United States of America
9225	21	2	21	5	The funding target of the Paris Agreement is incorrectly stated. In the Paris Agreement, there is a clear funding and quantitative target of 100 billion U.S. dollars per year. It is recommended to delete the reference.	Noted, the quantitative target is not in the Agreement itself. Clarified	Yongxiang Zhang	National Climate Center	China
27929	21	3	21	3	After "a quantitative assessment", add "climate actions and".	Reason for suggestion not clear. Reference does not add this.	Eleni Kaditi	Organization of the Petroleum Exporting Countries, OPEC	Austria
58373	21	5	21	5	Delete "agreement" and replace with "decision"	Accepted.	Government of United States of America	U.S. Department of State	United States of America
46313	21	7	21	9	It should be added that the objective also references to making finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development. (UNFCCC decision 14/CMA.1 para 2)	Reference to finance goal is already in the text.	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany
58375	21	10	21	20	Delete this paragraph. This is not exactly how one would articulate the meaning of this provision of the Paris Agreement, and assuredly there will be a range of views of what this provision means. It is not within the IPCC's expertise or mandate to weigh in on the interpretation of provisions of an agreement.	Noted, however the literature reflects interpretations of the text. And it is the IPCC's job to assess the literature.	Government of United States of America	U.S. Department of State	United States of America
63327	21	14	21	14	The term "CBDRRC", in the context of the Paris Agreement, is inseparable from "in the light of different national circumstances." Therefore the acronym should be CBDR-RC-NC and it should be introduced after the word "circumstances".	The acronym CBDRRC is used elsewhere too, as for instance in the context of the UNFCCC where ILDNC does not exist.	Government of Canada	Environment and Climate Change Canada	Canada
83557	21	21	21	43	I'm wondering whether it would be useful to clarify, based on Article 29 of the Paris Agreement and the specifications provided in the French and Spanish language versions of the Article 4.1 that the net zero GHG emissions (the "balance") of Article 4.1 refers to anthropogenic emissions and "anthropogenic" removals. This is explicitly specified in the French and Spanish versions of the agreement and thus provide the most precise view.	Noted, but this is an interpretative issue which we are aware is contested, so would prefer to rely on the language of the PA - in english, the language it was negotiated in.	Joeri Rogelj	Imperial College London	United Kingdom (of Great Britain and Northern Ireland)
58377	21	28	21	29	Delete sentence that starts with "Coupling this requirement ...". It is not the IPCC's place to fix years to language in the Paris Agreement that deliberately did not identify a year. Some might consider that this language calls for net zero sooner than the date range provided, so citing this assertion as a fact is prejudicial and incorrect.	Language nuanced to indicate that some argue this. It is supported in the literature which it is the IPCC's job to assess.	Government of United States of America	U.S. Department of State	United States of America

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
83541	21	28	21	30	I'm a bit puzzled as to where this range is based on. Based on the evidence provided in the IPCC SR1.5 Chapter 2 (Rogelj et al, 2018), I would think that the range for possible interpretations of Article 2 of the Paris Agreement spans 2044 to 2100 (see Table 2.4 in IPCC SR1.5). If only the range of median estimates across 1.5°C (with no, limited or high overshoot) and "lower-2°C" scenarios is taken then the values would be: 2063-2100. Maybe the latter was taken to support this statement. I would suggest no to artificially narrow the range. If useful, I'm happy to provide some text.	Following up with Joeri. Will implement at the next stage	Joeri Rogelj	Imperial College London	United Kingdom (of Great Britain and Northern Ireland)
70743	21	28	21	33	Given that this is the IPCC WG3 report, there is no added value in referring to earlier literature when stating what emissions reductions are required to meet the Paris temperature goal.	Noted, but we think it provides important context.	Philippe Tulkens	European Union (EU) - DG Research & Innovation	Belgium
83543	21	30	21	31	The range of reductions is 45% to 60% relative to 2010. I suggest to either cite the range, or write "at least" 45%.	Accepted.	Joeri Rogelj	Imperial College London	United Kingdom (of Great Britain and Northern Ireland)
83547	21	32	21	43	A useful additional piece of information that could be included here is that achievement of the Paris Agreement's Article 4.1 aim in combination with Paris Rulebook decisions implies that global warming will peak and put on a gradually declining path. This is not only fully consistent with pathway understanding at the time of AR5 and the Paris Agreement, but also with potential interpretations of Article 2.1 of the Paris Agreement combining both a maximum limit and an intent to "pursue" limiting warming subsequently to even lower levels, including 1.5°C. A recent contribution in the literature clarifies this further: Rogelj, Geden, Cowie & Reisinger, Nature, 2021. Also Schlessner et al (2019) (DOI:10.1088/1748-9326/ab56e7) provides further insights into this.	Accepted. Added brief reference.	Joeri Rogelj	Imperial College London	United Kingdom (of Great Britain and Northern Ireland)
47389	21	35	21	35	The reference to Data-Driven EnviroLab early release report should be updated to the following one, which is the final report. NewClimate Institute and Data-Driven EnviroLab (2020). Navigating the nuances of net-zero targets. Cologne, Germany. NewClimate Institute and Data-Driven EnviroLab. https://newclimate.org/wp-content/uploads/2020/10/NewClimate_NetZeroReport_October2020.pdf	Accepted.	Takeshi Kuramochi	NewClimate Institute	Germany
52761	21	24	21	24	The specific example we give here applies pretty much to the whole document. The authors liberally refer to discipline-specific concepts such as 'ambition cycle' as noted here, without giving sufficient context for the reader (another such example is 'gold rush' on p. 28, l. 9). Such references may be applicable in most scientific studies, assuming all have a clear understanding of where such a term comes from. Even then, the specific study under question situates that concept within existing literature. But here, way too many such concepts are introduced from quite a few disciplines for an audience who are not necessarily experts in any of these disciplines. We understand the need to reflect the current state of literature; however, such a frequent use of "loaded" concepts dilute the report's message, and use up the bandwidth of the reader's attention span more than what the authors probably intend. In relation, the authors should exhibit slightly more effort in tying the findings of a study to the overall argument in the chapter. Quite a few times, the text reads as a juxtaposition of various findings that are not necessarily used to underpin an argument in the chapter.	Noted.	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia
75665	21	44	24	39	Updates on the latest NDCs' submissions and reports is needed in this section, 14.3.2.2. You might want to refer to: NDC Synthesis report (UNFCCC) (https://unfccc.int/process-and-meetings/the-paris-agreement/nationally-determined-contributions-ndcs/nationally-determined-contributions-ndcs/ndc-synthesis-report), Climate Watch NDC tracker (https://www.climatewatchdata.org/2020-ndc-tracker).	Noted, thanks	Karla Solis	Peru	Germany
8451	21	44	24	15	The UNEP 2020 Emissions Gap report insists on the opportunity for governments to use COVID-19 recovery to create more sustainable, resilient and inclusive societies. Chapter 14 should reflect this idea.	Noted, but this would take more words than we have.	Sandrine MALJEAN-DUBOIS	CNRS/ Aix-Marseille University	France
58379	21	45	22	12	This should be deleted; at most this should just quote the provisions. There are differences of view as to the nature of some of the specific obligations, and it is not the IPCC's place to offer a legal interpretation.	Rejected. It is the IPCC's role to reflect the literature.	Government of United States of America	U.S. Department of State	United States of America
427	21	46	21	47	"binding procedural obligation" should read "procedural obligation". Any obligation, by definition, is binding. Specifying that some obligations are binding suggest that some others, by contrast, are not, which is misleading.	Accepted.	Benoit Mayer	The Chinese University of Hong Kong	China
63329	21	29	21	30	This framing seems inconsistent with the discussion on emissions pathways in Chapter 3, which tend toward net zero in the third quarter of the 21st century.	Accepted. We have changed the text.	Government of Canada	Environment and Climate Change Canada	Canada
14577	21	29	21	30	It is really important that this message about the timing of net zero is aligned with findings on net zero elsewhere in AR6, including in the SPM.	Accepted. We have aligned, and cross referenced the box.	Joanna Depledge	Centre for Environment, Energy and Natural Resource Governance (CEENRG), University of Cambridge	United Kingdom (of Great Britain and Northern Ireland)
83545	21	32	21	43	Additional information on net-zero targets can be found in a forthcoming paper: Rogelj, Geden, Cowie & Reisinger, Nature, 2021.	Noted. Thank you.	Joeri Rogelj	Imperial College London	United Kingdom (of Great Britain and Northern Ireland)
429	22	4	22	5	I don't understand what a "normative expectation" is. I suppose that this should read "expectation". A norm would create an obligation, or contribute to the interpretation of an obligation, which is not the case here.	Rejected. There are differing views on this.	Benoit Mayer	The Chinese University of Hong Kong	China
63331	22	7	22	8	CBDR-RC-NC is not a standalone feature of NDCs in the Paris Agreement. Rather the Paris Agreement sees it as modifier of the ambition and progression features of NDCs. Therefore, this sentence is misleading in its current formulation and we would recommend that it be modified to read: "...highest possible ambition and progression, reflecting CBDR-RC-NC"	Accepted.	Government of Canada	Environment and Climate Change Canada	Canada
12635	22	9	22	9	new or updated NDC every 5 years	Accepted	Jennifer Allan	Cardiff University	United Kingdom (of Great Britain and Northern Ireland)

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
431	22	13	22	14	"binding obligation" should read "obligation", as any obligation is, by definition, binding.	Accepted	Benoit Mayer	The Chinese University of Hong Kong	China
22529	22	16	22	16	here, as in other places, is used the term "binding requirements" to qualify requirement in the Paris Rulebook (Decisions of the CMA). But even when formulated in binding term, the legal nature of COP decisions prevent them to be legally binding on their own. Such statement could create confusion especially because legal analysis of provisions and of their legal bindingness is well discussed and distinguished before.	Accepted	Government of France	Ministère de la Transition écologique et solidaire	France
63333	22	20	22	21	Under the Paris Agreement developed countries "should continue taking the lead by undertaking economy-wide absolute emission reduction targets". It is therefore misleading to suggest that there are normative expectations of "developed country leadership" without this context. We would suggest that sentence be amended to read "address the normative expectations described in the previous paragraph".	Rejected. The term is explained in the previous paragraph. This change would make the sentence less clear on its own terms.	Government of Canada	Environment and Climate Change Canada	Canada
63335	22	24	22	26	We would note that para. 7 of Decision 4/CMA.1, "strongly encourages Parties to provide this information in relation to their first nationally determined contribution, including when communicating or updating it by 2020" and would suggest this would be beneficial context to include.	Accepted	Government of Canada	Environment and Climate Change Canada	Canada
63337	22	27	22	27	The UNFCCC is a treaty, not a body and thus we would suggest that the sentence be edited to read "the registry maintained by the Secretariat to the Paris Agreement", which is also the Secretariat to the UNFCCC.	Accepted	Government of Canada	Environment and Climate Change Canada	Canada
52765	22	27	22	45	Is ambiguity a necessarily bad thing in achieving international cooperation? Do countries 'optimally obfuscate' a la D. Kono (2004, American Political Science Review)?	Noted, but unclear what changes are being suggested. And, reference is from 2004.	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia
12637	22	27	22	27	provisional registry maintained by the UNFCCC. The actual registry prototype has yet to be approved by parties	Accepted	Jennifer Allan	Cardiff University	United Kingdom (of Great Britain and Northern Ireland)
70745	22	27	22	27	More accurate to refer to "target type" rather than "type of NDC".	Accepted	Philippe Tulkens	European Union (EU) - DG Research & Innovation	Belgium
63339	22	29	22	29	The term "adaptation contribution" does not exist in the Paris Agreement. Rather, the Paris Agreement refers to an adaptation "communication". We would suggest that the report use this terminology for consistency. More information on the wording of this issue can be found in Decision 4/CMA.1 para 8 f.	Accepted. Language changed.	Government of Canada	Environment and Climate Change Canada	Canada
433	22	43	22	43	The discretion that Parties enjoy is, inevitably, "national": this latter word is redundant in this sentence (unless it suggests that the EU does not have the discretion that country Parties have, which would of course be a groundless assertion).	Accepted	Benoit Mayer	The Chinese University of Hong Kong	China
52767	23	1	23	6	How exactly do these two approaches (Jeffrey et al 2018 ve Holme et al 2018) contrast? Unclear.	One reflects the viewpoints of Parties, the other does not. We think this is clear.	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia
8449	23	7	23	10	add reference to the UNEP 2020 Emissions Gap Report (already mentioned in references page 121 line 40)	Accepted	Sandrine MALJEAN-DUBOIS	CNRS/ Aix-Marseille University	France
83549	23	12	23	12	Probably useful to highlight that these 40-50% reduction refer to total greenhouse gas emissions reductions to avoid confusion with reductions of CO2 only.	Accepted	Joeri Rogelj	Imperial College London	United Kingdom (of Great Britain and Northern Ireland)
48297	23	16	23	17	Are conditional commitments working looking at data from new NDCs?	Only for the first round available so far.	Susana Hancock	University of Oxford	United States of America
47457	23	22	23	25	There are also uncertainties relating to the ambiguity of how the land sector contributes to the NDCs, see Fyson and Jeffery 2019, Earth's Future (https://agupubs.onlinelibrary.wiley.com/doi/full/10.1029/2019EF001190). Please expand!	Accepted. Added reference.	Government of Saint Lucia	Department of Sustainable Development - Ministry of Education, Innovation, Gender Relations and Sustainable Development	Saint Lucia
72781	23	22	23	25	A potentially useful reference here for land use in the NDCs is Fyson and Jeffery 2019, Earth's Future. https://agupubs.onlinelibrary.wiley.com/doi/full/10.1029/2019EF001190	Accepted. Added reference.	Matthew Gidden	Climate Analytics	Germany
14973	23	29	23	39	This section on the Paris Agreement and what is needed for success is partially misleading on how the Paris Agreement works, and is presented more as a set of statements than an assessment of the literature. In particular, the characterisation of Article 6 as a means to meet conditional NDCs is not necessarily true. There can be many kinds of conditionalities, e.g. regular financing, markets in general, or the use of Article 6. If an NDC is conditional on the use of Article 6 it is not clear how this would work, and more detail would be needed to understand how (once a corresponding adjustment has been made, mitigation benefits are transferred to the buyer). Also, Article 6 is explicitly designed to deliver additional mitigation (an overall mitigation in global emissions), rather than simply to reduce the costs of mitigation, as implied in lines 38/39. Finally, the statement that there is a "policy inconsistency" between the bottom-up nature of the PA and the setting of the long-term goals is an opinion, and shouldn't be stated as fact.	Accepted, in part. Language nuanced.	Government of Saint Kitts and Nevis	Department of Environment - Ministry of Agriculture, Marine Resources, Cooperatives, Environment and Human Settlements	Saint Kitts and Nevis
53527	23	29	23	31	Replace "Particularly relevant for this chapter on international cooperation is the significant contribution of conditional NDCs, as such NDCs require international cooperation on finance, technology and capacity-building (...)" by a more neutral and balanced wording: "In this context, it should be recalled that many NDCs have been formulated in conditional terms, i.e. the implementation of many NDCs depends at least partly on international cooperation on finance, technology and capacity- building (...)"	Accepted. Language changed.	Government of Switzerland	Swiss Federal Office for the Environment Federal Department of the Environment, Transport, Energy and Communications DETEC Federal Office for the Environment FOEN International Affairs Division	Switzerland

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
70747	23	29	23	31	Replace "Particularly relevant for this chapter on international cooperation is the significant contribution of conditional NDCs, as such NDCs require international cooperation on finance, technology and capacity-building (...)" by more neutral wording such as: "In this context it should be recalled that many NDCs have been formulated in conditional terms, i.e. as NDCs whose implementation is at least partly dependent on international cooperation on finance, technology and capacity- building (...)"	Accepted. Language changed.	Philippe Tulkens	European Union (EU) - DG Research & Innovation	Belgium
84853	23	29	23	29	Odd phrasing.	Rephrased	Yann Robiou du Pont	Climate Analytics	France
63341	23	31	23	32	We believe that there is a missing "or" in this sentence "*or*" through Article 6..."	Language changed	Government of Canada	Environment and Climate Change Canada	Canada
58381	23	31	23	32	(1) Article 6 is not the only avenue for channeling these resources. (2) Article 6 will only contribute to deeper levels of mitigation if double-counting is avoided, regardless of NDCs' "conditionality". (3) "and" should be deleted here, as is unclear what else Article 6 is (i.e., if not bilateral agreements and market mechanisms). Suggest the following formulation: "... building (Kissinger et al., 2019), potentially including through Article 6 in the form of bilateral agreements and market mechanisms provided that double-counting is avoided (UNFCCC, 2016b). More broadly, there is a 'policy inconsistency' between the facilitative, ..."	Accepted, in part. Language nuanced.	Government of United States of America	U.S. Department of State	United States of America
78163	23	32			Is this an opinion or a fact? This is not sufficiently substantiated to uphold this statement.	Accepted. Language changed.	Charlotte Plinke	Climate Analytics	Germany
84855	23	36	23	36	It already is crucial.	Accepted. Language changed.	Yann Robiou du Pont	Climate Analytics	France
78165	23	38	23	39	This is not a precise/correct characterisation of Article 6. It should be clarified that additionality is a crucial element for Article 6.	Noted, this is made clear in the Article 6 section	Charlotte Plinke	Climate Analytics	Germany
84857	24	2	24	2	Figure 14.3: the figure is not immediately clear on what we are looking at. What is the 0 describing? Current policies it seems, this could be written on the graph. It seems also a bit odd to compare NDCs to policies as additional since policies are part of NDCs. The phrasing could be changed to "additional contribution from NDCs" and "mitigation gap". Overall this figure is unclear and little informative as it stands although it is describing an easy to understand concept. Also it should mention the global level.	Accepted. The notes to the figure have been modified.	Yann Robiou du Pont	Climate Analytics	France
78167	24	10	24	12	Again, please revise the characterisation of conditional NDCs and Article 6. As it stands, it appears that Article 6 is the main mechanism of conditional NDCs.	Accepted. The notes to the figure have been modified.	Charlotte Plinke	Climate Analytics	Germany
14975	24	10	24	12	Similar to the point above, this is a misleading sentence on the conditionality of NDCs on Article 6. There can be many kinds of conditionalities, e.g. regular financing, markets in general, or the use of Article 6. If an NDC is conditional on the use of Article 6 it is not clear how this would work, and more detail would be needed to understand how (once a corresponding adjustment has been made, mitigation benefits are transferred to the buyer).	Accepted. The notes to the figure have been modified.	Government of Saint Kitts and Nevis	Department of Environment - Ministry of Agriculture, Marine Resources, Cooperatives, Environment and Human Settlements	Saint Kitts and Nevis
22531	24		24		Figure 14.3 : It looks like there is some errors or at least inconsistency with the text before, or maybe it needs to be clearer. Indeed, in page 22 line 32 its written that NDC will result in reduction ranging from 47 to 63 Gt/year. In that figure it looks like it is ten time less (4.7-6.3 Gt) and on the vertical axis it should be Gt/year. Or this figure represent simply the accumulated reduction of carbon stock during the period 2020-2030. In that case, the link between that sentence (p. 22, line 32) and this figure makes thing a lot simpler than exposed in the paragraph before the figure, and this link should be made clearer.	Noted. We have included the GtCO2/year as suggested. However, please note that the figure on the old page 22 is total yearly emissions, while figure 14.3 shows "reductions in emissions". We have modified the title to clarify this.	Government of France	Ministère de la Transition écologique et solidaire	France
83551	24	17	25	41	Maybe the study by Meinshausen et al (2015) could also provide an interesting perspective which argues that countries that intend to take up a climate leadership role should show "diversity-aware leadership". That means, as perceptions of equity and fairness are unavoidably influenced by local perspectives, instead of imposing one equity perspective to all, leading nations should simply accept this diversity and act accordingly. Meinshausen, M., Jeffery, L., Guetschow, J., Robiou du Pont, Y., Rogelj, J., Schaeffer, M., Hohne, N., den Elzen, M., Oberthur, S., Meinshausen, N., 2015. National post-2020 greenhouse gas targets and diversity-aware leadership. Nature Clim. Change 5, 1098–1106. https://doi.org/10.1038/nclimate2826	Noted, but we have limited words to add.	Joeri Rogelj	Imperial College London	United Kingdom (of Great Britain and Northern Ireland)
70749	24	17	25	41	When fairness and equity mentioned, it is normally inter-national, inter-regional, or inter-generational. However, fairness and equity within a country also matter since NDCs will be domestically implemented by national governments and entities. Hence, attention should be given also to fairness and equity among citizens of a country.	Noted. We have included a clarifactory note about scope of this section.	Philippe Tulkens	European Union (EU) - DG Research & Innovation	Belgium
84859	24	18	24	18	The text could also stress the link between fairness and ambition that shows that fairness is key to assess the total ambition of country's NDC including international support, beyond domestic action.	Accepted. Mentioned below.	Yann Robiou du Pont	Climate Analytics	France
19691	24	25	24	28	It is positive that the report includes a statement on the compatibility of the indicators of fairness used by countries in their NDCs with international environmental law. This statement should include that cost effectiveness as an indicator of fairness is not in line with international environmental law, particularly as this is often used as an indicator in deciding mitigation levels at the domestic level. More specifically, it would be helpful if the report reflects the fact that alignment with global cost-efficient emission trajectories is not an expression of fairness that is in line with principles of international environmental law (as outlined by and Rajamani et al. submission under review).	Accepted. Added reference.	Dennis van Berkel	Urgenda Foundation	Netherlands
84863	24	27	24	27	Robiou du Pont et al. 2018 (https://minerva-access.unimelb.edu.au/handle/11343/213527 Chapter 7, Table 7.1, also in https://climate-energy-college.org/files/site1/docs/9834/Paris%20Agreement%20-%20Fair%20share%20for%20G20%20countries.pdf table Table 3) discusses the justifications of countries, including as small emitters, as well as the alignment of their NDCs with equity criteria, or even with only a grandfathering approach considered unfair.	Noted, but we have limited words to add, and the points have been covered.	Yann Robiou du Pont	Climate Analytics	France
52769	24	28	24	28	reference year?	Accepted	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
22533	24	19	24	21	("The Rulebook...") : this has already been said p. 22, line 20. This statement should stay here, but should be removed in p. 22. It makes thing clearer in following the structuring of the chapter.	Noted.	Government of France	Ministère de la Transition écologique et solidaire	France
435	25	3	25	3	After "It is challenging, however to determine 'fair shares'", I would suggest (if this is still possible at this stage of the drafting) to add a reference to an article that makes precisely the point that fair shares cannot be assessed in any objective manner: Benoit Mayer, 'Interpreting States' general obligations on climate change mitigation: A methodological review' (2019) 28(2) Review of European, Comparative and International Environmental Law 107-121.	Noted, but the point is uncontroversial and we don't have much words to add.	Benoit Mayer	The Chinese University of Hong Kong	China
22535	25	3	25	4	it could be mentionned here or before the difficulty to chose criterion of Fairness and their consequences, notably on effectiveness : Vinuales, Jorge E., Balancing Effectiveness and Fairness in the Redesign of the Climate Change Regime (July 27, 2010). Leiden Journal of International Law, Vol. 24, No.1, Available at SSRN: https://ssrn.com/abstract=1623214	Noted, but the article is dated.	Government of France	Ministère de la Transition écologique et solidaire	France
84865	25	3	25	11	Robiou du Pont et al. 2018 (https://www.nature.com/articles/s41467-018-07223-9/) combines equity concepts in a bottom-up manner arguably reflective of the Paris-Agreement, consistent with differentiated potentially self-interested sovereign approaches. It is also in line with litigation cases, such as Urgenda where the judge can only rule for the least stringent of multiple equity allocation, while ensuring a top-down consistency with global warming thresholds.	Accepted. Added reference.	Yann Robiou du Pont	Climate Analytics	France
19693	25	15			A reference should be included to section 13.5.5 which goes deeper into the role of climate litigation as a governance tool, and the judgment of the Supreme Court of the Netherlands, Civil Division 2019, in particular (referenced in 13.5.5 as the Dutch Urgenda Case).	Accepted	Dennis van Berkel	Urgenda Foundation	Netherlands
84867	25	17	25	17	There could be a reference to: Winter 2020, CASE COMMENT Armando Carvalho and Others v. EU: Invoking Human Rights and the Paris Agreement for Better Climate Protection Legislation doi:10.1017/S2047102520000072	Rejected, not focusing on specific cases. Just used illustratively here.	Yann Robiou du Pont	Climate Analytics	France
14579	25	21	25	21	is it really just a "normative expectation" that developed countries should take the lead? Under UNFCCC, the leadership role of developed countries is clearly stated and operationalised.	Accepted. Language changed.	Joanna Depledge	Centre for Environment, Energy and Natural Resource Governance (CEENRG), University of Cambridge	United Kingdom (of Great Britain and Northern Ireland)
437	25	23	25	24	I strongly disagree with the assertion that it is the role of the "scientific community to generate methods to assess fairness". Assessing the fair share of a State in mitigating climate change must of course build on facts, that science can demonstrate, but facts are not enough. One cannot determine what a State ought to do without a value judgment - an interpretation of fairness. Science (even in a broad understanding, including social sciences) does not provide a method to make value judgments. In a democratic society, a scientist has no more legitimate role in deciding what is fair than any other individual.	Noted, but we are reflecting literature. Not sure what we can do with this strong view.	Benoit Mayer	The Chinese University of Hong Kong	China
52773	25	24	25	24	The assertion that it is on scientists to define what fairness can be perceived as a value-laden suggestion.	Noted.	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia
84869	25	25	25	25	The role of court decision in influencing public opinions and stimulate ambition could be discussed here (or later in the text): Anke Wonneberger & Rens Vliegthart (2021) Agenda-Setting Effects of Climate Change Litigation: Interrelations Across Issue Levels, Media, and Politics in the Case of Urgenda Against the Dutch Government, Environmental Communication, DOI: 10.1080/17524032.2021.1889633	Noted, but not directly on point. We are not focusing on climate litigation which is discussed in chapter 13	Yann Robiou du Pont	Climate Analytics	France
52771	25	26	25	41	a clarification question: the paragraph promises to discuss options to assess or introduce fairness. The following suggestions do not distinguish whether they help to assess or introduce fairness? Or, do the two aims lead to the same outcome?	We are introducing the literature that does both these things.	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia
60361	25	26	25	41	It would be interesting here to see the results of the different options to assess equity. Which countries' NDCs can be considered equitable from many perspectives and which only from a few?	Thanks, but is there literature that does this? Following up with Niklas	Niklas Höhne	NewClimate Institute	Germany
84861	25	30	25	30	Robiou du Pont et al. 2018 extends the 2017 study by allowing self-differentiation in country picking the least-stringent equity concept for themselves while aligning with the warming threshold. This novel approach arguably better reflects the bottom-up approach of equity by sovereign countries under the Paris Agreement: https://www.nature.com/articles/s41467-018-07223-9/	Reference already added in response to similar comment above.	Yann Robiou du Pont	Climate Analytics	France
439	25	40	25	40	As much as I am sympathetic with the claim made here, I don't think the IPCC is allowed to do it, under its Principle requiring it to be policy-relevant but policy-neutral. The Report could note the existence of an opinion according to which "grandfathering" is "perverse", but I do not find it appropriate for the IPCC to endorse this (or any other) policy position.	Language further nuanced but we think it was clear that we were citing scholars who argued that, than endorsing that position.	Benoit Mayer	The Chinese University of Hong Kong	China
84871	25	41	25	41	The current statement is good and important. It could be illustrated with concrete example. I suggest: "While no country's NDC explicitly supports the grandfathering approach (https://minerva-access.unimelb.edu.au/handle/11343/213527 Ch. 7) many countries describe as 'fair and ambitious' NDCs that only align with a grandfathering approach (Robiou du Pont et al. 2017 https://www.nature.com/articles/nclimate3186).	Accepted. Added reference.	Yann Robiou du Pont	Climate Analytics	France

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
84873	25	41	25	41	A discussion is lacking here on the implications of having multiple metrics, through multiple equity concepts, to measure ambition. Multiple studies have tackled this issue and by averaging or weighing multiple equity approaches (Climate Action Tracker, Peters 2015), by allowing differentiated approaches (PBL 2012 http://www.pbl.nl/sites/default/files/cms/publicaties/PBL_2012_Greenhouse-gas-emission-reduction-targets-for-2030_500114023.pdf , Meinshausen et al. 2015 https://www.nature.com/nclimate/journal/v5/n12/full/nclimate2826.html and Robiou du Pont et al. 2018 https://www.nature.com/articles/s41467-018-07223-9). Robiou du Pont et al. 2018 show that a self-interested bottom-up aggregation of equity might lead to a median 2100-warming of 2.3 °C (likely below 2.5°C), which could incidentally reflect the ruling in each country of an Urgenda decision whereby each government is ruled to follow at least the least ambitious end of an equity range based on multiple equity concepts (this is discussed in depth in Robiou du Pont 2017 CH 9.3 https://minerva-access.unimelb.edu.au/handle/11343/213527 and Mayer 2018 https://www.cambridge.org/core/journals/transnational-environmental-law/article/state-of-the-netherlands-v-urgenda-foundation-ruling-of-the-court-of-appeal-of-the-hague-9-october-2018/6CFC1F7512D27307A325A434FDE40535). In turn, Robiou du Pont et al. 2018 suggest a self-differentiated approach whereby each country can follow the least stringent equity approach individually, in a bottom-up manner, while collectively achieving the top-down warming thresholds of the Paris Agreement. This self differentiation is consistent with the bottom-up nature of the Paris agreement, respects the sovereignty of countries and avoids applying an unchosen equity concept to a country through the application of multiple dissonant equity approaches averaged or weighed together without justification. In the absence of a consensus on a single equity approach across country, this approach provides an example of a bottom-up metric for ambition under the Paris Agreement despite the multiple, apparently dissonant equity metrics. This metric then provides a correspondence between 2030 national emissions and 2100 global warming which, for the first, provides a global warming metric for national level ambition and NDCs. This and other ambition metrics can inform the Global Stocktake of the Paris Agreement..	Accepted, in part. Sentence and two references added.	Yann Robiou du Pont	Climate Analytics	France
47621	25	42	26	33	Recommendation that the issue about transparency and accountability should include a summation more clearly about how it ties up with international cooperation and the impacts and consequences of transparency and accountability on optimal international cooperation.	Noted, but this section only deals with transparency and accountability in the Paris Agreement.	Deshni Nadar	Environmental Consultant	Qatar
14581	25	42	26	2	This first paragraph must make the point that these transparency provisions build on those already operational under the UNFCCC, including use of IPCC Guidelines and methodologies.	Accepted.	Joanna Depledge	Centre for Environment, Energy and Natural Resource Governance (CEENRG), University of Cambridge	United Kingdom (of Great Britain and Northern Ireland)
22537	25	44	24	45	please consider that the transparency framework is not limited to mitigation contributions for the statement "designed to track progress in implementing and achieving mitigation contributions"	Accepted, clarified, but we focus on this because of our focus on Mitigation	Government of France	Ministère de la Transition écologique et solidaire	France
52775	26	34	27	35	The authors should add a final argument/proof as to why exactly REDD+ cannot be considered as a comprehensive solution	Rejected, prescriptive	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia
84875	26	4	26	4	Please highlight that equity metrics, included self-differentiated bottom-up metrics such as Robiou du Pont et al.2018 described above, can inform ambition levels of NDC updates under the global stocktake. As was rightly written earlier in the Chapter, equity is a metric for total NDC ambition (domestic and extra-territorial through finance).	Accepted. Added reference.	Yann Robiou du Pont	Climate Analytics	France
58383	26	19	26	19	Delete "weak" which is subjective.	Accepted, in part.	Government of United States of America	U.S. Department of State	United States of America
441	26	21	26	21	"in mandatory terms ('shall not')" does not add anything that the word "prohibited" has not already said.	Accepted. Deleted	Benoit Mayer	The Chinese University of Hong Kong	China
3819	26	26	26	26	See also Raiser et al., forthcoming, "Beyond Pledge and Review: learning from analogies to the Paris Agreement's review mechanisms" - the authors here further support this critique of the PA based on evidence from other review mechanisms. They further point out the need to ensure states and the UNFCCC itself have sufficient capacities to carry out the review process.	We will keep an eye out for the article.	Raiser Kilian	Hertie School	Germany
58385	26	34	27	3	The Global Stocktake is to take stock of the implementation of the Paris Agreement to assess the collective progress towards achieving the purpose of the Agreement and its long-term goals. The outcome of the global stocktake shall inform Parties in updating their NDCs. IPCC reports should refrain from paraphrasing, interpreting, or opining on negotiations or political dynamics underlying the UNFCCC or Paris Agreement. The sentence on page 26, lines 39-42, should read "The Paris Rulebook DETAILS the scope of the global stocktake to INCLUDE THE impacts of response measures, and loss and damage associated with the adverse effects of climate change (UNFCCC, 2019d, paras 8-10)." The portion of the sentence on page 26, lines 43-46, after the comma is an interpretation and should be removed. The sentence beginning on page 26, line 46, should be revised to read: "The Paris Rulebook INCLUDES consideration of EQUITY in the modalities and sources of inputs for the global stocktake (UNFCCC, 2019d, paras 1, 2, 13, 27, 31, 36h, and 37g)." The portion after the comma is an assumption about an outcome that is a Party-driven process and is not possible to know at this time. Lastly, neither Article 14 of the Paris Agreement nor 19/CMA.1 include the concept of fair share in the global stocktake. The first sentence on page 27 should be revised to read: "The Rulebook does not DESCRIBE THE RELATIONSHIP BETWEEN the collective nature of the GLOBAL stocktake and the CONCEPT OF EQUITY (Zahar, 2019; Rajamani and Bodansky, 2019)."	Accepted many of the changes. However, we are not paraphrasing the Paris Agreement but reflecting the literature on the Paris Agreement. We take the point that it is not our job to interpret the Paris Agreement anew, but it is our job to assess/reflect the literature. Some of the changes suggested relate to cited literature, and if we made these changes it will no longer reflect the literature accurately. We have clarified that 'some argue' certain positions.	Government of United States of America	U.S. Department of State	United States of America
58387	26	39	26	42	The sentence starting with "The Paris Rulebook cautiously ..." should be deleted. The CMA decision does not characterize this as "expand[ing] the scope." The language in the GST decision was very carefully negotiated. It is neither the place of the IPCC nor within its expertise to recharacterize COP or CMA decisions.	Accepted. Changed	Government of United States of America	U.S. Department of State	United States of America

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
58389	26	43	27	3	What is the basis for these statements, which, like much of the content of this chapter come from a narrow set of sources outside of the areas of the IPCC's core competence. For example, there is not necessarily a general understanding that the rulebook seeks to "operationalise equity" -- which might imply a certain role for equity in the Paris Agreement -- or that the GST might include consideration of "equitable burden sharing" on an individual country level. Suggest deleting this paragraph.	Accepted. Changed.	Government of United States of America	U.S. Department of State	United States of America
22539	27	12	27	12	Section 14.3.2.6 : Elements on REDD+ appears insufficiently developed, with regard to the importance of the issue for the future of the climate regime. It is not explained how and why consensus on REDD+ has been made, how REDD+ works (based for example on books published by A. Angelsen, or the one of C. Voigt, or of J. Delliaux mentioned below). More importantly, it has especially been demonstrated that REDD+ reveal several innovations under the climate regime with regard to international cooperation : See : J. Delliaux, Le mécanisme visant la conservation des forêts tropicales de la Convention-cadre sur les changements climatiques (REDD+) : illustration de l'adaptativité du droit international, sous la direction de Sandrine Maljean-Dubois et Marcelo Varela, Thèse, Université Aix-Marseille, 2017, 737 p. available at : https://www.researchgate.net/publication/349141790 . Those aspects seems particularly relevant for this chapter because this thesis demonstrates that the legal system for REDD+ manage to conciliate flexibility (creating consensus) and legal security (maintaining a normative function). Thus it reveal high standard of effectiveness following the criterion used by the author of the chapter (notably on transformative potential and institutional strength).	Noted.	Government of France	Ministère de la Transition écologique et solidaire	France
22543	27	12	27	12	This paragraph maybe gives an optimistic view of REDD+. Maybe put a caveat on ligne 11 at least on the large uncertainties left in many countries situated outside the best scope in the guidelines of reporting under the Convention.	Noted. Adopted	Government of France	Ministère de la Transition écologique et solidaire	France
65611	27	12	27	17	What is the role of the Ocean in this section? Should it be mentioned and integrated to other reports? Additionally, which ecosystems should be safeguarded for climate mitigation purposes?	Adopted.	Mônica M. C. Muelbert	UNFESP	Brazil
22541	27	14	27	14	About the term "including forest", it misses the application of article 5 to a wider set of sinks and reservoirs, add " therefore we suggest to add and refer back to article 4.1(d) of the Convention which provides for a wider range of actions to promote sustainable management and cooperation in the conservation and enhancement of sinks and reservoirs of all greenhouse gases including biomass, forests and oceans as well as other terrestrial, coastal and marine ecosystems ..."	Adopted. Text added.	Government of France	Ministère de la Transition écologique et solidaire	France
70751	27	14	27	14	"to take action in to support" - delete "in"	Adopted.	Philippe Tulkens	European Union (EU) - DG Research & Innovation	Belgium
8741	27	21	27	24	I would remove the citation at the end of the sentence -- which only states the content of Art. 5 PA. Park et al, have not contributed to this fact.	Adopted.	Charlotte Streck	University of Potsdam	Germany
51793	27	21	27	21	The terminology is wrong. REDD+ should not be referred to as "mechanism", as this has very specific connotations in the UNFCCC context (CDM, JI, Article 6), and could be confusing. REDD+ activities or initiatives would be preferable.	Adopted. Text adjusted.	Florin Vladu	UNFCCC Secretariat	Germany
22545	27	21	27	21	the problem with REDD + is benefits sharing, equitable distribution within the communities receiving funding. These are a compensation for the non-exploitation of resources but the risk exists that these financial compensations constitute a disturbance impacting the social balance of the villages.	Adopted. Text adjusted.	Government of France	Ministère de la Transition écologique et solidaire	France
51795	27	26	27	27	Strange phrasing, as the Warsaw Framework for REDD+ is not "included" in the existing REDD+ framework, but actually is the name of the existing REDD+ Framework.	Noted. Left as it is	Florin Vladu	UNFCCC Secretariat	Germany
51797	27	31	27	34	While private sector participation is expected by some authors, this is certainly not the case for all. After all, the response to the question what the private sector would be paying for and what the return on investment would be and where it would come from remains open. Suggest to answer this question, or remove the sentence.	Noted. Added "by some"	Florin Vladu	UNFCCC Secretariat	Germany
8743	27	34	27	35	It is worth noting that REDD+ cannot be considered as a comprehensive solution in its current form for Article 5 implementation. – It is not clear what this sentence is supposed to mean. Art. 5 refers to much more than REDD+; this is clear to anybody who reads the Art, not least because it also mandates mitigation and adaptation action in developed countries. The next para also clarifies that non-market-based and integrated solutions are also necessary (as part of REDD+ and in addition to REDD+). But I am wondering whether this is what authors mean here. I suggest clarifying (with arguments or sources) or deleting this sentence.	Adopted. Sentence deleted.	Charlotte Streck	University of Potsdam	Germany
22547	27	34	27	35	("It is worth noting...") : Such statement shall be explained and based on references. Indeed, written that way it does not seem to be a consequence of statements made before and seems not scientifically based.	Adopted. Sentence deleted.	Government of France	Ministère de la Transition écologique et solidaire	France
29567	27	34	27	35	The reference to REDD+ should be elaborated. The REDD+ mechanisms are still developing and the last ten years have shown substantial changes with both progress and backlashes. This is elaborated more further down in chapter 14, but in a too pessimistic and unbalance note in our view. We do not view REDD+ as the only solution, but "not comprehensive" is a too negative term. Please consider to include a sentence that could be formulated to something similar to e.g. "It is worth noting that all impacts and potential of REDD+ remain poorly understood and are in need of more knowledge and experiences. That on some issues like monitoring, reporting and verification lessons have been learned, but that there are some indications that REDD+ needs to be further developed in order to be considered as a comprehensive solution for Article 5 implementation"	Noted.	Government of Norway	Norwegian Environment Agency	Norway
58391	27	34	27	35	It is unclear what the last sentence (starting "It is worth noting...") here means. Suggest clarifying or, alternatively, deleting.	Adopted. Sentence deleted.	Government of United States of America	U.S. Department of State	United States of America
12639	27	34	22	35	It may be worth noting that there are no follow up actions related to REDD+ envisioned. Subsequent negotiations concluded without mandating any future work.	Rejected. It remains an ongoing negotiation.	Jennifer Allan	Cardiff University	United Kingdom (of Great Britain and Northern Ireland)

Comment Id	From Page	From Line To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country	
22549	27	36	27	40	Concerning the sentence, "Article 5.2 also encourages parties' support for 'alternative policy approaches' to forest conservation and sustainable management such as 'joint mitigation and adaptation approaches.' It reaffirms the importance of incentivising, as appropriate, non-carbon benefits associated with such approaches (e.g. improvements in the livelihoods of forest-dependent communities, facilitating poverty reduction and sustainable development).", it would make this paragraph more precise and interesting to make this aspect clearer."	Adopted. Accommodated in the text.	Government of France	Ministère de la Transition écologique et solidaire	France
46315	27	4	27	11	This paragraph should mention the views in the literature regarding what could be meant by "inform" and evaluate them in more detail, see also: - Friedrich, Global Stocktake, in: Klein et al, The Paris Agreement on Climate Change: Analysis and Commentary, 2017, pp. 319–337 - Zahar, Collective Progress in the Light of Equity Under the Global Stocktake, (2019) 9 Climate Law, Issue 1-2 (Special Issue) 101-121 - Rajamani, Ambition and Differentiation in the 2015 Paris Agreement: Interpretative Possibilities and Underlying Politics, (2016) 65 International and Comparative Law Quarterly 493 et seq	Accepted. Brief reference added.	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany
85993	27	44	29	36	While the experiences of the Kyoto Protocol's market-based mechanisms are certainly an important backdrop for considering Article 6 of the Paris Agreement, Article 6 itself should be the key focus of this section. However the section's structure and content lead to it instead being dominated by the drawing of parallels to the KP's CDM. Suggest this could be addressed by placing the paragraphs that focus on Article 6 (14-28 line 35 through 14-29 line 36) ahead of the discussion of the CDM (which is at 14-27 line 44 through 14-28 line 34), and appropriate editing to turn the focus on Article 6 rather the CDM.	Accepted. We have moved the paragraphs assessing the Kyoto mechanisms to 14.3.3, where we now assess Kyoto more generally.	Government of Australia	Department of Industry, Science, Energy and Resources	Australia
85995	27	44	27	47	Recommend removing "content and" from line 44. The current language implies Article 6 should be based on the CDM and the experiences learned from it. This is contentious and a live issue in current negotiations. There are certainly lessons to be learned from the CDM, but it has not been agreed that the content of Article 6 should be based on the CDM.	Accepted. We have reworded accordingly.	Government of Australia	Department of Industry, Science, Energy and Resources	Australia
19817	28	4	28	8	Replace "Joint Implementation ... World Bank 2018)." by "Joint Implementation led to substantial volumes of emissions credit transactions, mostly from economies in transition but also some Western European countries while International Emissions Trading led only to limited transaction volumes due to the fear of acquiring budget overhangs, so-called "hot air" (Shishlov et al. 2016)". Reason: JI transactions were much higher than IET New reference: Shishlov, I., R. Morel, and V. Bellassen, 2016: Compliance of the Parties 1 to the Kyoto Protocol in the first commitment period. Clim. Policy, 16, 768–782.	Accepted. We have included a slightly rewritten text as proposed.	Axel Michaelowa	University of Zurich	Switzerland
48551	28	4	28	8	Market approaches implemented under Kioto Protocol not only resulted in only limited number of trades, but also in double accounting of emission reductions by some countries. This issues, should be mentioned when describing GHG market's results.	Noted. We mention this later in the text.	Fany Ramos Quispe	Environmental Engineers Association of La Paz	Bolivia
8437	28	6	28	7	I wonder if the expression "Japan as the key buyer" is correct, because the reference cited (World Bank 2018) does not clearly mention this, and other related publications not cited here, such as Morel and Shishlov (2014) Ex-post evaluation of the Kyoto Protocol: Four key lessons for the 2015 Paris Agreement, indicates in its Figure II-1 that much of AAU tradings were made among EU-ETS member countries. AAUs were circulated inside EU-ETS, so if that is not counted, then, yes, Japan is the largest buyer as a final consumer.	Accepted. We have removed this sentence.	Yasuko Kameyama	National Institute for Environmental Studies	Japan
58393	28	9	28	12	That the CDM is more "important" than, e.g., the procedures and provisions for international emissions trading under the KP is a highly subjective assessment. Suggest "active" which is consistent with the analysis that follows. Moreover, in Article 6 negotiations, Parties use "unilateral" to refer to a variety of types of engagements with offset projects and markets, and it is unclear how this reference is used here. Suggest the following formulation: "Of the Kyoto Protocol's Mechanisms, the CDM market has been the most active, with a "gold rush" period between 2005 and 2012. The CDM has also been used for implementing bilateral strategies and unilateral (non-market or purely domestic) actions; these forms of use are also anticipated for the mechanism established in Article 6.4 of the Paris Agreement."	Accepted. Wer have rewritten	Government of United States of America	U.S. Department of State	United States of America
11987	28	9	28	34	Beyond debates regarding CDM effectiveness, it is worth noting human rights concerns that have been raised in the context of CDM implementation (e.g. Schade & Obergassel 2014)	Accepted. We have included the reference.	Tom Pegram	University College London	United Kingdom (of Great Britain and Northern Ireland)
19821	28	13	28	13	Replace "The EU ... in 2011" by "The EU, which had allowed the import and use of CDM credits under its domestic emissions trading scheme, restricted import and use from 2011 onwards, ..." Reason: the EU did not buy credits itself, the buyers were private companies under the EU ETS.	Accepted. We have changed the wording.	Axel Michaelowa	University of Zurich	Switzerland
37733	28	14	28	17	Text sais "This price never recovered, as the demand for CDM was very weak after 2012, mainly because of the difficulties encountered in securing the entry into force of the Doha Amendment, which established the second commitment period of the Kyoto Protocol". The Doha Amendmend would have been a supporting factor. But the main reason for the low price was that the only relevant demand, the EU ETS, stopped allowing for most CERs to be eligible and now other relevant demand from other countries emerged.	Accepted. We have changed "mainly" to "partly"	Juerg Fuessler	INFRAS	Switzerland
85997	28	18	28	18	The Doha Amendment came into force on 31 December 2020.	Accepted.	Government of Australia	Department of Industry, Science, Energy and Resources	Australia

Comment Id	From Page	From Line To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country	
14583	28	18	28	18	The Doha Amendment entered into force on 31 December 2020. (It's symbolically important that this happened while CP2 was still effective, and indeed the secretariat went to some lengths to encourage parties to accept the amendment in time to enable this). The CDM price never recovered because of uncertainty over the future of the mechanism, and its eventual relationship with the Paris Article 6 mechanisms. Failure to resolve these issues in Katowice have exacerbated and prolonged the uncertainty.	Accepted the change of date. The second part is noted, but not included due to space limitations.	Joanna Depledge	Centre for Environment, Energy and Natural Resource Governance (CEENRG), University of Cambridge	United Kingdom (of Great Britain and Northern Ireland)
19819	28	19	28	19	Replace "international emissions trading mechanisms" by "international market mechanisms". Reasons: CDM and JI are baseline and credit systems, whereas emissions trading is done in the form of "cap and trade" systems.	Accepted. We have changed the wording.	Axel Michaelowa	University of Zurich	Switzerland
12641	28	19	28	20	A meta analysis of the effectiveness of carbon markets found that they only reduce emissions 0-2%, and work best in an emissions trading scheme. Green, J. F. (2021). Does carbon pricing reduce emissions? A review of ex-post analyses. Environmental Research Letters.	Accepted. We have included the reference.	Jennifer Allan	Cardiff University	United Kingdom (of Great Britain and Northern Ireland)
37737	28	19	28	34	This entire paragraph on the experience with the CDM does not seem to provide a balanced picture. The role of the CDM for capacity building may hardly be underestimated and is well described in the text. On the other hand, the significant evidence that the use of the CDM in compliance regimes such as in the EU ETS has led to an net increase in global GHG emissions seems to be downplayed. In order to provide a balanced view, this aspect should be made more explicit: The main reason for the CDM to result in a net increase in global emissions lies in the fact that the majority of CDM projects were and are not additional. For instance, Öko-Institut (2016) finds that "Overall, our results suggest that 85% of the projects covered in this analysis and 73% of the potential 2013-2020 Certified Emissions Reduction (CER) supply have a low likelihood that emission reductions are additional and are not over-estimated. Only 2% of the projects and 7% of potential CER supply have a high likelihood of ensuring that emission reductions are additional and are not over-estimated." An important reason for this lies in the fact that in particular for CDM projects related to energy efficiency and renewable energies, which represent the predominant project types, the revenues from the participation in the CDM and the selling of CERs typically provided only a very low contribution to the overall financial performance. For instance, CER revenues increased the project IRR on average by 2.6 - 2.8 percentage points for wind projects and by a mere 1.2 to 1.4 percentage points of IRR for solar projects (sources: IGES and UNEP-DTU, as cited in Table 2-3 in Öko-Institut (2016)). With such a low impact on project profitability, it can hardly be claimed that all these projects would not have been implemented in absence of the CER revenues and would therefore be additional. The body of CDM regulation, methodologies and tools (UNFCCC 2021), even though it improved over the last decade in areas such as baseline setting and overall methodological consistency, still does not provide sufficient safeguards to rule out projects with high risk of non-additionality. On the contrary, for instance the emergence of project types with automatic additionality for microscale projects (UNFCCC 2018) further weakened the robustness of CDM's additionality test, because they allow for the eligibility of programs with a large number of renewable energy projects without checking additionality. Also, the strong decline of CER prices over the last decade further diminished the already small contribution from CER revenues, rendering the causal link between the registration of the project under the CDM and the implementation even weaker and further undermining any claims for additionality.	Accepted. We have substantially reworded this text, including the specific numbers from the Cames study.	Juerg Fuessler	INFRAS	Switzerland
20017	28	19		34	this picture on emission trading is diplomatic but not helpful - you miss to mention corruption that hampered JI and CDM alike and do not add the relevant literature here	Noted. We have rewritten substantially.	Manuela Dr. Troschke	Scientists for Future Germany	Germany
37739	28	22	28	22	You might want to cite the paper (Öko-Institut 2016) correctly with its authors (Cames et al. 2016).	Accepted. We have changed the citation.	Juerg Fuessler	INFRAS	Switzerland
37735	28	23	28	25	"more recent studies taking into account regulatory tightening and learning how to devise robust additionality tests see a more positive outcome": It appears that the cited studies do not provide more than anecdotal evidence. Major flaws with the determination of additionality and baseline setting as e.g. documented in Ökoinstitut 2016 (you may want to cite this correctly with authors names) have not been rectified and still prevail.	Accepted. We have rewritten this.	Juerg Fuessler	INFRAS	Switzerland
85999	28	33	28	34	There is no factual basis for the assertion that experiences from the CDM - e.g. through a proliferation of private sector consultants setting up CDM projects - have contributed to the host country government's understanding of how to produce a set of GHG accounts under the Paris Agreement. Suggest removing the last sentence "While this was costly... under the Paris Agreement."	Accepted. We have rewritten.	Government of Australia	Department of Industry, Science, Energy and Resources	Australia
48553	28	35	28	41	There are some other experiences that can be relevant for the implementation of Article 6 related to non-market approaches. For instance the Bolivian Joint Mechanism for Mitigation and adaptation for Sustainable and Integral Forest Management, which has been implemented under Bilateral and multilateral financing schemes, and which has demonstrated higher benefits of community-led management, rather than valuing only carbon sequestration under REDD+ schemes.	Rejected. This fits better into the section on Forestry and REDD+	Fany Ramos Quispe	Environmental Engineers Association of La Paz	Bolivia
86001	28	35	28	41	'It lists a number of specific types of cooperative approaches'. As this sentence follows immediately after one about Article 6.1, the reader would likely assume the 'It' in question is Article 6.1, whereas what is actually meant is Article 6 (the subject of the first sentence in this paragraph).	Accepted. Reworded	Government of Australia	Department of Industry, Science, Energy and Resources	Australia
86003	28	38	28	41	Article 6 does not 'list' types of cooperative approaches, but it does 'address' or 'cover' them. Suggest this amendment.	Accepted. Reworded	Government of Australia	Department of Industry, Science, Energy and Resources	Australia
86005	28	39	28	39	ITMOs themselves are not a type of cooperative approach. Suggest adding 'those involving the use of' before 'internationally transferred...'. This would more accurately reflect the text of Article 6.2, which addresses cooperative approaches that involve the use of internationally transferred mitigation outcomes towards NDCs.	Accepted. Reworded	Government of Australia	Department of Industry, Science, Energy and Resources	Australia
63343	28	39	28	41	This sentences implies that ITMOs and the new mechanism are separate, mutually exclusive options, which is incorrect. We would suggest this sentence be redrafted or deleted to ensure accuracy.	Accepted. Reworded	Government of Canada	Environment and Climate Change Canada	Canada

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
22551	28	39	28	39	Ambit, meaning "framework" if we understand, may be ambiguous, and used in the same sentence as "ambition". Maybe just remove "that come within its ambit, including" and replace it by "such as"	Accepted. Reworded	Government of France	Ministère de la Transition écologique et solidaire	France
58395	28	39	28	39	In referencing ITMOs, use the full relevant text of Article 6.2, namely adding the following text: "... USE OF internationally transferred mitigation outcomes TOWARDS NATIONALLY DETERMINED CONTRIBUTIONS ..."	Accepted. Reworded	Government of United States of America	U.S. Department of State	United States of America
29569	28	40	28	41	The reference to the non-market mechanisms in Article 6 could be more elaborated, and perhaps you can consider explaining how programs such as REDD+ can be seen as an avenue to implement Article 6. Similarly as formulations currently on page 27 line 40-42.	Noted. We have specifically mentioned aspects of REDD+ here.	Government of Norway	Norwegian Environment Agency	Norway
58397	28	41	28	41	Delete "mechanisms" and replace with "approaches" for consistency with Article 6.9 and other relevant provisions of Article 6, which do not refer to non-market "mechanisms".	Accepted. Reworded	Government of United States of America	U.S. Department of State	United States of America
51801	28	42	28	43	Can a reference be given where Article 6.2 mentions regional carbon markets or REDD+? If not, such speculations should better be avoided in IPCC publications.	Accepted. Reworded	Florin Vladu	UNFCCC Secretariat	Germany
86007	28	42	28	43	Incorrect - there is no mention of REDD+ or regional carbon markets in the agreed text for Article 6.2. Suggest this is an assumption rather than something that is "indicated" by the text. Recommend removing this sentence, or at least amending to reflect the A6.2 text as agreed.	Accepted. Reworded	Government of Australia	Department of Industry, Science, Energy and Resources	Australia
22553	28	42	28	42	It seems incorrect to say "indicates" since article 6.2 is silent on what exactly an ITMO is. We recommend to modify to "Article 6.2 does not give a precise description of the scope of ITMOS, but it is broadly understood that these could originate from a variety of sources ..."	Accepted. Reworded	Government of France	Ministère de la Transition écologique et solidaire	France
58399	28	42	28	42	Article 6.2 does not "indicate" any specific systems from which ITMOs might originate, so suggest noting that ITMOs could represent mitigation that arises from the types of systems described in the lines that follow. It is important to be clear and factual in summarizing what is (and is not) in the text of Article 6.2. Suggest the following formulation: "Under Article 6.2, ITMOs could represent mitigation originating from a variety of sources including regional carbon ..."	Accepted. Reworded	Government of United States of America	U.S. Department of State	United States of America
58401	28	42	28	43	As drafted, this implies that Article 6.2 itself states that these can come from regional carbon markets or REDD+. Cooperative approaches referred to in Article 6.2 can come from a wide variety of sources, but the sentence should be clarified to avoid suggesting that 6.2 refers explicitly to REDD+ or other sources.	Accepted. Reworded	Government of United States of America	U.S. Department of State	United States of America
22555	28	45	28	46	Suggestion to add "This is a key challenge since it is only when there are transfers between parties under article 6 that the rules on accounting for NDCs have to take account of the multiple forms and varied coverage that NDCs may take," after "counting"	Rejected. If there were a reference for this statement we would have been glad to include it, but as yet it is more speculative.	Government of France	Ministère de la Transition écologique et solidaire	France
86009	28	46	28	46	Unclear what is meant by 'similar provisions in the KP'. Suggest deleting as the analysis of A6 does not need to be constantly referenced against KP	Noted. We have been more explicit in the reference to Kyoto	Government of Australia	Department of Industry, Science, Energy and Resources	Australia
58403	28	46	28	48	Here, "this option" refers back to the establishment of an international emissions trading system centrally administered under the UNFCCC (Article 17 of the KP). However, "this option" is clearly not provided for in Article 6.2 itself. Suggest the following formulation: "... counting. While this provision, unlike Article 17 of the Kyoto Protocol, does not create an international carbon market, it enables Parties to pursue, for example, the linking of domestic or regional carbon markets, should they choose to do so (Marcu, 2016; Muller and ..."	Noted. We have been more explicit in the reference to Kyoto	Government of United States of America	U.S. Department of State	United States of America
70753	29	44	30	1	To avoid mixing up arguments (on Art 2.1 c with Art 9) replace "As highlighted above, the objective of the Paris Agreement includes the goal of '[m]aking finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development' (UNFCCC 2015a, Art 2.1(c)). Provision of finance will be critical to achievement of many parties' NDCs, particularly those that are framed in conditional terms (...)" by "As highlighted above, the objective of the Paris Agreement includes the goal of '[m]aking finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development' (UNFCCC 2015a, Art 2.1(c)). Aligning finance flows will be thus critical to achievement of many parties' NDCs, including those that are framed in conditional terms (...)"	Same as above	Philippe Tulkens	European Union (EU) - DG Research & Innovation	Belgium
22563	29	37	29	37	section 14.3.2.8 on finance flows : this section could be clearer. Indeed, it would be better to first expose the legal framework and then evaluate its implementation and finances flows. Thus, after the two first paragraph, it would be better to continue with the fifth paragraph (the one starting in p. 30, line 21) and then paragraph starting in p. 31 line 9. This would allow to have first a global picture of the legal framework on finance. Then it can be presented how finance is operated and gap in finances flows : In continuing with paragraph starting p. 30, line 3 and the one starting line 14 (to have a view of entites operating finance), then to continue with paragraphs starting p. 30 line 34 and 44 and p. 31 line 18 (to expose more clearly the gap in finance).	Accepted.. The legal framework and the rest of what is being considered are already taken into account in chapter 15 on Finance.	Government of France	Ministère de la Transition écologique et solidaire	France
82909	29	37	31	29	A lot of overlap with Chapter 15, Check for duplication and coherence.	Preeti Bhandari (Ch. 14) and Kreibiehl Silvia (CH. 15) are coordinating to avoid redundancies/overlaps and duplications on finance flows.	Jim Skea	Imperial College London	United Kingdom (of Great Britain and Northern Ireland)
22565	29	38	29	43	The three means of implementation (FF, TT and CB) start with a paragraph saying that they are further discussed after. It may be better to make a common paragraph saying that legal framwork is expose here successivly for the 3 means of implementation and that those issues are further developped after.	In considering US comment on "means of implementation", this comment can no longer be handled.	Government of France	Ministère de la Transition écologique et solidaire	France

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
53529	29	44	30	1	To avoid confusion and the mixing up of arguments (on Art 2.1 c with Art 9) replace "As highlighted above, the objective of the Paris Agreement includes the goal of '[m]aking finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development' (UNFCCC 2015a, Art 2.1(c)). Provision of finance will be critical to achievement of many parties' NDCs, particularly those that are framed in conditional terms (...)" by "As highlighted above, the objective of the Paris Agreement includes the goal of '[m]aking finance flows consistent with a pathway towards low greenhouse gas emissions and climate-resilient development' (UNFCCC 2015a, Art 2.1(c)). Aligning finance flows will be thus critical to achievement of many parties' NDCs, including those that are framed in conditional terms (...)"	Accepted in part, "Alignment" is different from "Provision". The last reflect the agreed Paris Agreement language. Modify the original to include both.	Government of Switzerland	Swiss Federal Office for the Environment Federal Department of the Environment, Transport, Energy and Communications DETEC Federal Office for the Environment FOEN International Affairs Division	Switzerland
58415	29	46	29	46	Delete "provision" and replace with "mobilization", which is a broader conception.	Rejected. "Provision" is the agreed commitment in the Paris Agreement (Articles 9.1 & 9.4), while "Mobilization" is only encouraged according to Art. 9.3 of the PA. The statment in this paragraph reflects obligation to provide financial resources as in the PA.	Government of United States of America	U.S. Department of State	United States of America
58413	29	38	29	38	Delete "means of implementation and". There is not general understanding or agreement on what "means of implementation" means, and "support" is a clearer and more straightforward term to use when describing support for developing countries.	Accepted. Changed	Government of United States of America	U.S. Department of State	United States of America
72973	29	7	29	8	It is my feeling that some facts on the potential of international cooperation, as suggested through Article 6 of PA provisions could be stated also in this chapter. Economic potential of Article 6 of the Paris Agreement implementation has been already discussed in Chapter I of this report To complement the content of Chapter 1 on this issue, one could quote a recent report published by IETA, CPLC and University of Maryland (Reference to be included : J. Edmonds, D. Forrister, L. Clarke, S. de Clara, C. Munnings, IETA, University of Maryland and CPLC, September 2019, "The Economic Potential of Article 6 of the Paris Agreement and Implementation Challenges", Washington, D.C. License: Creative Commons Attribution CC BY 3.0 IGO). This report shows that the benefits to cooperation under Article 6 are large and that the potential cost reductions over independent implementation of countries' NDCs could total about \$250 billion per year in 2030. This indicates how important to design clear and transparent rules for the implementation of Article 6. The report can easily been collected at the following site : https://www.ieta.org/resources/International_WG/Article6/CLPC_A6%20report_no%20crops.pdf	Noted. We already included a number of peer-reviewed papers that make this point.	Jean-Yves CANEILL	ERCST	France
72975	29	7	29	8	Following comment 3, this reference coul be added inside the commas : « (Mehling 2018; Gao et al. 2016; Fujimori et al. 2016, J. Edmonds et al. 2019)	Noted. We don't need to cite this non journal article, given the other citations.	Jean-Yves CANEILL	ERCST	France
86011	29	8	29	13	Query the use of 'growing' (line 8) with reference to the body of research, as only 2 studies are referenced. Two studies does not seem a normal scale for a 'growing body' of research.	Accepted. We have reworded.	Government of Australia	Department of Industry, Science, Energy and Resources	Australia
37743	29	9	29	9	Additional paper on environmental integrity for inclusion: L. Schneider et al., March 2017. Environmental Integrity under Article 6 of the Paris Agreement. Discussion Paper. https://www.researchgate.net/publication/315685295_Environmental_Integrity_under_Article_6_of_the_Paris_Agreement_Discussion_Paper	Rejected. We need a peer-reviewed reference.	Juerg Fuessler	INFRAS	Switzerland
58405	29	13	29	14	"These studies "collectively affirm" (i.e., all of the studies' conclusions) that environmental integrity can be delivered through the elements referred to in suggested edits. Two of the studies (not all of them, "collectively") explore approaches to imposing limits on the transfers and use of ITMOs, while acknowledging that no single approach is suited to all NDC formulations. Suggest the following formulation: "... et al. 2019). These studies collectively affirm that robust guidance on accounting for ITMOs, and for reporting and review under Article 13 of the Paris Agreement, alongside progressively more ambitious and comprehensive NDCs, will be critical to ensuring environmental integrity (Muller and Michaelowa, 2019; Mehling ..."	Accepted. We haven't included the exact text you suggest, but quite similar.	Government of United States of America	U.S. Department of State	United States of America
37741	29	14	29	15	Additional paper on accounting for inclusion: L. Schneider et al., September 2017. Robust Accounting of International Transfers under Article 6 of the Paris Agreement. Discussion Paper. https://www.researchgate.net/publication/321057839_Robust_Accounting_of_International_Transfers_under_Article_6_of_the_Paris_Agreement_Discussion_Paper	Rejected. We need a peer-reviewed reference.	Juerg Fuessler	INFRAS	Switzerland
86013	29	16	29	17	The terminology 'sustainable development mechanism', and acronym 'SDM', is not agreed and therefore should not be used to refer to the Article 6.4 mechanism. Suggest deleting the information that some have proposed this name, as this is superfluous and does not add necessary or helpful clarity. Further, other possible names have also been proposed and for completeness this would need to be clear. Suggest using 'Article 6.4 mechanism' and acronym 'A6.4M', which are neutral and widely used within the UNFCCC and amongst experts. (If a decision is made to proceed with including any information on proposed names please include other suggestions that have been made, and specify there is no agreement on name.) Comment also relates to references to 'SDM' at 4-29 lines 19, 21, 23, 26, and page 4-37 line 37.	Accepted. We have reworded.	Government of Australia	Department of Industry, Science, Energy and Resources	Australia
86015	29	16	29	29	The analysis of the Article 6.4 mechanism is skewed to comparisons with the CDM. It partially reviews paragraph 4 of Article 6, and does not address paragraphs 5 and 6, which also relate to the new mechanism. Further, all sub-points of paragraph 37 of 1/CP.21 are relevant to understanding the A6.4M but the analysis only covers select aspects.	Accepted. We have reworded.	Government of Australia	Department of Industry, Science, Energy and Resources	Australia
63345	29	16	29	17	We note that the term "sustainable development mechanism (SDM)" is not widely used among Parties because it de-emphasizes the importance of mitigation. The common terminology is "the new central mechanism" or "the Article 6.4 mechanism (A6.4M)." and would recommend this terminology be used instead.	Accepted. We have reworded.	Government of Canada	Environment and Climate Change Canada	Canada

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
12643	29	16	29	17	It may be worth noting the remarkable similarity between PA Article 6.4 text and KP CDM text. Also, several countries refuse to call it the sustainable development mechanism, so this sentence may be attracting more attention than needed.	Accepted. We have reworded this, noting the similarity.	Jennifer Allan	Cardiff University	United Kingdom (of Great Britain and Northern Ireland)
19523	29	16	29	20	The origins of SDM are left unclear here, in the "referred to by some parties". The underlying reference is equally unclear, with its "It has already been informally baptised by some and referred to as SDM (Sustainable Development Mechanism, ...)" It might be useful to provide additional clarity here. Also, the reference to Marcu 2016 could be amended, as it states just the author, year and title, but not the publication series (CEPS).	Accepted. We have reworded.	Markku Rummukainen	Lund University	Sweden
22557	29	17	29	17	Concerning SDM, there is no formal agreement on the use of this term - it would be wiser in this section to stick to "article 6.4 mechanism"	Accepted. We have reworded.	Government of France	Ministère de la Transition écologique et solidaire	France
86017	29	19	29	19	Please delete reference to SDM as 'sustainable development mechanism' is not an agreed way of referring to the Article 6.4 mechanism. As noted in comment on 4-29 para 16, please use the neutral acronym 'A6.4M' which is widely used as shorthand for 'Article 6.4 mechanism'.	Accepted. We have reworded.	Government of Australia	Department of Industry, Science, Energy and Resources	Australia
86021	29	20	29	20	'in a similar fashion to the CDM' - this reference implies a connection between the Article 6.4 mechanism and the rules and governance of the CDM which is inaccurate. Further, its interpretation is unclear - is the supervision to be done in a 'similar fashion' to the CDM (in which case this should be teased out as it cannot be assumed the reader is fluent in the operations or governance of the CDM - the relevant information is that the A6.4M will operate under the guidance of the CMA with an appointed Supervisory Body to implement its operations); or is it that the body is similar to the CDM (in which case presumably the comparator should be the CDM EB)?	Accepted. We have reworded.	Government of Australia	Department of Industry, Science, Energy and Resources	Australia
86019	29	21	29	21	Please delete reference to SDM as 'sustainable development mechanism' is not an agreed way of referring to the Article 6.4 mechanism. As noted in comment on 4-29 para 16, please use the neutral acronym 'A6.4M' which is widely used as shorthand for 'Article 6.4 mechanism'.	Accepted. We have reworded.	Government of Australia	Department of Industry, Science, Energy and Resources	Australia
86023	29	21	29	23	Second sentence implies that the experience of the CDM is to form the basis for the A6.4 mechanism. This incorrectly represents paragraph 37 of the decision in several ways. Firstly, it is not the mechanism itself but rather its rules, modalities and procedures that should be adopted on the basis the elements listed at 37a-f. Secondly, 37f does not refer to the CDM, but rather, more broadly to experience with and lessons learned from existing mechanisms and approaches under the Convention and its legal instruments. While it may be the case that much of the literature focuses on the CDM, the decision is broader than this.	Accepted. We have reworded.	Government of Australia	Department of Industry, Science, Energy and Resources	Australia
63347	29	21	29	21	We suggest that first sentence in this paragraph should be revised for accuracy to reflect the wording of Article 6.4a: "To promote the mitigation of greenhouse gas emissions while fostering sustainable development"	Accepted. We have reworded.	Government of Canada	Environment and Climate Change Canada	Canada
19823	29	23	29	24	Revise "Compared ... mandate..." as follows: "Like the CDM under the Kyoto Protocol, the SDM has a twin target of climate change mitigation and sustainable development, but it has a stronger political mandate" Reason: The targets of CDM and Article 6.4 are worded in exactly the same language.	Accepted. We have noted the similarity in language.	Axel Michaelowa	University of Zurich	Switzerland
86025	29	23	29	23	Please delete reference to SDM as 'sustainable development mechanism' is not an agreed way of referring to the Article 6.4 mechanism. As noted in comment on 4-29 para 16, please use the neutral acronym 'A6.4M' which is widely used as shorthand for 'Article 6.4 mechanism'.	Accepted. We have reworded.	Government of Australia	Department of Industry, Science, Energy and Resources	Australia
86027	29	26	29	26	Please delete reference to SDM as 'sustainable development mechanism' is not an agreed way of referring to the Article 6.4 mechanism. As noted in comment on 4-29 para 16, please use the neutral acronym 'A6.4M' which is widely used as shorthand for 'Article 6.4 mechanism'.	Accepted. We have reworded.	Government of Australia	Department of Industry, Science, Energy and Resources	Australia
19549	29	26	29	26	Add after "Olsen et al. 2018": "(Michaelowa et al. 2020)". Reason: Reference provides detailed assessment of sustainable development co-benefits in international carbon markets. New reference: Michaelowa, Axel; Espelage, Aglaja; Hoch, Stephan (2020): Co-benefits under the market mechanisms of the Paris Agreement, in: Buchholz, Wolfgang; Markandya, Anil; Rübbecke, Dirk; Vögele, Stefan (eds.): Ancillary benefits of climate policy, Springer, Dordrecht, p. 51-67	Noted. We'll stick with the one peer-reviewed reference.	Matthias Honegger	Utrecht University, Perspectives climate research, IASS-Potsdam	Germany
37745	29	27	29	29	Additional paper on ambition raising through article 6.4 might be considered: J. Fuessler et al. June 2019: Options for fostering increasing ambition levels under the Paris Article 6.4 Mechanism. https://www.researchgate.net/publication/336135400_Options_for_fostering_increasing_ambition_levels_under_the_Paris_Article_64_Mechanism	Noted. We'll stick with the one peer-reviewed reference.	Juerg Fuessler	INFRAS	Switzerland
58407	29	28	29	28	The Article 6.4 mechanism operates within the context of the Article 6.1 chapeau, so unclear what is meant by OMGE being "in addition to" these overarching objectives. Suggest the following formulation: "... overall mitigation in global emissions," which is framed by the general expectation in Article ..."	Accepted. We have reworded.	Government of United States of America	U.S. Department of State	United States of America

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
72969	29	30	29	36	In this section, in the last paragraph, it is written : « whether to impose a mandatory share of proceeds on both Article 6.2 and 6.4 mechanisms to fund adaptation». The point is not really relevant for Article 6.4 : as a matter of fact the legal text of Paris Agreement states in its Point 6 of this article: "The Conference of the Parties serving as the meeting of the Parties to the Paris Agreement shall ensure that a share of the proceeds from activities under the mechanism referred to in paragraph 4 of this Article is used to cover administrative expenses as well as to assist developing country Parties that are particularly vulnerable to the adverse effects of climate change to meet the costs of adaptation". Credits issued from projects relevant to implementation of Article 6.4 should generate share of proceeds for adaptation, like CDM credits under the Kyoto Protocol, as it is stated clearly in the Article 6. However the question is real for ITMOS relevant to implementation of Article 6.2. There is no agreement, between Parties, at this stage to whether or not to impose a share of proceeds on future transactions ; this is not stated in the legal text, as for Article 6.4.	Accepted.	Jean-Yves CANEILL	ERCST	France
72971	29	30	29	36	Following comment 1 the text could be modified as follows : « whether to impose a mandatory share of proceeds on Article 6.2 mechanism to fund adaptation, like for Article 6.4 »	Accepted. We have used your suggested text.	Jean-Yves CANEILL	ERCST	France
86031	29	32	29	33	The characterisation of the first of the 3 issues listed is only partially accurate. At issue is whether and to what extent to allow the transition of projects and units from the CDM into the Article 6.4 mechanism for use towards Parties' NDCs. The use by Parties to the Kyoto Protocol of their own AAUs towards their NDC is not something that Article 6 addresses and therefore is not at issue in Article 6.	Accepted. We have reworded.	Government of Australia	Department of Industry, Science, Energy and Resources	Australia
58409	29	32	29	36	Recommend deleting the sentence starting with "There are entrenched differences ..." There is no need for the IPCC to characterize the dynamic of the negotiation, and the framing here suggests that for many of these there is simply a question of whether to do something or not, whereas some of the viewpoints reflected are in the view of many parties not legally available options. Thus painting them as questions of "whether or not" to do these things creates a false equivalency.	Accepted. We have reworded.	Government of United States of America	U.S. Department of State	United States of America
22559	29	33	29	34	Suggestion to add after "NDCs," : in brackets "(an issue that strictly relates to accounting for NDCs under article 4 rather than voluntary cooperation under article 6 itself)"	Noted. This text has changed.	Government of France	Ministère de la Transition écologique et solidaire	France
63349	29	34	29	34	The share of proceeds is mandatory for the 6.4 mechanism (per Art. 6.6) but does not apply to other cooperative approaches under Article 6.2. We therefore recommend that this sentence be revised to read "whether to extend the share of proceeds of the Article 6.4 mechanism to also apply to other cooperative approaches under Article 6.2"	Accepted. We have reworded.	Government of Canada	Environment and Climate Change Canada	Canada
58411	29	34	29	36	It is important to clarify here that (1) a mandatory share of proceeds was already agreed by Parties, as reflected in the Paris Agreement (which is not the case under Article 6.2 approaches); and (2) the Paris Agreement does not describe Article 6.2 as a "mechanism". Article 6.4 very explicitly refers to emissions reductions (NOT units) generated under the Article 6.4 mechanism, which is an important distinction in this discussion. Also, the subject of disagreement is how to prevent 6.4 ERs from being "double-used"; it's no longer (or not only) about whether 6.2 guidance applies to the 6.4 mechanism. Suggest the following formulation: "... NDCs, whether to impose a mandatory share of proceeds under Article 6.2, as the Paris Agreement explicitly requires under the Article 6.4 mechanism to fund adaptation; and, whether emissions reductions generated under Article 6.4 should be subject to accounting rules that prevent their double use in line with the guidance under Article 6.2 ..."	Accepted. We have reworded.	Government of United States of America	U.S. Department of State	United States of America
22561	29	35	29	35	The debate is more nuanced on accounting for article 6.4, it would be better to say "how" or "whether and how"	Accepted. We have reworded.	Government of France	Ministère de la Transition écologique et solidaire	France
19547	29	36	29	36	Add after "... Article 6.2": "(Michaelowa et al. 2020)". Reason: Reference provides detailed overview of positions. Reference: Michaelowa, Axel; Müller, Benito; Espelage, Aglaja (2020): 2020 update: Negotiating cooperation under Article 6 of the Paris Agreement, ECBI, Oxford	Accepted. Thanks for the citation	Matthias Honegger	Utrecht University, Perspectives climate research, IASS-Potsdam	Germany
37273	29		29		New mention - Finance shall be allotted to promote the idea of CDR that includes funding and	Noted. We see this as potentially too policy prescriptive, and have not included it.	Arun kumar Nayak	Bhabha Atomic Research Centre Trombay Mumbai	India
14585	29	30	29	30	Lack of agreement on Article 6 may change, so I would add "so far" or "at the time of writing" (or be prepared for a swift edit after COP 26).	Noted. We felt that it was sufficiently clear that the sentence was backward looking, and so did not this qualifier.	Joanna Depledge	Centre for Environment, Energy and Natural Resource Governance (CEENRG), University of Cambridge	United Kingdom (of Great Britain and Northern Ireland)
87097	29	38	29	46	These two paragraphs could be reversed: finance is both a broad goal of the Paris Agreement (article 2.1c) and a mean of implementation	We agree in principle. However, we left the ordering as it had been.	Philippe Wen	Ministère de l'Économie, des Finances et de la Relance	France
30589	30	3	30	4	In a quote "a complex and fragmented", the word 'fragmented' is not appropriate as the above-mentioned mechanisms and forums were established one another and were not meant to be unified, yet they are more and more coordinated among themselves.	Rejected. We are quoting from the literature.	Government of Japan	Climate Change Division - Ministry of Foreign Affairs	Japan
64351	30	3	30	13	The para does not include bilateral finance channels/mechanisms, despite half of international climate finance is going through these. Also, therole of the MDBs is not mentioned. I would add both, as they are significant. One could differentiate between those entities/channels that are specifically mandated to serve the PA, and those that are used based on UNFCCC Article 11.5 (=developed countries can use other channels too when providing climate finance).	Noted, but this is addressed later in the chapter.	Jan Kowalzig	Oxfam	Germany
63351	30	17	30	19	We would recommend a wording change from: "The GCF, which became operational in 2015, is expected to become the main mechanism for transferring public funds, and some private funds, to developing countries to address climate change.", to: "The GCF, which became operational in 2015, is the largest dedicated international climate change fund and plays a key role channelling financial resources to developing countries." This change is in line with the language from decisions launching the Green Climate Fund (decision 3.CP.17 and its annex).	Accepted	Government of Canada	Environment and Climate Change Canada	Canada

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
58417	30	17	30	20	It remains to be seen (policy-wise at least) if the GCF "is expected to become the main mechanism for transferring public funds, and some private funds, to developing countries to address climate change".	Accepted, language changed in response to Canadian comment above.	Government of United States of America	U.S. Department of State	United States of America
64353	30	25	30	30	The "must be interpreted in light of the UNFCCC" does not capture the complete story. One the one hand, those (i.e. Annex 2 countries) that have an existing obligation under the UNFCCC (i.e. UNFCCC Articles 4.3 and 4.4) to provide assistance accept a new obligation under PA 9.1 that continues the old one under UNFCCC 4.3 and 4.4. that means that their new obligation has to be fulfilled based on the same provisions that underpin the existing obligation (e.g. that finance needs to be new and additional and that it shall cover the incremental cost of action etc.). On the other hand, the current text suggests that the expansion of the potential pool of contributors is solely based on PA Article 9.2; another legal interpretation (by the Legal Response Initiative that unfortunately I cannot attach to this comment sheet, and it hasn't been published on the internet as far as I am aware of; but if you'd like to see it, email me at jkwalzig@oxfam.de) of the situation suggests that PA Article 9.1 already does that. It creates a new obligation for all developed countries. Those developed countries that have an existing obligation (i.e. Annex 2 countries) are to fulfill the new one (Paris) in continuation of the old one (UNFCCC), and those developed countries that do not have an old one nonetheless have accepted a new one with Paris, albeit not one they fulfill in continuation of anything. This means, Paris expands the legal obligation to provide assistance to all developed countries (and Annex 2 countries fulfill it in continuation of the old one), and then invites other countries (i.e. non-developed countries) to provide assistance on a voluntary basis.	Accepted. Excellent point.		Oxfam	Germany
58419	30	30	30	30	Add "AS PART OF A GLOBAL EFFORT" text from Article 9.3 in front of "developed countries should continue ...". That language is a critical part of that provision and should not be left out.	Accepted. Changed	Government of United States of America	U.S. Department of State	United States of America
58421	30	31	30	31	Delete "requirement" and replace with "expectation" or "recognition." By its own terms, the language does not in fact create a requirement or obligation.	Accepted. Changed	Government of United States of America	U.S. Department of State	United States of America
63353	30	34	30	37	We would recommend this paragraph remain factual and reflect the decision text from COP21 by removing "Beyond this there are no new recognised promises (Cipler et al. 2018)". In the Paris Agreement negotiations, parties formalised and extended previous long-term finance pledges made under the international climate regime, such as the Copenhagen Accord's pledge by developed countries to raise USD 100 billion yr-1 by 2020 to 2025. We would thus suggest the text read: "In the Paris Agreement parties formalized the continuation of the existing collective mobilization goal through 2025 in the context of meaningful mitigation actions and transparency on implementation (decision 1/cp.21, para 53)."	Accepted in part. The first suggestion relates to scholarship which we accurately reflect. The second to decision text, which we are happy to accept.	Government of Canada	Environment and Climate Change Canada	Canada
22567	30	35	30	35	Concerning the "merely formalised and extended", in the associated COP decision, not in the Agreement itself	Accepted. Language changed.	Government of France	Ministère de la Transition écologique et solidaire	France
8265	30	37	30	37	When mentioning the goal for developed countries to raise \$100 billion USD by 2020, the failure of achieving this by 2020 should also be mentioned.	This will be addressed in Chapter 15	Frida Zahlander	DanChurchAid	Denmark
63355	30	37	30	39	We note that the use of the word "process" is not agreed among Parties and recommend that the report use the language from the COP24 decision on initiating the new goal (decision 14/CMA.1), by changing "A decision on the initiation of a process for determining a new collective goal on finance has been deferred to the Glasgow COP26 in 2021" to: "Deliberations on setting a new collective quantified goal will be initiated at COP26".	Accepted. Changed	Government of Canada	Environment and Climate Change Canada	Canada
15313	30	39	30	41	"This new collective goal on finance is not explicitly limited to developed countries and could therefore encompass finance flows from developing countries' donors." The Paris Agreement clearly states "Developed country Parties shall provide financial resources to assist developing country Parties with respect to both mitigation and adaptation in continuation of their existing obligations under the Convention; Other Parties are encouraged to provide or continue to provide such support voluntarily". The Parties to the Convention and the Agreement are currently consulting on a new collective goal on finance for the post-2025 period. It is not appropriate to prejudge the outcome of COP26, which has not yet been reached, and it is suggested to delete this sentence.	Rejected. The text is sufficiently nuanced and precise.	Government of China	China Meteorological Administration	China
64355	30	39	30	41	Yes, it could include developing country contributions. Why single out them here? The whole story would be that developed countries are obliged to contribute to achieving the new goal through providing finance as a legal obligation (PA 9.1), that other (i.e. developing countries) are invited to also contribute to the goal voluntarily (PA 9.2) and that developed countries will lead the mobilisation of finance (PA 9.3) as much as that would also be seen as contributing to the new goal. BTW in the negotiations, the difference between 'provide' and 'mobilise' is usually that 'provide' refers to the provision of public funds; while 'mobilise' is seen as referring to private or public investments (eg. including market-rate loans by developed countries' development banks). Though there is no official definition, of course.	Accepted, in part. Text expanded.	Jan Kowalzig	Oxfam	Germany
64357	30	39	30	41	What's equally interesting about the new goal is that other than the 100bn goal it will not be set by developed countries under their terms (e.g. what and how to count towards it, however generously), but that it (and presumably its terms) will be negotiated and then adopted by all Parties.	Noted.	Jan Kowalzig	Oxfam	Germany
86029	30	41	30	43	Suggest changes to accurately reflect agreement in Katowice. Parties have also not agreed to a 'process', as follows: "The initiation of deliberations for a new collective goal on finance has been deferred to the Glasgow COP26 in 2021"	Accepted. Text changed.	Government of Australia	Department of Industry, Science, Energy and Resources	Australia

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
58425	30	41	30	43	This line is confusing as drafted and could imply something not reflected in the CMA decision. The CMA decision in Katowice indicated that the CMA would initiate deliberations at CMA3 (COP26), but did not necessarily indicate how that would be done or indicate that there would necessarily be a decision at that point. If included at all, this should just quote the language from the decision rather than recharacterize it.	Accepted. Text changed.	Government of United States of America	U.S. Department of State	United States of America
64359	30	44	30	48	These lines compare the 100bn goal with financing needs written into developing countries' NDCs - I find this a difficult approach. The finance information in NDCs usually mixes support needs and investment needs - the former being the core of the 100bn goal, while it is often the latter that countries have identified that is needed to implement NDCs. AND: when comparing the 100bn with needs, one could include here the estimates for adaptation finance needs as per the UNEP Adaptation Gap Report. While those figures cover the 2030 and 2050 timeframe, they are not about investment but about cost (some of which could be expected to be covered from developed countries fulfilling their support obligations under PA 9.1), so in fact a somewhat better comparison than investment needs written into NDCs (although of course the UNEP work only covers adaptation costs).	Noted, this is a good point but we have to work with the literature available which focuses on finance information in the NDCs. We can't over-interpret the material and literature.	Jan Kowalzig	Oxfam	Germany
48567	30	44	31	8	I would like to suggest including as a reference Oxfam's new report and briefly discuss the differences between the OECD report, the Oxfam report, and the information provided in Biennial Reports submitted by developed countries and submitted to the UNFCCC. This is the reference to the Oxfam report: Climate Finance Shadow Report 2020: Assessing Progress Towards the \$100 Billion Commitment (Oxfam, 2020); https://bit.ly/3qLQLV9	Rejected, this goes beyond what we have the space or mandate to do.	Raul Salas Reyes	University of Toronto	Canada
63357	30	46	30	47	We would suggest the removal of the aggregated USD 474 billion figure from this paragraph as it may not be accurate. The majority of NDCs do not specify how the estimated costs are calculated. Due to the lack of information methods used in calculating financial needs and the use of varying methodologies by Parties, it is not accurate to simply add up these figures due to the risk of double counting.	Rejected. We are citing literature that has done this work.	Government of Canada	Environment and Climate Change Canada	Canada
30591	30	46	30	47	Please add explanation that the value of '474 billion year by 2030' referred in the text is baseless figure.	Rejected. We are citing literature that has arrived at this number. We cannot add a judgment on the figure.	Government of Japan	Climate Change Division - Ministry of Foreign Affairs	Japan
19501	30	46	30	46	This would seem to be only one estimate (and the very only that the authors have assessed). If presented, it would need to be provided with sufficient context. Looking at the provided reference, it would seem to be based on rather unrealistic assumptions (richer countries not progressing their climate action beyond (I)NDCs, developing countries closing the whole gap from the (I)NDCs to emission reductions needed for the Paris Agreement goals, an unmotivated scaling between mitigation and adaptation finance needs, etc.). This would seem to be a poor basis for an assessment of this aspect.	Noted, but we are not reviewing this article, merely reflecting it as an illustrative number based on work done by those authors. All reports and estimates have assumptions, some of which may be problematic.	Markku Rummukainen	Lund University	Sweden
43759	30	48	31	1	Please ensure to provide a more comprehensive assessment of climate finance, e.g. by taking into account the estimates provided by Oxfam's Climate Finance Shadow Report 2020.	Noted, but we are reluctant to cite Reports from advocacy groups.	Government of Jamaica	Meteorological Service Division	Jamaica
19525	30	48	31	8	It would be good to be extremely clear on definitions and scopes, and provide appropriate cross-references till Chapter 15. For example, in section 15.3.2.2, the total of 546 bn USD is quoted for 2019). This includes, of course other flows than those specifically going from one group of countries to another, but is still a possible source of confusion. A cross-reference to Box 15.5 (present WGIII draft) might also be useful here.	Accepted. Cross reference added.	Markku Rummukainen	Lund University	Sweden
58423	30	35	30	36	Delete references to "pledge" or "pledges" and replace with "goal". Copanhen and other decisions do not refer to it as a "pledge".	Accepted. Changed	Government of United States of America	U.S. Department of State	United States of America
82911	31	30	32	5	A lot of overlap with Chapter 16. Check for duplication and coherence. Cautally Ch 16 is weaker on int'l cooperation and could borrow some material	Need to be in line with decision language	Jim Skea	Imperial College London	United Kingdom (of Great Britain and Northern Ireland)
12731	31	46	31	48	(Suggestion) I hope that that the sentence starting with 'contestations arising' can be rewritten as follows: "Contestation continued in negotiations for the Paris Rulebook. Particularlry, contestation over technology innovation was distinctive in terms of the meaning of technological innovation, which actors should be supported, and how support should be provided by the UNFCCC (Oh 2020a)".	Accepted.	Chaewoon Oh	Green Technology Center	Republic of Korea
16647	31	46	31	48	(Suggestion) I hope that that the sentence starting with 'contestations arising' can be rewritten as follows: "Contestation continued in negotiations for the Paris Rulebook. Particularlry, contestation over technology innovation was distinctive in terms of the meaning of technological innovation, which actors should be supported, and how support should be provided by the UNFCCC (Oh 2020a)".	Accepted. Repeats comment 12731.	Government of Republic of Korea	Korea Meteorological Administration (KMA)	Republic of Korea
30593	31	3	31	6	Please add explanation that the GCF funding gap mentioned here is not correct understanding if the fact; US's unconfirmed pledge is 2 billion throughout the Initial Resource Mobilization period, not yearly.	Noted, but the text does not suggest that 2 billion is per year.	Government of Japan	Climate Change Division - Ministry of Foreign Affairs	Japan
19521	31	3	31	8	This might be useful to update, given the fact that the US now has rejoined the Paris Agreement.	Accepted. Deleted all the text relating to the US. Outdated.	Markku Rummukainen	Lund University	Sweden
58427	31	4	31	4	While the United States had withdrawn from the Paris Agreement, they are officially a Party again (as of 19 February 2021). This is the problem with including policy-prescriptive statements that may change significantly with time. It would be more appropriate to state "... resulting from the previous U.S. withdrawal from the Paris Agreement (noting they are a Party again as of February 2021), with estimates ..."	Accepted. Deleted all the text relating to the US. Outdated.	Government of United States of America	U.S. Department of State	United States of America
58429	31	6	31	8	Suggest deleting lines 6-8. This is coming in a paragraph about the \$100 billion, and in that context it is inappropriate to single out any specific country. Moreover, this seems to cite a source from before President Biden took office; at most, only official sources from the U.S. government should be used to describe any specific intentions.	Accepted. Deleted all the text relating to the US. Outdated.	Government of United States of America	U.S. Department of State	United States of America
58431	31	6	31	8	The statement about the Biden administration re-joining the Paris Agreement and reinstating GCF funding pre-judges any possible policy outcome. Delete this statement as this is policy-prescriptive.	Accepted. Deleted all the text relating to the US. Outdated.	Government of United States of America	U.S. Department of State	United States of America
48299	31	6	31	8	Add an update about Biden rejoining and finances/terms?	Accepted. Deleted all the text relating to the US. Outdated.	Susana Hancock	University of Oxford	United States of America

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
22569	31	9	31	29	The report could also indicate that unlike the \$100bn goal, no enough progress has been made in the UNFCCC on the article 2.1c part of the story / the whole financial sector stakes, though there has been literature on it. (Works carried by ODI, WRI, I4CE)	Noted, but Chapter 15 covers all these issues in greater depth	Government of France	Ministère de la Transition écologique et solidaire	France
64361	31	9	31	17	This 'need' is based on constant bickering between developed and developing countries whether or not developed countries are meeting their UNFCCC and Paris obligations to provide assistance and whether or not they make progress towards meeting the 100bn-a-year-by-2020 goal. This is also so because there is no formal link between the reporting (biennial reports and PA 9.7) and the details of the financial obligation in UNFCCC article 4.3 (that still stands also under Paris), for instance a definition how to define 'new and additional' finance and the 'incremental cost' criterion. So developed countries report sets of numbers but it has never been clarified if the reported numbers actually demonstrate progress in fulfilling UNFCCC 4.3 (and soon Paris 9.1 in continuation of UNFCCC 4.3).	Noted, but not sure what textual change is being proposed here, and on what cited authority.	Jan Kowalzig	Oxfam	Germany
48569	31	9	31	17	There was a recent publication in Nature Climate Change that talks about the many issues on transparency and accountability in reporting climate finance. This paragraph could talk more about the ambiguous technicalities that have been used by developed countries. See Roberts, J.T., Weikmans, R., Robinson, Sa. et al. Rebooting a failed promise of climate finance. Nat. Clim. Chang. 11, 180–182 (2021). https://doi.org/10.1038/s41558-021-00990-2 .	Accepted, in part. Reference added.	Raul Salas Reyes	University of Toronto	Canada
63359	31	14	31	14	We would suggest to remove the reference to "Article 9.5" from this line/paragraph as it has no linkage to reporting requirements on the provision of climate finance nor the enhanced transparency framework of the Paris Agreement. Should the report want to reference obligations under Article 9.5 on biennially communicating indicative climate finance, this should be done separately from references to Article 9.7 and the enhanced transparency framework to avoid conflating the two concepts.	Accepted, in part. Changed the language to reflect the differing content of the two provisions.	Government of Canada	Environment and Climate Change Canada	Canada
63361	31	26	31	29	The framing as currently presented is not accurate, in particular in regards to framing the report as an 'assessment' and stating the report is only for financial needs, when it covers also technology development and transfer and capacity building needs. References to the report on the determination of needs of developing countries should be kept consistent with the Decision from COP24 (decision 4/CP.24, para 13) and agreed outlines by Parties of the report. Therefore, we request a wording change from "During the 2018 Katowice conference, UNFCCC parties agreed to conduct an assessment of developing countries financial needs and priorities and requested the Standing Committee on Finance to produce a '2020 Needs Report' for presentation at COP26 in 2021." to: " During the 2018 Katowice conference, UNFCCC Parties requested the Standing Committee on Finance to prepare, every four years, a report on the determination of the needs of developing country Parties related to implementing the Convention and the Paris Agreement, for consideration by parties at COP26."	Accepted. Changed.	Government of Canada	Environment and Climate Change Canada	Canada
64363	31	27	31	27	The agreed to do a report on the determination of needs (current text misses the 'determination'). This isn't trivial since: Developed countries want this report to be about the determination (i.e. a report on how to determine), while developing countries want it to be about needs (i.e. a report on how much they need). In any case, the current text will be a bit outdated once the AR6 comes out *after* COP26.	Language has been changed in response to earlier comments	Jan Kowalzig	Oxfam	Germany
78169	31	1			Please take into account other estimates as well such as the Oxfam's Climate Finance Shadow Report 2020.	Noted, but we are reluctant to cite Reports from advocacy groups.	Charlotte Plinke	Climate Analytics	Germany
87099	31	9	31	17	The report could also indicate that unlike the \$100bn goal, little progress has been made in the UNFCCC on the article 2.1c part of the story / the whole financial sector stakes, though there has been literature on it. (Works carried by ODI, WRI, I4CE)	Thank you. We added additional detail to this paragraph.	Philippe Wen	Ministère de l'Économie, des Finances et de la Relance	France
58433	32	41	32	42	Delete "means of implementation and". The line cites Article 14.1, but that article does not specifically identify what is meant by "means of implementation and support". Thus, a more generic term should be used.	The term "the means of implementation and support" is in quotes in the chapter indicating this is the specific language used in the quoted provision i.e. Article 14.1 Hence, this term has been retained.	Government of United States of America	U.S. Department of State	United States of America
52779	32	18	32	20	R&D support for which specific actors? Absent this detail, assessing the relationship between international cooperation and R&D would become difficult.	Noted. This statement is drawn from the supporting reference which has a focus particularly on support for developing countries so this qualification has been included to provide greater specificity.	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia
27931	33	15	33	15	After (Khan et al. 2020), add "whereas all developing countries need to enhance their capacity-building to assess the effects of climate change and the impact of mitigation response measures".	Rejected. This is not supported by the literature cited in this paragraph.	Eleni Kaditi	Organization of the Petroleum Exporting Countries, OPEC	Austria
52781	33	17	33	17	"SIDS" instead of "SIDs"	Accepted. Change made	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia
22571	34	6	34	6	A further section could be included to address Climate change education, public awareness, public participation and public access to information. The Paris Agreement includes a short article 12 on these issues and the Rulebook provides for further action, in relation with related activities under the Convention, noting that such activities play a key role in promoting changes in lifestyles, attitudes and behaviours needed to foster low-emission, climate-resilient and sustainable development. Also this section should maybe be linked with the one on transparency framework in order to discuss the change in compliance mechanisms under Paris agreement towards increased of trust and facilitation. This is an important issue for international cooperation aspects.	Noted. Reference is made to Article 12 in this section and the fact that these elements can be included as part of capacity-building. Text expanded to reference further action under Rulebook. Cross-reference included to section dealing with Transparency and Accountability.	Government of France	Ministère de la Transition écologique et solidaire	France

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
15315	34	20	35	28	The content involved here over-interprets the mitigation features of the Paris Agreement while ignoring the important role of other elements. In Box 14.1, NDC is not limited to NDC alone, and NDC mitigation has no characteristics. The relevant conclusions should not be subjectively summarized. The expression of the goal in Article 2 is not fully cited, lacking "This Agreement, in enhancing the implementation of the Convention, including its objective, aims to strengthen the global response to the threat of climate change, in the context of sustainable development and efforts to eradicate poverty". In addition, Box 14.1 states that the efficacy of the Paris Agreement in achieving its goals is therefore dependent upon three additional elements: 1. Voluntary ratcheting of NDCs; 2. Enhanced transparency framework; 3. Collective global stocktake. However, the achievement of the Paris Agreement does not depend on these three elements alone. In addition, there is no indication of a document source in Box 14.1 and many statements do not respect the original Paris Agreement. It is suggested to delete such statements.	Noted. It is counter-productive in a Box attempting to provide a high-level overview of the key features of the Paris Agreement to reproduce exact language from the Paris Agreement. Some attempt at summarization and characterization needs to be made. The features highlighted are directly sourced to relevant provisions of the Paris Agreement, and are highlighted in all texts relating to the Paris Agreement. Both Figure 14.2 and Box 14.1 are illustrative not exhaustive of the provisions and features of the Paris Agreement.	Government of China	China Meteorological Administration	China
12645	34	20	34	20	The box appears to be misnamed - or the reason that these features are relevant to mitigation needs to be clearer at the outset. It is more a box summarizing the key features of the Agreement	Noted, thanks.	Jennifer Allan	Cardiff University	United Kingdom (of Great Britain and Northern Ireland)
14587	34	20	35	28	This box 14.1 is repetitive of the extensive descriptive material in the previous section 14.3.2. Also please avoid such terms as agreements "permitting" Parties to take action (here, "permits voluntary cooperation"). Sovereign states don't need the "permission" of any climate treaty to engage in "voluntary" cooperation.	Noted and accepted.	Joanna Depledge	Centre for Environment, Energy and Natural Resource Governance (CEENRG), University of Cambridge	United Kingdom (of Great Britain and Northern Ireland)
70755	34	20	35	28	If section 14.3 focuses on the PA and section 14.4 does on the UNFCCC, as Box 14.1 nicely summarizes key features of UNFCCC relevant to mitigation a similar box for the UNFCCC would give a good comparison between two regimes.	Accepted in principle. We have added a column in Table 14.4 on the UNFCCC. But we are including just one box on the Paris Agreement as this is 'new' since AR5.	Philippe Tulkens	European Union (EU) - DG Research & Innovation	Belgium
9227	34	20	35	28	In Box 14, the goals of the Paris Agreement are partial and comprehensive. NDC is not only mitigation, but NDC mitigation has no characteristics, and relevant conclusions should not be subjectively summarized. The expression of the goal in Article 2 is not fully cited, and lacks "this agreement is aimed at strengthening the Convention, including the implementation of its goals, in order to link sustainable development and poverty eradication efforts, and to strengthen global response to the threat of climate change." . In addition, the article now points out that the realization of the goals of the Paris Agreement depends on the following three additional elements: one is the independent submission of NDC, the second is enhanced transparency, and the third is an overall global inventory. But the realization of the Paris Agreement does not rely solely on these three elements. There is no document source in Box 14, and many expressions do not respect the original text of the Paris Agreement. It is recommended to delete it.	Noted, response as above to the identical comment from the Government of China.	Yongxiang Zhang	National Climate Center	China
83553	34	34	34	39	In addition to the information provided here, it could be clarified that reaching net zero greenhouse gas emissions (Article 4.1) would lead to a peak and gradual decline in global warming consistent with the temperature target set out in Article 2.1.	Noted, but not included, as we are summarizing features of the Agreement here, and this is not mentioned in the Agreement.	Joeri Rogelj	Imperial College London	United Kingdom (of Great Britain and Northern Ireland)
83555	34	34	34	39	I'm wondering whether it would be useful to clarify, based on Article 29 of the Paris Agreement and the specifications provided in the French and Spanish language versions of the Article 4.1 that the net zero GHG emissions (the "balance") of Article 4.1 refers to anthropogenic emissions and "anthropogenic" removals. This is explicitly specified in the French and Spanish versions of the agreement and thus provide the most precise view.	Noted, but not included. This level of detail is not warranted here. And, it is open to interpretation, given the Paris Agreement was negotiated in English.	Joeri Rogelj	Imperial College London	United Kingdom (of Great Britain and Northern Ireland)
63363	34	37	34	39	We would recommend the removal of "with the share of emissions reductions effort both by different Parties to be determined" as it is inconsistent with Article 4.1 of the Paris Agreement. Under the Paris Agreement, the basis of equity and context of sustainable development applies to the balance between emissions and removals in the second half of this century.	Accepted in part. The language has been nuanced to address the first point. The interpretation provided in the second sentence, however, appears contrived, and is not adopted.	Government of Canada	Environment and Climate Change Canada	Canada
58435	34	37	34	39	Delete the rest of the sentence starting with "with the share of emissions reductions ..." This adds words not found in Article 4.1 and makes it sound as if under the Paris Agreement there will be a specific determination of the shares of reductions by different parties.	Accepted. Language nuanced.	Government of United States of America	U.S. Department of State	United States of America
58437	34	39	34	41	The meaning of Article 2.2 is often the subject of debate. If cited at all, it should be in a very factual way -- i.e., "Article 2.2 states that [quote exact text] ..."	Noted. In an Box attempting to summarize the provisions of the Paris Agreement, there is a limit to which we can (or should) quote exact text from the Paris Agreement. However, the language we use here is from the Paris Agreement 'in the light of equity.....circumstances.' This is factual not an interpretation.	Government of United States of America	U.S. Department of State	United States of America
63365	34	40	34	41	It is important to ensure this sentence remains consistent and accurate to the language of Art. 2.2 of the Paris Agreement. As currently written, the "common" responsibilities of CBDR-RC-NC appears to have been removed.	Accepted. Changed.	Government of Canada	Environment and Climate Change Canada	Canada
63367	34	43	34	44	This language could be strengthened to better track with the Paris Agreement by replacing "the contents" with "the ambition of which Parties determine, reflecting their highest possible ambition and a progression of ambition in the light of their national circumstances".	Thanks, but this doesn't reflect the language of the Paris Agreement.	Government of Canada	Environment and Climate Change Canada	Canada
52783	34	6	34	16	How exactly is this compliance committee unique with respect to the theoretical approaches this chapter subscribes to in depicting international cooperation? What are some of the unique processes that promote cooperation?	Noted, but unclear what changes are being suggested.	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia
43761	35	30			A much more profound discussions is required on the nature of the temperature goal of the Paris Agreement. The strengthening of the previous Cancun language on 'below 2°C' to 'well below 2°C' is not even discussed, although it is a key outcome of the 2013-2015 Periodic Review. The implications of the findings of the Periodic Review need to be assessed much more prominently.	Noted. The temperature goal is discussed in 14.3.2.1 including mention of the 2013-2015 periodic review.	Government of Jamaica	Meteorological Service Division	Jamaica

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
14977	35	30			The purpose of this section is very much unclear and can be seen as highly policy-prescriptive in defining categories under which the Paris agreement should be assessed. As the authors write themselves: "Assessments of the Paris Agreement on paper are necessarily speculative and limited by the lack of credible counterfactuals." Why should it be included here then? This is not mandated by the approved outline and probably best deleted.	Rejected. Assessment of the Paris Agreement is a key component of evaluating the effectiveness of international cooperation on mitigation post AR5. It is also a significant focus of the literature although this literature does not reach a definitive assessment.	Government of Saint Kitts and Nevis	Department of Environment - Ministry of Agriculture, Marine Resources, Cooperatives, Environment and Human Settlements	Saint Kitts and Nevis
14589	35	30	36	7	(1) A core reason for pessimism about the PA is that there is no legally-binding obligation for countries to comply with the contents of their NDCs. This is not covered by the statement about "extensive use of soft law provisions". (2) I would move the statement about US non-participation to the end of this list, as this is not part of the PA design, whereas the other elements are; (3) delete "the falling cost of low-carbon technologies" in lines 6-7. This is not part of the PA design. It is a trend that began before the PA, and might be accelerated by it, but that is mixing up cause and effect.	Accepted for first two comments. Amendments made. On third comment, note this sentence is not detailing aspects of PA design but rather factors discussed in literature as a basis for an optimistic assessment of the chances for enhanced international cooperation on mitigation.	Joanna Depledge	Centre for Environment, Energy and Natural Resource Governance (CEENRG), University of Cambridge	United Kingdom (of Great Britain and Northern Ireland)
12733	35	31	35	31	(Suggestion) The criteria identified in Section 14.2.2 should be changed to "Section 14.2.3".	Accepted.	Chaewoon Oh	Green Technology Center	Republic of Korea
16649	35	31	35	31	(Suggestion) The criteria identified in Section 14.2.2 should be changed to "Section 14.2.3".	Accepted	Government of Republic of Korea	Korea Meteorological Administration (KMA)	Republic of Korea
69397	35	31			Should be referring to Section 14.2.3.	Accepted	Tyler Felgenhauer	Duke University	United States of America
3821	35	38	35	39	Raiser et al., 2020 "Is the Paris Agreement Effective? a systematic map of the evidence" would be a fitting further citation here.	Accepted. Reference added.	Raiser Kilian	Hertie School	Germany
76181	35	41	36	2	I think proximity to 1.5 deg C has also been a point raised.	Noted. However, no supporting reference cited.	Jan Fuglestedt	CICERO	Norway
19503	35	1	35	2	That the NDCs are not subject to review or adequacy would seem to bypass the fact that the NDCs are both analysed (such as now started for the second round) and will be subject to the Global Stocktake mechanism that does just this, albeit conceivably on global aggregate level. Provision of NDCs is also binding for the Parties. In particular, article 4.3 means that Parties are committed to providing NDCs, and in accordance with the principle of progressive increase in ambition.	Noted. The fact remains that there is no INDIVIDUAL review of NDCs. Further clarified.	Markku Rummukainen	Lund University	Sweden
72825	35	1	35	9	Delete "voluntary" as this is not an accurate characterisation of the Paris Agreement's architecture	Accepted.	Matthew Gidden	Climate Analytics	Germany
48301	35	2	35	3	Is this going to be a weakness of the Agreement with respect to the NDCs we know so far? Is there space to amend compliance mechanisms?	Not sure what the suggestion is?	Susana Hancock	University of Oxford	United States of America
58439	35	5	35	6	For consistency with Article 8.1, delete "that arises where mitigation and adaptation efforts are insufficient" with "associated with the adverse efforts of climate change". Loss and damage language was carefully negotiated in Article 8 and the IPCC should not be putting a gloss on the language not found in the text of the Agreement itself.	Accepted.	Government of United States of America	U.S. Department of State	United States of America
445	35	9	35	9	It seems that the authors could not agree on whether ratcheting NDCs is an obligation or not. Either it is "voluntary", or it is a "must". I lean towards the latter, but agree that this is not crystal clear. There could be other phrasings that would leave the question unsettled without expressing two contradictory statements.	Accepted. Voluntary deleted.	Benoît Mayer	The Chinese University of Hong Kong	China
63369	35	9	35	12	We would highlight that it is misleading to frame CBDR-RC-NC as a standalone feature of NDCs. The Paris Agreement uses CBDR-RC-NC as a modifier of the ambition and progression features of NDCs. We would recommend this sentence be amended to read read "...highest possible ambition and progression, reflecting CBDR-RC-NC"	Accepted. Changed.	Government of Canada	Environment and Climate Change Canada	Canada
47459	35	9			A correction of this statement is needed as the ratchet mechanism is not defined as voluntary.	Accepted. Changed.	Government of Saint Lucia	Department of Sustainable Development - Ministry of Education, Innovation, Gender Relations and Sustainable Development	Saint Lucia
84209	35	17	35	20	Suggest adding "long-term goals" after the "objectives", as the Global Stocktake assesses the collective progress towards achieving not only the objectives of the Paris Agreement but its long-term goals.	Accepted.	Madoka Yoshino	United Nations University Institute for the Advanced Study on Sustainability	Japan
63371	35	23	35	24	We recommend that this sentence be edited as it is misleading and inaccurate. The Paris Agreement does not make ambition contingent on support, rather it makes both ambition and support legally binding. This sentence incorrectly frames the legal obligations of Parties	Accepted. Language nuanced.	Government of Canada	Environment and Climate Change Canada	Canada
53531	35	23	35	25	Replace "For developing countries, the Paris Agreement recognises that increasing (...) depends upon the provision of financial resources, capacity building, and technology development and transfer." by "For developing countries, the Paris Agreement recognises that increasing (...) can be bolstered by the provision of financial resources, capacity building, and technology development and transfer.	Accepted, with thanks.	Government of Switzerland	Swiss Federal Office for the Environment Federal Department of the Environment, Transport, Energy and Communications DETEC Federal Office for the Environment FOEN International Affairs Division	Switzerland
58441	35	23	35	25	As drafted, this last sentence implies a kind of dependency that, at least as applied broadly, is likely overstated and was not supported by countries in the negotiations. In other words, it is not the case that for all so-called developing countries there is a dependency, which this sentence might imply as drafted. Therefore, this should be restated along the following lines: "The Paris Agreement recognizes that increasing mitigation ambition and realising long-term low-emissions development pathways will be enhanced by mobilization of financial resources, support for capacity building, and cooperation on technology development and transfer."	Accepted.	Government of United States of America	U.S. Department of State	United States of America
64365	35	23	35	28	This para could mention that Article 9 creates a legal obligation for developed countries to provide financial assistance for mitigation (and adaptation), I think that is even more important than the dependency between finance provided and mitigation action in developing countries. For some developed countries (those in Annex 2) this obligation is to be fulfilled under the same terms as the UNFCCC 4.3 and 4.4 obligation, e.g. finance must be new and additional and cover the incremental cost of action.	Accepted.	Jan Kowalzig	Oxfam	Germany

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
70757	35	23	35	25	Replace "For developing countries, the Paris Agreement recognises that increasing (...) depends upon the provision of financial resources, capacity building, and technology development and transfer." by "For developing countries, the Paris Agreement recognises that increasing (...) can be bolstered by the provision of financial resources, capacity building, and technology development and transfer."	Accepted.	Philippe Tulkens	European Union (EU) - DG Research & Innovation	Belgium
81089	35	14	36	46	Second, p.36 lines 14-46 really do make me worry about balance in the chapter. I find it strange that a Common Accounting Framework focused on six gases, and sinks and sources, is presented as inferior and less environmentally effective than a Treaty which demands no common coverage of accounting framework, clearly tempting countries to pick and choose gases and baselines to make their efforts look better, making comparability much harder and increasing the risk of double counting. Exactly what important gases were omitted under Kyoto which you think will be covered much better under the PA? Of course a treaty involving all countries preparing goals and plans has potential to have greater global impact - as one would absolutely hope under the evolution of the global regime. However, the cost of weakening the governance framework for richer countries has yet to be weighed.	Accepted. This has been addressed now through extensive revision of the text.	Michael Grubb	UCL - Institute of Sustainable Resources	United Kingdom (of Great Britain and Northern Ireland)
75667	35	32	39	22	<p>It is my understanding that the Assessment of the Paris Agreement section 14.3.3. reads as a summary of literature review of the different assessments carried out of the Paris Agreement. The assessment attempts to evaluate the Paris Agreement against the 5 criteria established above in section 14.2.3. and summarized in table 14.3. In order to provide a clear structure, it might be useful to also provide a background of why for some of the criterion (such as environmental effectiveness, distributive outcomes, institutional strength) the Paris Agreement is compared to the Kyoto Protocol. Why is the Paris Agreement not compared to the Montreal Protocol when assessing e.g. transformative potential? In this regard, it is suggested to provide a 'benchmark' agreement to be compared against in order to carry out a more consistent analysis.</p> <p>For the criteria for assessment the effectiveness of international cooperation I would like suggest to include a metric approach for which a set of 2-3 sub criteria for each of the criterion can be used to evaluate the particular attributes that will allow answering the high level question raised for each of the 5 criterion. E.g. under</p> <p>Criterion Environmental outcomes Sub-criteria: i) Amount of emissions reduced in X period: XXX tCO2 ii) Types of GHG included in the total amount of emissions reduced:</p> <p>In doing so for each of the 5 criterion of assessment, the overall assessment of different multilateral agreements under section 14.6.2. and summarized in table 14.6 would represent results that can be comparable to each other as at the moment it is not clear.</p>	Rejected. These are all good ideas in theory, and indeed we tried to implement them in the FOD. What we discovered, however, is that the literature simply does not allow us to go into this level of detail. We are not doing original research or data analysis in this chapter, but rather relying on what is reported in published studies. This substantially limits what we can do.	Karla Solis	Peru	Germany
60363	35	38	36	13	The temperature increase expected from action and pledges by targets has decreased over the last 10 years, an effect that could be attributed to the Paris Agreement (Climate Action Tracker https://climateactiontracker.org/publications/global-update-paris-agreement-turning-point/ , grey literature). Our temperature estimate for "pledges and targets", which include the NDCs under the Paris Agreement, has decreased from 3.5°C (estimated in 2012) to 2.6°C (estimated in 2020). - The Climate Action Trackers estimate of emissions in 2030 assuming full implementation of pledges is today 10% lower than in 2012 before the pledges were made under the Paris Agreement (53 GtCO2e vs 58 GtCO2e, https://climateactiontracker.org/publications/global-update-paris-agreement-turning-point/ , https://climateactiontracker.org/documents/17/CAT_2012-12-08_WarningsOfClimateScienceWrittenInDohaSand_BriefingPaper.pdf)	Accepted. We cite this study now, and the qualitative finding that Paris has led to a turning point in countries pledges. Note that we also find that Kyoto led to a turning point in many countries' emissions.	Niklas Höhne	NewClimate Institute	Germany
81091	35		39		Most fundamentally and at the risk of repetition, these are not Treaties that can sensibly be compared because they have fundamentally different purposes. Why on earth does a section "Assessment of the Paris Agreement" spend its first half trying to misrepresent the Kyoto Protocol? The KP established a regime to deliver commitments on developed countries to lead. Why - given that AR5 did not and arguable couldn't - have a separate and balanced assessment of the lessons from the KP? The PA made necessary sacrifices in structure to enable a politically viable expansion to direct global engagement. In the end I was unable to see what legitimate point was being made through this comparison.	Noted, or less rejected. First, the comparisons in this text of Paris to Kyoto are rather infrequent; in most places we are assessing Paris on its own terms, and it likelihood of being effective, rather than in comparison to Kyoto. Second, we believe that in some respects a comparison is in order. We have added a new section that assesses the effects of Kyoto. This then creates a benchmark for success within the UNFCCC regime; it is worthwhile assessing whether Paris is likely to exceed this benchmark or not. We take issue with the idea that Paris and Kyoto had fundamentally different purposes. They do have fundamentally different structures. But these responded to the same desire -- to create a sub-agreement under the UNFCCC that would actually lead towards a solution to the problem -- under different circumstances.	Michael Grubb	UCL - Institute of Sustainable Resources	United Kingdom (of Great Britain and Northern Ireland)
443	35	2	35	2	Suggesting that Parties have no "legally binding obligations of result" is misleading: Parties have obligations (legally binding ones!) of conduct.	Not clear. The claim is not that there are no legally binding obligations, just not of result.	Benoit Mayer	The Chinese University of Hong Kong	China
447	36	14	36	14	I don't understand why the word "potentially" has been added here. Even discounting conditional NDCs and sectors that are not clearly included, it seems obvious that the Paris Agreement applies to a larger range of emissions than the Kyoto Protocol (even in its first commitment period). The sole NDC of China demonstrates this conclusion.	Accepted	Benoit Mayer	The Chinese University of Hong Kong	China

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
22573	36	14	36	14	The paragraph on environmental effectiveness seems to need some clarification. Different things are discussed under the same topic. Indeed, it seems (based on what is said line 15) that the paragraph focus on two questions : coverage of GHG and participation of states, that are indeed discussed line 16 and 43. But in the first part on coverage of GHG, several issues are discussed : types of GHG that are covered, sectors of emissions, and finally effective reduction of emission. Those three questions are distinct and this shall be made clearer.	Noted. This section is applying the criterion of environmental effectiveness, the elements of which are articulated in section 14.2.3.	Government of France	Ministère de la Transition écologique et solidaire	France
22575	36	14	36	14	Suggestion to remove the term "potentially": there is no ambiguity on the much wider coverage	Accepted	Government of France	Ministère de la Transition écologique et solidaire	France
14591	36	14	36	46	The key difference between the PA and the KP is in terms of participation of states in mitigation action, not GHG coverage. The sentences from lines 42 to 46 should therefore be moved up to the start of the section. And here, the main point is the tension between coverage and strength of commitments. The KP had limited coverage but stronger commitments (legally binding obligation of result), whereas the PA has global coverage, but weaker substantive commitments. In this regard, I would move up the reference to Keohane and Oppenheimer on p.38 line 9 -11, as it seems to make this point well. But many others have made it too. It is also important to note that the PA represented a "weakening" of commitments for those industrialised countries that were party to the KP, although a strengthening for those that were not, and for developing countries. See Sebastian Oberthür & Lisanne Groen (2020) Hardening and softening of multilateral climate governance towards the Paris Agreement, Journal of Environmental Policy & Planning, 22:6, 801-813, DOI: 10.1080/1523908X.2020.1832882	Noted. These points are made in the paragraph already; the particular order does not seem critical. Additional reference included	Joanna Depledge	Centre for Environment, Energy and Natural Resource Governance (CEENRG), University of Cambridge	United Kingdom (of Great Britain and Northern Ireland)
14593	36	14	36	46	Regarding GHGs, this is a far less significant point than that regarding country participation, and should therefore come second in this section. Although it is fair to state that the PA can potentially cover a more extensive range of GHGs, this should not be overstated, and requires further precision. The KP covered GHGs accounting for the vast majority of radiative forcing (with the CFCs and other ODS under the Montreal Protocol accounting for the bulk of the rest) - see entry for GHGs in the AR6 draft Glossary (Annex A). Nitrogen trifluoride (NF3) was added to the Annex A gases under the Doha Amendment and should therefore be added to the list here. At present, the implication is that the KP gases amount to "limited" coverage of the causes of global warming, which is simply untrue. Phrases such as "the Kyoto Protocol limits its coverage" and "parties may cover the full spectrum of GHGs in their NDCs" need to be adjusted to avoid this implication. In terms of additional GHGs that parties could include in their NDCs, this relates to Short Lived Climate Pollutants, such as NMVOCs or black soot. This should be stated. There are no major GHGs other than the KP gases and those under the MP, as the AR6 draft Glossary makes clear. I also note that the latest NDC synthesis report indicates that 7% of new/updated NDCs cover SLCPs, compared with 1% of initial NDCs, so perhaps this is worth mentioning. https://unfccc.int/sites/default/files/resource/cma2021_02_adv_0.pdf	As above, the order of points made in the paragraph is not regarded as critical. No change.	Joanna Depledge	Centre for Environment, Energy and Natural Resource Governance (CEENRG), University of Cambridge	United Kingdom (of Great Britain and Northern Ireland)
14595	36	14	36	46	It seems odd to emphasise that "the PA makes express reference to Parties taking action to conserve and enhance sinks and reservoirs of GHGs... This allows for coverage of AFOLU emissions...", given that the UNFCCC itself makes the same express reference (Article 4.1(c) and (d)). The KP also (famously!) covers LULUCF (Article 3.3 and 3.4, plus extensive rules under the Marrakesh Accords), while the CDM additionally allows for LULUCF sector projects. The implication in the section at the moment is that AFOLU was newly covered in the PA, which is not true.	Accepted. Clarifications made.	Joanna Depledge	Centre for Environment, Energy and Natural Resource Governance (CEENRG), University of Cambridge	United Kingdom (of Great Britain and Northern Ireland)
76185	36	15	36	18	The gas NF3 was added to the Kyoto Basket. Please consult WGIII Ch2	Accepted	Jan Fuglestedt	CICERO	Norway
63373	36	18	36	20	We recommend that this sentence on the coverage of NDCs also accurately incorporate the accounting provisions in Annex II to Decision 18/CMA.1, which require each Party to strive to include all sectors and gases, increase coverage over time and to never narrow the coverage. There is also the expectation in Article 4.4 that developing countries move over time toward economy-wide absolute emission targets. These edits would provide additional context and strengthen the discussion	Accepted	Government of Canada	Environment and Climate Change Canada	Canada
76183	36	19	36	20	I think a few countries also included SLCP (such as Black Carbon), which is an example of attention to co-benefits and linkages to SDGs. I think this dimension could be mentioned here.	Accepted	Jan Fuglestedt	CICERO	Norway
22577	36	20	36	20	After the term "sectors" we suggest to insert: "... although the decision on the transparency framework provides that parties report on the seven gases that were included in the KP basket." and also to add "Some parties have also included objectives related to other climate forcers such as black carbon"	Accepted as specified through other amendments	Government of France	Ministère de la Transition écologique et solidaire	France
22579	36	27	36	29	("Other studies...") : this sentence reveal the need to increase analysis of REDD+ issues in this chapter.	Noted. Addressed in other sections that directly address REDD+	Government of France	Ministère de la Transition écologique et solidaire	France
52785	36	32	36	35	Given the publication data of Elzen et al (2016) (and the time it took for the manuscript to get published), the developments over the last five years warrants an updating of Elzen et al's findings	Noted. This literature is post AR5 so eligible for inclusion. No alternative references suggested.	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia
12111	36	20	36	23	The reference to 'sinks and reservoirs for greenhouse gasses' not only allows for coverage of AFOLU, but also all forms of CDR. It is suggested this be noted	Accepted. Noted.	Paul Rouse	Carnegie Climate Governance Initiative (C2G) - The Carnegie Council for Ethics and International Affairs	United Kingdom (of Great Britain and Northern Ireland)
70759	36	42	36	46	The sentences say that the PA outperforms the KP in terms of participation of states in mitigation actions. That is true but, on the other hand, mentioning the legally-binding characteristics of the KP as well compared with voluntary approach of the PA would make the comparison more neutral.	Accepted. We have included this point.	Philippe Tulkens	European Union (EU) - DG Research & Innovation	Belgium

Comment Id	From Page	From Line To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country	
22581	36	47	36	47	The paragraph on transformative potential should be clearer. Indeed, positive and negative aspects shall be grouped together (it is better made on paragraph on distributive outcomes). Here, it start with a positive statement (on investment flow : p. 37 line 2), followed with two negative ones (on the investment signal that is unclear : line 3 / and several others from line 8). Finally a positive aspects is noted (from line 13 to 18). Thus, the first and the last statements shall be presented successivly, and then present the negative ones.	Accepted. We have restructured this paragraph as suggested.q	Government of France	Ministère de la Transition écologique et solidaire	France
14597	36	47	37	18	(1) I confess to confusion about what "transformative potential" consists of - I assumed from section 14.2.3 and table 14.3 that it was about promoting long term technological transition. However, the focus in this section is on a "signalling function" (which I agree is really important). But I don't see any mention of a "signalling function" in section 14.2.3 or table 14.3. Perhaps the descriptions in the two sections should be aligned. Moreover, later in the chapter, in table 14.6, transformative potential appears to equate to the provision of financial assistance, or initiatives to promote technology transfer, overlapping with "distributive outcomes". This needs to be resolved more satisfactorily (2) Regarding lines 16-18, indeed the PA may send a stronger signalling function than the KP did because of its global coverage of countries, but equally the absence of any legally binding obligations of result could send a weaker signal than that of the KP. Both possibilities should be mentioned. As Oberthur and Groen note, the PA signified a weakening of commitments relative to the KP for KP Parties. Sebastian Oberthür & Lisanne Groen (2020) Hardening and softening of multilateral climate governance towards the Paris Agreement, Journal of Environmental Policy & Planning, 22:6, 801-813, DOI: 10.1080/1523908X.2020.1832882	Accepted. We have tried to rewrite this paragraph to be clearer about these issues.	Joanna Depledge	Centre for Environment, Energy and Natural Resource Governance (CEENRG), University of Cambridge	United Kingdom (of Great Britain and Northern Ireland)
60365	36	47	37	18	The paragraph on transformation potential could include the additional element of establishing the net zero goal, which transforms actor behaviour: The Paris Agreement includes the goal of net zero greenhouse gas emissions. This goal has now translated into targets of a variety of actors. 127 countries consider or have adopted the goal covering two thirds of GHG emissions (https://climateactiontracker.org/publications/global-update-paris-agreement-turning-point/). The number of regions, cities and businesses with such a goal has doubled in a year (https://newclimate.org/2020/10/22/navigating-the-nuances-of-net-zero-targets/). Without the Paris Agreement this would not have happened. It has transformed the common understanding on how to tackle climate change.	Accepted. We note this now in the evaluation	Niklas Höhne	NewClimate Institute	Germany
453	37	16	37	19	This sentence omits the fact that the Paris Agreement does create obligations of conduct in relation to the mitigation objectives of NDCs. This is (at least in my view) the most important legal aspect of the Paris Agreement!	Noted. This point is discussed in earlier sections on the Paris Agreement provisions.	Benoit Mayer	The Chinese University of Hong Kong	China
8271	37	16	38	3	When discussion other sectors then energy which requires additional finance flows, it is important to also highlight what has been most succesful up until now? In what sectors, and what kind of investments can we find the most successful investments in terms of emission mitigation per dollar spent?	Noted. These issues are addressed to the extent relevant in the sections of the chapter on finance flows. Chapter 15 and Chapter 16 deal more particularly with finance and technology investment.	Frida Zahlander	DanChurchAid	Denmark
449	37	17	37	17	"Binding" is unnecessary and redundant when it qualifies "obligation" (an obligation is, by definition, binding).	Rejected. This term adds greater clarity for non-legal readers.	Benoit Mayer	The Chinese University of Hong Kong	China
451	37	18	37	18	The phrase "normative expectation" does not have a clear meaning. I suggest to remove "normative". Those are expectations, nothing else.	Rejected. Normative is used to indicate that expectations aligned with particular normative positions e.g. on net zero.	Benoit Mayer	The Chinese University of Hong Kong	China
63377	37	25	37	25	We would suggest that it is more accurate to state that "neither the Kyoto nor Paris approaches are fully consistent with the equitable principles of international environmental law"	Accepted	Government of Canada	Environment and Climate Change Canada	Canada
64367	37	25	37	25	'equitable' should probably be 'equitability' or 'equity'. Not the principles are equitable but the principles are about equity/equitability.	Accepted	Jan Kowalzig	Oxfam	Germany
53533	37	29	37	32	Replace "In relation to other indicators such as the provision of support, the distributive outcomes of the Paris Agreement are heavily dependent on (...)" by "(...) are partly dependent on (...)"	Accepted. Word heavily deleted	Government of Switzerland	Swiss Federal Office for the Environment Federal Department of the Environment, Transport, Energy and Communications DETEC Federal Office for the Environment FOEN International Affairs Division	Switzerland
70761	37	29	37	32	Replace "In relation to other indicators such as the provision of support, the distributive outcomes of the Paris Agreement are heavily dependent on (...)" by "(...) are partly dependent on (...)"	Accepted. Word heavily deleted	Philippe Tulkens	European Union (EU) - DG Research & Innovation	Belgium
51803	37	35	37	37	The terminology is wrong. REDD+ should not be referred to as "mechanism", as this has very specific connotations in the UNFCCC context (CDM, JI, Article 6), and could be confusing. REDD+ activities or initiatives would be preferable.It's also unclear how the Paris Agreement 'enhanced' biodiversity conservation through the endorsement of REDD+.	Accepted. Amendments made to qualify this sentence	Florin Vladu	UNFCCC Secretariat	Germany
86033	37	37	37	37	Please delete reference to SDM as 'sustainable development mechanism' is not an agreed way of referring to the Article 6.4 mechanism. As noted in comment on 4-29 para 16, please use the neutral acronym 'A6.4M' which is widely used as shorthand for 'Article 6.4 mechanism'.	Accepted	Government of Australia	Department of Industry, Science, Energy and Resources	Australia
14601	37	40	37	41	This is a slightly odd statement. Parties have always been able to "link mitigation policies", under all treaties of the regime	Noted. This is specifically referring to linkages of carbon market policies	Joanna Depledge	Centre for Environment, Energy and Natural Resource Governance (CEENRG), University of Cambridge	United Kingdom (of Great Britain and Northern Ireland)
52789	37	41	37	41	linking what to what? Unclear. Also, we were unable to link how the discussion in the whole paragraph relate to the criterion of economic performance.	Noted. This is the terminology used in the reference source.	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia
20019	37	46		48	the expression "environmental integrity of traded emissions reduction" is diplomatic but not helpful - you miss the literature on wide-spread corruptive practices here	Noted. This terminology follows that used in the underlying literature	Manuela Dr. Troschke	Scientists for Future Germany	Germany

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
81097	37	17	37	18	".. the Paris 17 Agreement may fail to directly support system transformations, its signalling function is stronger than that of Kyoto." This bold statement begs the obvious question, signalling to whom and for what. We know that private investment will be important in tackling climate change. The parts of the private sector looking to invest in low carbon have for a long time stressed that policy commitments need to be "long, loud and legal". This is not surprising since investability is absolutely central and the private sector generally seeks legal certainty, whether in terms of contract or government policy, which makes it bankable. The Kyoto Protocol had this effect in the major financial and industrial sectors of the countries that took on its binding targets, as is clear from the evidence from impact, investment and patents. Politicians know the importance of the Paris agreement, but it was (and remains) harder for business to judge; it was disappointing that market indicators showed little reaction to the adoption of the Paris Agreement, presumably because they saw nothing enforceable. The statement quoted really has no foundation that I can discern.	Accepted. We have removed this stuff about signalling.	Michael Grubb	UCL - Institute of Sustainable Resources	United Kingdom (of Great Britain and Northern Ireland)
63375	37	19	37	22	It is unclear what evidence suggests that the KP is better on distributive outcomes given that binding commitments only covered an increasingly small % of global emissions. If there is no such evidence then we would recommend the removal of this sentence	Accepted. We have qualified this statement	Government of Canada	Environment and Climate Change Canada	Canada
14599	37	19	37	39	(1) This work would seem to be a very useful reference for this section: Caroline Zimm & Nebojsa Nakicenovic (2020) What are the implications of the Paris Agreement for inequality?, Climate Policy, 20:4, 458-467, DOI: 10.1080/14693062.2019.1581048 (2) lines 33-34 - it is surprising to see this sentence here, implying across-the-board conflict between NDCs and poverty reduction. There are many, many works that point to synergies between NDCs and the SDGs, including poverty reduction; including many, many studies that show how climate change itself endangers the development process and will impact most on the poorest. Please make sure there is alignment with the extensive treatment of mitigation/SDG issues in chapter 1. (3) The point about human rights is over-stated. The only mention of human rights is in the preamble. Perhaps "...the PA also endorses human rights perspectives in its preambular text, creating a hook etc..."	Accepted. We have rewritten this text and included relevant literature.	Joanna Depledge	Centre for Environment, Energy and Natural Resource Governance (CEENRG), University of Cambridge	United Kingdom (of Great Britain and Northern Ireland)
11989	37	19	37	39	In terms of distributive outcomes, it is worth mentioning that the Paris Agreement is also the first climate treaty to endorse a "just transition" (even if only preambular language). Implementation of the Agreement hinges on systemic transitions on the national level which are unlikely to be sustainable if not perceived as just.	Accepted. We have noted this.	Tom Pegram	University College London	United Kingdom (of Great Britain and Northern Ireland)
19815	37	49	38	2	Replace "Employing ... obligations": "Most literature (Kim et al. 2020, Maamoun 2019, Grunewald and Martinez-Zarzoso 2016, Aichele and Felbermayr 2013) finds that the Kyoto Protocol has effectively reduced emissions compared to a business as usual scenario; Miyamoto and Takeuchi (2019) find a clear effect on patents for renewable energy technologies. Only Almer and Winkler (2017) find no effect." New references: Kim Y, Tanaka K, Matsuoka S (2020) Environmental and economic effectiveness of the Kyoto Protocol. PLoS ONE 15(7): e0236299; Maamoun, N. (2019). The Kyoto protocol: Empirical evidence of a hidden success. Journal of Environmental Economics and Management, 95, 227-256; Miyamoto, M., & Takeuchi, K. (2019). Climate agreement and technology diffusion: Impact of the Kyoto Protocol on international patent applications for renewable energy technologies. Energy Policy, 129, 1331-1338; Grunewald, N. and I. Martinez-Zarzoso (2016), Did the Kyoto Protocol fail? An evaluation of the effect of the Kyoto Protocol on CO2 emissions, Environment and Development Economics 21, 1-22; Aichele, R. and Felbermayr, G. (2013), The Effect of the Kyoto Protocol on Carbon Emissions. J. Pol. Anal. Manage., 32: 731-757. Almer, C., & Winkler, R. (2017). Analyzing the effectiveness of international environmental policies: The case of the Kyoto Protocol. Journal of Environmental Economics and Management, 82, 125-151	Accepted. We have included a great deal of new literature evaluating the impacts of Kyoto.	Axel Michaelowa	University of Zurich	Switzerland
52787	37	49	38	2	The way synthetic counterfactual on the Kyoto protocol (Almer and Winkle 2-17) relates to the rest of the paragraph is unclear.	Accepted. We have removed this reference, and indeed written a new section on Kyoto where their finding are put into perspective.	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
14603	37	49	38	2	(1) This is to do with environmental effectiveness, not economic effectiveness, and should therefore be moved to the relevant section. (2) There are several other works that consider the environmental performance of the KP, some of which come to differing conclusions, including the following, none of which were considered in AR5: Aichele, R. and Felbermayr (2012), Kyoto and the carbon footprint of nations, Journal of Environmental Economics and Management 63 (3), 336-354. Kumazawa, Risa, and Michael S. Callaghan. "The effect of the Kyoto Protocol on carbon dioxide emissions." Journal of Economics and Finance 36.1 (2012): 201-210. Aichele, R. and Felbermayr, G. (2013), The Effect of the Kyoto Protocol on Carbon Emissions. J. Pol. Anal. Manage., 32: 731–757. doi:10.1002/pam.21720: Iwata, H. & Okada, K. Environ Econ Policy Stud (2014) 16: 325. Greenhouse gas emissions and the role of the Kyoto Protocol doi:10.1007/s10018-012-0047-1 Halkos, G.E. & Tzeremes, Measuring the effect of Kyoto protocol agreement on countries' environmental efficiency in CO2 emissions: an application of conditional full frontiers.N.G. J Prod Anal (2014) 41: 367. doi:10.1007/s11123-013-0343-1 Aichele, R. and Felbermayr, G. (2015) Kyoto and Carbon Leakage: An Empirical Analysis of the Carbon Content of Bilateral Trade Grunewald, N. and I. Martinez-Zarzoso (2016), Did the Kyoto Protocol fail? An evaluation of the effect of the Kyoto Protocol on CO2 emissions, Environment and Development Economics 21, 1-22. Maamoun, N. (2019), The Kyoto protocol: Empirical evidence of a hidden success. Journal of Environmental Economics and Management, 95, 227-256. Miyamoto, M., & Takeuchi, K. (2019), Climate agreement and technology diffusion: Impact of the Kyoto Protocol on international patent applications for renewable energy technologies. Energy Policy, 129, 1331-1338. Kim Y, Tanaka K, Matsuoka S (2020) Environmental and economic effectiveness of the Kyoto Protocol. PLoS ONE 15(7): e0236299. (3) I therefore suggest, as noted in my overall comments, the addition of a box that directly considers the effectiveness of the KP, based on the literature available.	Accepted. We have written a new section evaluating Kyoto.	Joanna Depledge	Centre for Environment, Energy and Natural Resource Governance (CEENRG), University of Cambridge	United Kingdom (of Great Britain and Northern Ireland)
15317	38	5	38	7	Incorrect statement. It is stated in 4/CMA1 that all NDCs submitted in 2020 are the first round, so there are no second NDCs submitted around 2020. It is suggested to replace "who have submitted their second NDCs", with "who have updated their NDCs".	Rejected. This is the terminology used on the NDC registry	Government of China	China Meteorological Administration	China
29571	38	5	38	6	This number should be updated and "thus far" be specified to provide from when the information was retrieved. Currently, there are more than 40 countries that have submitted an updated NDC. See: https://www4.unfccc.int/sites/ndcstaging/Pages/LatestSubmissions.aspx	Accepted. Updated	Government of Norway	Norwegian Environment Agency	Norway
9229	38	5	38	7	The presentation is wrong. It is pointed out in 4/CMA1 that all NDCs submitted in 2020 are in the first round, so there is no second round (Second) NDC submitted around 2020.	Rejected. This is the terminology used on the NDC registry	Yongxiang Zhang	National Climate Center	China
47395	38	23	38	26	The original analysis underlying the 15-23 GtCO2e/year reduction figure from the UNEP Emissions Gap Report has later been published as follows: Lui, S., Kuramochi, T., Smit, S., Roelfsema, M., Hsu, A., Weinfurter, A., et al. (2021). Correcting course: the emission reduction potential of international cooperative initiatives. Clim. Policy 21, 232–250. doi:10.1080/14693062.2020.1806021.	Accepted. Reference added.	Takeshi Kuramochi	NewClimate Institute	Germany
22585	38	30	38	30	The basis of "current lack of clear reporting requirements" this is not clear - there are reporting rules under the decisions adopted in Katowice	Accepted. Deletion made	Government of France	Ministère de la Transition écologique et solidaire	France
29573	38	33	38	36	The ratchet mechanism of the Paris Agreement should be mentioned here. This is a core component of the Paris Agreement. It is also referred to as the ambition mechanism, this component mandates that governments resubmit a new set of NDCs every five years, which are required to be more ambitious than the country's previous set. The "ratchet mechanism" is mentioned on page 38, line 42, but its objective is not clearly formulated.	Noted. The importance of 'ratcheting' is reflected in this para	Government of Norway	Norwegian Environment Agency	Norway
8439	38	42	38	44	As for literature that dealt with "ratcheting up of collective action", I would like to have another important document cited: Tamura, Kentaro, Masahiro Suzuki, Madoka Yoshino (2016) Raising Ambition towards the 1.5C/2C Goal: Ratcheting-up Mechanism under the Paris Agreement, IGES Discussion Paper. https://www.jstor.org/stable/resrep02905?seq=1#metadata_info_tab_contents I am aware there are already many citations here, but I think this paper was published before many other papers using the term "ratchet up" came out, and also because there should be a better balance between countries/regions of authors of cited publications. There are very few publications by authors from Japan and other Asian countries throughout this chapter, and I hope a certain consideration is given where there are similar publications from various parts of the world outside Europe and North America.	Noted. Sufficient references already included	Yasuko Kameyama	National Institute for Environmental Studies	Japan
81093	38	1			Sorry to say this sentence reinforces my sense of a bias at least in this section. There are probably a dozen papers assessing the impact of the Kyoto Protocol on emissions. The paper by Almer and Winkler 2017 is the only one to report no discernible impact. It is a paper which demonstrates technical sophistication, but also - as can happen - seems to stumble into an obvious error, if I am not mistaken. Whereas other papers try to assess using panel data and comparisons with other countries, the paper evaluates KP outcomes against 50 US States. Unfortunately, unless I misunderstand something, this appears technically sophisticated but is actually almost irrelevant since most US states are correlated by many things, most obviously the Shale Gas revolution. Isn't the technical conclusion that participation in the Kyoto Protocol had statistically as much impact as the US Shale revolution - which was very big. That is totally different from saying it had no impact, and would explain why this paper is such an outlier. It was anyway superceded, in the same journal by the much more extensive and generalised methodology and study of Maamoun, N., 2019: The Kyoto protocol: Empirical evidence of a hidden success. J. Environ. Econ. Manage., https://doi.org/10.1016/j.jeem.2019.04.001 .	Accepted. We have written a new section on Kyoto.	Michael Grubb	UCL - Institute of Sustainable Resources	United Kingdom (of Great Britain and Northern Ireland)

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
22583	38	3	38	3	the paragraph on institutional strength first starts with participation, an issue that is already discussed under environmental integrity. It should be specified which part of this issue is linked with environmental integrity and which one is linked with institutional strength (if it's mentioned in both paragraphs).	Accepted. We have deleted much of the stuff that relates to environmental effectiveness.	Government of France	Ministère de la Transition écologique et solidaire	France
12647	38	3	38	12	The number of parties is less important than the share of global emissions that those parties with mitigation actions represent. The PA is a small move up from the Cancun pledges in that regard. The limit of this comparison should be acknowledged, or include the share of emissions of A1 parties to the KP.	Accepted. We have removed this.	Jennifer Allan	Cardiff University	United Kingdom (of Great Britain and Northern Ireland)
14605	38	9	38	11	This is more to do with environmental effectiveness than economic effectiveness. I suggest moving to the relevant section.	Accepted.	Joanna Depledge	Centre for Environment, Energy and Natural Resource Governance (CEENRG), University of Cambridge	United Kingdom (of Great Britain and Northern Ireland)
10853	39	14	39	22	In assessing the PA, one will have to discuss what is going to happen to the Agreement in the case where it turns out that the goals in terms of mitigation cannot be reached.	Noted. This assessment is not possible based on the current literature.	Philippe Waldteufel	CNRS	France
14609	39	15	39	15	Add "collective ambition and implementation" (ultimately, implementation is just as important as ambition).	Accepted	Joanna Depledge	Centre for Environment, Energy and Natural Resource Governance (CEENRG), University of Cambridge	United Kingdom (of Great Britain and Northern Ireland)
11991	39	19	39	28	In this context, it is significant that the Paris Agreement facilitated continued engagement with American non-tate actors even after US withdrawal, e.g. through the United States Climate Alliance.	Noted. Non-state actor cooperation aspects are addressed in other parts of the chapter	Tom Pegram	University College London	United Kingdom (of Great Britain and Northern Ireland)
22587	39	23	39	23	It is hard to understand why means of implementation are not fully adressed under the previous section where they are already presented. This make the understanding of the content more confusing and difficult.	Noted. The previous section deals with means of implementation in the context of provision made in the Paris Agreement. This facilitates a holistic assessment of the contribution of the Paris Agreement to international cooperation. The sections under 14.4 look at broader international cooperation (beyond Paris) on means of implementation. It was decided that separating out these analyses would add clarity by not making the Paris Agreement sections too unwieldy. Amendment made to make that structure explicit.	Government of France	Ministère de la Transition écologique et solidaire	France
22589	39	29	39	30	"the next two sections..." : it is unclear which are the two sections that are mentioned here. Indeed, there is 5 sub-sections in this section. Or this statement refer to the current section and the next one. In this case it should be specified, saying that : "this section (about means of implementations), and the next one on multi-level governance adress this complementarity..."	Accepted. It is intended to refer to sections 14.4 and 14.5 - amendment made to text to reflect this.	Government of France	Ministère de la Transition écologique et solidaire	France
11993	39				I miss a more general discussion here of how the UNFCCC apparatus is embedded in a wider climate change regime complex (Coen, Kreienkamp & Pegram 2020), noting that fragmentation presents both problems and opportunities and also presents another important rationale for international cooperation, namely managing interface conflict and potential synergies between different global agendas (from trade to energy to biodiversity to human rights, etc.).	Noted. Reference included.	Tom Pegram	University College London	United Kingdom (of Great Britain and Northern Ireland)
84879	39	7	39	7	A key summary figure / table is missing in the AR6, as it was in the SR1.5. Both the AR4 and the AR5 contained summary of equity-based mitigation targets for countries or regions. The AR4 indicated fair levels of mitigation for developing and developed countries in table 13.7. Table 13.7 was key to informing the EU 2050 target at the time and informed the Urgenda decision and thereby the Dutch law and its mitigation target. Providing a similar table with up to date information would inform government, courts and diplomats around the world on fair levels of mitigation efforts, beyond the domestic action described in depth in other chapters. Single studies on equity were also used to inform governmental targets; 1) Robiou du pont et al 2017 (https://www.nature.com/articles/nclimate3186) was used the CCC (file:///C:/Users/medac/AppData/Local/Temp/Net-Zero-The-UKs-contribution-to-stopping-global-warming.pdf , figure 3.9, p 109) in the UK to establish the net-zero target for 2050, 2) Robiou du Pont et al 2016 (https://iopscience.iop.org/article/10.1088/1748-9326/11/5/054005) was used to justify the ambition of the 2030 68% reduction target for the UK by the CCC (file:///C:/Users/medac/AppData/Local/Temp/The-Sixth-Carbon-Budget-The-UKs-path-to-Net-Zero.pdf), and Meinsausen et al 2018 (commissioned work https://www.climatechange.vic.gov.au/_data/assets/pdf_file/0016/421702/Greenhouse-Gas-Emissions-Budgets-for-Victoria.pdf) informed the subnational targets of the government of Victoria. At the city level, the Deadline 2020 report for C40 informed the mitigation targets of major cities. As it is explicitly mentioned in the WG3 report (CH14 I believe) fairness is the metric for ambition. Fairness if key to formulating asks across diplomatic negotiation teams, it informs both governments and justice cases against governments (and ultimately towards legality). I am really surprised that there isn't a figure to reflect the prgress of the lieterature in this discipline. Regarding my own contributions,Robiou du Pont et al. 2017 quantifies approaches representative of the equity categories modelled in the IPCC AR5 in a consistent manner in order to assess the ambition of NDCs across various equity concepts. Figure 1 directly reviews the IPCC AR5 regional level outcomes.. Robiou du Pont et al. 2018 combines equity approaches in a bottom upmanne reflective of the Paris Agreement, where countries can self differentiate in a sovereign self-interested manner, to inform on bottom-up and paris aligned targets. it also provides a single ambition metric, reflective of apparently dissonant equity concepts, to link antional emissions targets with corresponding global warming. Pn et al. 2016 has offered another cross equity assessment framework while the CSO and Holz et al.2018 suggest a combination of equity approaches to pursue a fairer outcome across and within	Rejected. As we note, there are now multiple sets of criteria that one could use to determine fair allocations of emissions reductions. Were we to prepare such a table, it would be prioritizing one of these over others, and ultimately would be highly policy prescriptive.q	Yann Robiou du Pont	Climate Analytics	France
60367	39	14	39	22	The paragraph could also include the positive comment, that the Paris Agreement has improved the situation. It has incentivised mitigation that otherwise would not have occurred.	Accepted. We have noted this.	Niklas Höhne	NewClimate Institute	Germany

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
14607	39	15	39	15	I don't see the need to repeat, yet again, this point about "a fundamental change in architecture from the KP". The two treaties are not in opposition, and there are many continuities between them in terms of transparency, financial provisions (eg adaptation fund), potential use of market mechanisms and more. At the very least, please remove "fundamental".	Accepted. We have removed this.	Joanna Depledge	Centre for Environment, Energy and Natural Resource Governance (CENRG), University of Cambridge	United Kingdom (of Great Britain and Northern Ireland)
82913	40	5	40		A LOT of overlap with Chapter 15, Check for duplication and coherence.	Noted. Ongoing coordination with Chapter 15, to strengthen the cross-referencing	Jim Skea	Imperial College London	United Kingdom (of Great Britain and Northern Ireland)
8267	40	6	44	14	When discussing the importance of finance and the different actors, the role of NGO and INGO should be mentioned. Not because they often are implementing partners, but mostly because in relation to finance flows they raise money from individuals in order to implement their projects. The contribution from individuals could also be a mean to achieve the finance flow necessary.	Noted. This chapter is on international cooperation and finance in that context. As such there is no literature to support the scale of this impact eventhough there are some funds pursuing the climate objectives(Jeff Bezos Earth Fund, Microsoft Innovation Fund, Clinton Climate Initiative etc). In general the role of various actors such as civil society and social movements, business actors, and subnational or substate actors is recognized in Section 14.5.	Frída Zahlander	DanChurchAid	Denmark
64349	40	6	40	9	The sentence suggest that international co-operation on finance is underpinned by UNFCCC Article 11.5. That article simply opens up ways to provide (and receive) finance through various channels, i.e. the focus is here on the channels (as opposed to the rest of Article 11 establishing/organising the Financial Mechanism. I'd argue that the real 'underpinning' happens through accepting a legal obligation to provide assistance in UNFCCC Articles 4.3 and 4.4, and in PA Article 9.1 and its provisions under 9.2 and 9.3.	Accepted, text to be amended to reflect also Articles 4.3 and 4.4 of the Convention and Article 9 of PA.	Jan Kowalzig	Oxfam	Germany
64369	40	19	40	20	The criticism this sentence seems to refer to (namely Carty et al 2020) is not about 'whether or not' reported finance represent climate-specific net assistance, but that reported numbers do not represent net flows (and instead include flows that will have to be paid back as they come in the form of e.g. loans, including loans at market rates) nor do they represent climate-only flows (but also include flows with only minor or no detectable climate-relevance). The former is helpfully clarified in the following sentence (on grant equivalents). The latter, that reported figures overestimate the climate-relevance of provided finance could be added here. It's the subject of several assessments, not only Carty et al 2020. DISCLAIMER: I am one of the authors of Carty et al 2020.	Noted. Appropriate edit for the phrase "whether or not" undertaken.	Jan Kowalzig	Oxfam	Germany
30595	40	25	40	25	The word 'fragmented' is not appropriate as the above-mentioned mechanisms and formus were established one another and were not meant to be unified, yet they are more and more coordinated among themselves.	Noted. The fragmentation argument goes beyond the Funds under the UNFCCC, to other actors including bilateral assistance, multilateral institutions and the private sector. Pickering et al (2017) Special issue: managing fragmentation and complexity in the emerging system of international climate finance, provide an exposition of it. Further, one of the roles of the Standing Committee on Finance is also to improve coordination and coherence of financing under the Financial Mechanism of the Convention, recognizing the need per se.	Government of Japan	Climate Change Division - Ministry of Foreign Affairs	Japan
86035	40	28	41	4	Suggest changes to improve accuracy of sentence that some NDCs have components which are conditional, and it is these that are sometimes tied to support, as follows: 'An early indication of these needs is provided in the conditional NDCs. Of the 136 conditional NDCs submitted by June 2019, 110 have components or additional actions conditioned on financing support for mitigation and 79 have components or additional actions conditioned on support for adaptation (Pauw et al. 2020). While the Paris Agreement did not explicitly countenance conditionality for actions in developing countries, it is generally understood that the ambition and effectiveness of climate ambition in these countries is dependent on financial support (Voigt and Ferreira 2016b).	Accepted. Edited to add components conditioned on support.	Government of Australia	Department of Industry, Science, Energy and Resources	Australia
53535	40	28	41	4	We suggest to delete this text. The development and implementation of NDCs shall not be framed as being conditional upon (international) financial supports. Such support can only ever be one element among others in this context.	Noted. Editing to components in NDCs conditional on support provides the full picture.	Government of Switzerland	Swiss Federal Office for the Environment Federal Department of the Environment, Transport, Energy and Communications DETEC Federal Office for the Environment FOEN International Affairs Division	Switzerland
64371	40	28	40	29	And in the UNEP Adaptation Gap Report, on adaptation finance needs. This reminds me that it could be useful to at least briefly reflect on the missing estimates for finance needs to recover from losses and damages resulting from climate change. The Paris Agreement has made addressing loss and damage the thiorid pillar next to mitigation and adaptation, so it would be adequate to touch upon that issue here too.	Rejected; this may be best covered in the WG 2 report	Jan Kowalzig	Oxfam	Germany
70767	40	28	41	4	We suggest to delete this text. The development and implementation of NDCs shall not be framed as being conditional upon (international) financial supports. Such support can only ever be one element among others in this context.	Noted. Editing to components in NDCs conditional on support provides the full picture. Same response as to comment # 53535	Philippe Tulkens	European Union (EU) - DG Research & Innovation	Belgium
22593	40	19	40	22	These criticisms have to be nuanced. At COP16, the Parties affirmed the commitment on the \$100 billion expressed in the Copenhagen Accord and agreed that "funds provided to developing country Parties may come from a wide variety of sources, public and private, bilateral and multilateral, including alternative sources".	Noted. Lines 23-24 on Page 40 provide the relevant nuances.	Government of France	Ministère de la Transition écologique et solidaire	France
22591	40	13	40	15	It is also worth mentioning that the Paris Agreement states in Article 9 that other parties are encouraged to provide financial resources at the international stage (§2) and that this is part of a global effort (§3).	Accepted. These points are reflected in the discussion of finance under the Paris Agreement in earlier sections.	Government of France	Ministère de la Transition écologique et solidaire	France
48303	40	0	40	0	Impossible to read clearly	Noted. We will address this.	Susana Hancock	University of Oxford	United States of America

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
7677	40	2	40	3	Omission: table 14.4 would benefit from a reference to the IMF in the section of "other global organizations" (it could be included jointly with "MDBs and the IMF" (see comment on page 57).	Noted. We have added one small point about the IMF engaging the issue, as it pertains to sustainable development / climate linkages, in section 14.5.1.2. It is of different character to the MDB programs, however, so we do not incorporate the IMF with the MDBs in the table.	Pablo Moreno	International Monetary Fund	United States of America
70763	40	2	40	4	Can 'Convention on Long-Range Transboundary Air Pollution Convention' be an entry under global treaties, considering the linkage between climate and air pollution?	Noted. It has regional rather than global participation.	Philippe Tulkens	European Union (EU) - DG Research & Innovation	Belgium
48681	40				Figure 14.4 - cell for 'non-state transnational actors' - 'climate and other social movements' - to recognise that social movements such as indigenous peoples organisations, gender-based organisations etc also have an active role on climate change	Accepted. We have changed the cell to make it more inclusive.	Lorraine Elliott	The Australian National University	Australia
70765	40	15	40	18	the same comments as in comment number 18.	We don't know what comment this comment is referring to, as the comments are not numbered according to individual reviewers.	Philippe Tulkens	European Union (EU) - DG Research & Innovation	Belgium
22595	40	28	40	28	For "an early indication of these needs", in volume 2, the self-assessed nature of the needs outlined in NDCs was highlighted. It would be relevant to precise this here as well as it applies also to mitigation	Accepted	Government of France	Ministère de la Transition écologique et solidaire	France
87101	40	13	40	15	It is also worth mentioning that the Paris Agreement states in Article 9 that other parties are encouraged to provide financial resources at the international stage (§2) and that this is part of a global effort (§3).	Noted. We did not have room to go into these additional details.	Philippe Wen	Ministère de l'Économie, des Finances et de la Relance	France
87103	40	19	40	22	These criticisms have to be nuanced. At COP16, the Parties affirmed the commitment on the \$100 billion expressed in the Copenhagen Accord and agreed that "funds provided to developing country Parties may come from a wide variety of sources, public and private, bilateral and multilateral, including alternative sources".	Noted. We did not have room to go into these additional details.	Philippe Wen	Ministère de l'Économie, des Finances et de la Relance	France
70769	41	1	41	1	79 for mitigation support for adaptation' should be rephrased to clarify the message.	Accepted. Editorial correction undertaken to 79 for components with support for adaptation	Philippe Tulkens	European Union (EU) - DG Research & Innovation	Belgium
22599	41	5	41	5	14.4.1.1 : The progress in alignment with the paris agreement made through bilateral finance, in particular through the IDFC, is not well captured in this section, and is rather included in the section on multilateral finance, which seems unbalanced as it associates bilateral finance results solely on OECD and UNFCCC reporting issues while highlighting the mainstreaming issue only in the multilateral section. This should be revised and balanced in view of the significant share of bilateral development finance in overall climate financial flows.	Rejected. The importance of bilateral finance has been captured in the section (lines 15-18). On IDFC, the membership includes DFIs from a variety of countries and there is mixed experience on aligning flows with the Paris Agreement. See report commissioned by IDFC (https://www.climatepolicyinitiative.org/wp-content/uploads/2019/09/Implementing-alignment-recommendations-for-the-International-Development-Finance-Club_-Full-Report.pdf	Government of France	Ministère de la Transition écologique et solidaire	France
14611	41	6	41	10	(1) This is a rather weak paragraph. The first sentence is, in essence, tautological - "reinforce the need...by referring to the need". (2) The last sentence is vague and inexplicable - what "programs" are being referred to here? Is the sentence really claiming that there is limited literature on how development assistance/finance promotes international cooperation? Please clarify.	Accepted	Joanna Depledge	Centre for Environment, Energy and Natural Resource Governance (CEENRG), University of Cambridge	United Kingdom (of Great Britain and Northern Ireland)
22601	41	15	41	16	This statement "The amount of bilateral development finance allocated to climate change has increased exponentially since 2000 (OECD 2019a)." would benefit from being highlighted in the SPM, which currently only states the gap and not the progress made.	Noted. To be determined along with Ch 15 (and CLAs)	Government of France	Ministère de la Transition écologique et solidaire	France
64373	41	15	41	16	The OECD database does not track 'development finance allocated to climate change'. It tracks development finance with climate relevance - but the majority of this is finance where climate goals are only secondary goals among others and subsumed under a non-climate primary goal - so not 'allocated to climate'. And, the database referenced here includes programmes with their full amount, not their climate-component. In any case, the 'allocated to climate change' should be changed to 'with at least some climate relevance' to be on the safe side.	Noted. Edited accordingly.	Jan Kowalzig	Oxfam	Germany
63379	41	19	41	21	We would request that further information be included regarding the robustness of these methodologies within this section and overall where critiques on the OECD report are mentioned to present a balanced view of perspectives on this information. Recommended language to be added in this regard: "The OECD uses a robust analytical and accounting framework which is has transparently documented through each three iterations of these reports on climate finance provided and mobilised since 2013. This accounting framework is consistent with: the methodology used in the Standing Committee on Finance's biennial assessments; with the modalities, procedures and guidelines for reporting finance provided and mobilised agreed at COP 24; and with earlier versions of these reports. There is value in having a consistent time series as it allows us to see clear trends in the mobilisation of climate finance. Furthermore, the robustness and transparency has been further strengthened overtime by refining the methodology and improving data collection, in particular in relation to mobilised private climate finance."	Noted. The SCF does not have its own methodology and compiles data from various sources. Further please see report of OCED (June 2019) Climate Change Expert Group on Reporting Tables: Suggestions for potential work by SBSTA on financial assistance provided and mobilized. It recognizes inter alia need for further transparency and inclusion of more detailed information on the methodologies adopted to calculate the climate-specific share of a bilateral contribution. This could include allowing for reporting on the coefficients that countries use to determine the climate-related amount of a contribution	Government of Canada	Environment and Climate Change Canada	Canada
64375	41	19	41	25	It's not so much the 'OECD methodology' that has been criticised but that developed countries use it when compiling their reports to the UNFCCC, i.e. claiming that counting based on their self-granted methodology reflects what climate finance has been provided. Among the critics is also Carty et al 2020 (already referred to further above), criticising a) that this methodology leads to gross rather than net figures of support (by including finance in the forms of loans, of which only their grant equivalent, if the loans are concessional, should be considered 'support', not the full face value of the loan as counted by developed countries); and b) that programmes/projects often have a much lower (and sometimes negligible) climate-relevance than implied by how they are counted by a reporting developed country. And: The current Enhanced Transparency Framework with its Common Tabular Format will "not" address these issue, other than suggested here, as the Katowice decisions allow the continuation of the gross over-estimation of actual climate-specific assistance as in the past. The question what and how to count remains at the discretion of the providing country, same as before. DISCLAIMER: I am one of the authors of Carty et al 2020.	Noted. See response to comment 63379	Jan Kowalzig	Oxfam	Germany
27933	41	21	41	21	After "Roberts 2019)", add "and its key findings continue to be questioned by stakeholders".	Noted. The critique of the OECD methodology is already captured and no supporting reference offered for this comment.	Eleni Kaditi	Organization of the Petroleum Exporting Countries, OPEC	Austria

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
29575	41	21	41	23	The Enhanced Transparency Framework will reveal how the donors use the Rio markers, not substitute it. Please reformulate the sentence accordingly.	Noted. SBSTA is expected to provide further guidance on the Enhanced Transparency Framework, and the intention here is not to confirm or substitute any existing methodology, rather enhance transparency, granularity and comparability of information. See also response to comment 63379	Government of Norway	Norwegian Environment Agency	Norway
64377	41	26	41	27	On what basis can one claim that the Standing Committee's Biennial Assessment is the best available information on financial support? For instance both the BA and OECD 2020 are based on the Biennial Reports from developed countries, but OECD 2020 cleans them up by e.g. removing coal finance from the sheets, while the SCF's BA keeps coal finance included. Also, OECD 2020 un-confuses incoherent reporting from developed countries e.g. with respect to multilateral versus bilateral finance, while the SCF does not do that. Sure, the SCF's BA is a mandated report under the UNFCCC while OECD 2020 is a developed country exercise - but on a "technical" level I'd argue OECD 2020 has the better data. when it comes to understand support flows from developed to developing countries in the context of e.g. the 100bn-a-year promise by developed countries.	Noted. In the balance SCF's report is the accepted report, with the expectation that the common tabular formats when agreed under the Enhanced Transparency Framework will provide more rigorous information acceptable to all Parties	Jan Kowalzig	Oxfam	Germany
52793	41	36	41	50	the footnote is not formatted. Various style/spelling mistakes.	Accepted. Editing undertaken	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia
22597	41	2	41	4	Conversely, the decision 1/CP.21 at COP21 states that climate finance provided by developed countries is understood "in the context of meaningful mitigation actions and transparency on implementation": climate finance is dependent on effective climate mitigation in developing countries	Noted. The reference to conditionality in decision 1/CP.21 is provided earlier in the section-lines 12-13 on page 40	Government of France	Ministère de la Transition écologique et solidaire	France
87105	41	2	41	4	Conversely, the decision 1/CP.21 at COP21 states that climate finance provided by developed countries is understood "in the context of meaningful mitigation actions and transparency on implementation": climate finance is dependent on effective climate mitigation in developing countries	Noted. We could not, however, find support in the scientific literature for this point.	Philippe Wen	Ministère de l'Économie, des Finances et de la Relance	France
70771	42	2	42	4	The number '44 in January 2020' is given by the references of 2015 and 2017. Need clarification how this is possible.	Noted. The reference is now placed with the earlier sentence.	Philippe Tulkens	European Union (EU) - DG Research & Innovation	Belgium
61515	42	7	42	29	It is worth mentioning that consistency in reporting climate finance among various climate finance actors, as well as data accessibility, remains to be the issue (level of reporting, etc.)	Noted. The broad import of data limitations and consistency in reporting on finance is covered in section 14.7 Gaps in Knowledge and Data and in Chapter 15.	Galyna Uvarova	Green Climate Fund - Independent Evaluation Unit	Republic of Korea
22603	42	15	42	16	The net total climate co-finance committed during 2019 alongside MDB resources was US\$ 102.7bn. Together, MDB climate finance and climate co-finance totalled US\$ 164.2bn. (EIB, 2020) So it is not so insignificant On top of that OECD report from 2020 indicates that multilateral public finance represents 29.6 bn USD in 2018, out of the total of 78.9 bn USD, which is far from an insignificant share. We suggest to revise the sentence: "While the share of multilateral development banks in overall climate financing is insignificant"	Noted. Sentence beginning modified.	Government of France	Ministère de la Transition écologique et solidaire	France
7667	42	23	42	26	Omission: The chapter lacks a reference to the Network of Central Banks and Supervisors for Greening the Financial System (NGFS, https://www.ngfs.net/en). It was established in 2017 and now has more than 87 members including the Central Banks of most major economies. Its aim is to promote best practices of environment and climate risk management in the financial sector, and to mobilize mainstream finance to support the transition toward a sustainable economy. A reference to the NGFS can fit in section 14.4.1.2, for instance, in page 42, between lines 23 and 26.	Noted. NGFS is mentioned in Chapter 15 which undertakes a broad scoping on Finance.	Pablo Moreno	International Monetary Fund	United States of America
61509	42	30	42	44	While climate funds are important addition to the climate finance landscape, elaboration of their role in climate finance landscape is limited. In 2019 climate funds flows comprised only 9% of overall climate finance (OECD CRDF data). At the same time, due to finance accessibility they play a role in project piloting by allowing actors to learn quickly before scaling up - and failing quickly and learning quickly is important given the urgency of addressing climate change impacts in vulnerable countries. Among the mentioned climate funds, GCF has largest average project (USD 25 million, almost twice larger than average in the other climate funds). This provides an opportunity to GCF to scale up successful pilot projects and serve as a stepping stone between climate funds and MDBs. Aspiration of GCF to scale up projects is captured in recently approved Updated Strategic Plan 2020-2023 (USP). However, complementarity and coherence between climate funds is limited up to date. As captured in project documentation, only 20% of GCF's projects had project-level (as of November 2020) with other climate fund (mainly scale-up of AF projects and lessons learned from GEF). References: Updated Strategic Plan of the GCF https://www.greenclimate.fund/document/updated-strategic-plan-green-climate-fund-2020-2023 Descriptive analysis of climate finance landscape (MDBs, climate funds etc) in the Independent Evaluation of GCF's Adaptation Portfolio: https://iea.greenclimate.fund/document/independent-evaluation-adaptation-portfolio-and-approach-green-climate-fund	Noted. Lines 30-44 capture the unique opportunities GCF can offer for transformation	Galyna Uvarova	Green Climate Fund - Independent Evaluation Unit	Republic of Korea
14613	42	31	42	34	Please rephrase. The GCF is also "an" operating entity of the financial mechanism.	Accepted	Joanna Depledge	Centre for Environment, Energy and Natural Resource Governance (CEENRG), University of Cambridge	United Kingdom (of Great Britain and Northern Ireland)
7679	42	34	42	44	In page 42, lines 34 and 44 in the same paragraph repeat the definition of the acronym GCF, Green Climate Fund.	Accepted	Pablo Moreno	International Monetary Fund	United States of America
22605	42	36	42	37	This list is incomplete and leaves out some of the financial instruments currently used by the GCF, such as Results-Based Payments. Language should be changed as to avoid limiting the list, for example to "in the form of multiple financial instruments, including grants, loans, equity, guarantees and others"	Accepted	Government of France	Ministère de la Transition écologique et solidaire	France

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
30597	42	39	42	39	The word 'fragmented' is not appropriate as the above-mentioned mechanisms and forums were established one another and were not meant to be unified, yet they are more and more coordinated among themselves.	Noted. See response to comment 30595	Government of Japan	Climate Change Division - Ministry of Foreign Affairs	Japan
52795	42	44	42	44	GCF reference - year missing	Noted.	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia
22607	42	45	43	5	This paragraph should also underline that the GCF has a special role in the climate finance landscape, which is to 'take the risks that no other institution is willing to take' (from the GCF updated strategic plan 2020-2023, adopted at B27, in november 2020). This is essential to properly describe the GCF's position. In addition, the fact that the GCF has a direct access modality, providing funds to local financial institutions directly, should also be underlined, as being a partnership institution is also an important value added of the GCF and the core of its DNA.	Accepted on risk taking aspect. On direct access modality, Adaptation Fund was the first to institutionalize it.	Government of France	Ministère de la Transition écologique et solidaire	France
87107	42	15	42	16	The net total climate co-finance committed during 2019 alongside MDB resources was US\$ 102.7bn. Together, MDB climate finance and climate co-finance totalled US\$ 164.2bn. (EIB, 2020) So it is not so insignificant	Accepted. We have reworded this sentence to remove the word "insignificant."	Philippe Wen	Ministère de l'Economie, des Finances et de la Relance	France
63381	43	9	43	9	While information on south-south flows remains limited, there are some estimates that are important to include. For example, the Climate Policy Initiative Global Landscape of Climate Finance 2019 notes a strong domestic preference, with 76% of climate finance being raised and spent domestically in 2017/2018. Also included in this report is an estimated average of US\$438 billion over 2017 and 2018 of domestic climate finance. Furthermore, the 2018 Standing Committee on Finance Biennial Assessment and Overview of Global Climate Finance Flows also reports the levels of domestic climate finance, which can be included/references in this chapter. Information on south-south flows can be found on page 8, paragraph 34 of the Standing Committee on Finance's Biennial Assessment and Overview of Climate Finance Flows - 2018, found here: https://unfccc.int/sites/default/files/resource/2018%20BA%20Technical%20Report%20Final%20Feb%202019.pdf	Noted. Reference to preference for domestic financing from CPI is noted on page 43 (lines 18-19). On South-South flows. The estimates provided in the BA report of the Standing Committee refer to non-Annex 1, non OECD. Have added estimates from CPI for 2018 for flows between non-OECD countries, as its an updated data in comparison to BA.	Government of Canada	Environment and Climate Change Canada	Canada
70773	43	19	43	21	Whereas climate finance provided and mobilised by developed countries was \$78.9 billion in 2018 in page 40, line 16 of this chapter, the international climate finance flow is total \$152 billion in page 43, line 20. Assuming not much climate finance was provided and mobilised by developing countries, where does this gap between 78.9 and 152 come from? Are they dealing with different financial flows?	The \$ 78.9 billion in 2018 is flows from developed countries to developing countries; whereas the \$ 152 billion is international flows and includes investments among developed countries and among developing countries.	Philippe Tulkens	European Union (EU) - DG Research & Innovation	Belgium
82915	43	25	43	25	Different numbers and representation than chapter 15	Noted. Chapter 15 refers to all finance -domestic and international and for mitigation and adaptation, while Ch 14 is only referring to international finance flows for mitigation	Jim Skea	Imperial College London	United Kingdom (of Great Britain and Northern Ireland)
50353	43		43		figure 14.5 has no quality to read.	Noted; will be rectified	Government of Iran	Islamic Republic of Iran Meteorological Organization (IRIMO)	Iran
1451	43		43		figure 14.5 has no quality	Noted; will be rectified	Hamideh Dalaei	climatologist at Islamic Republic of IRAN Meteorological Organisation	Iran
3209	43		43		figure 14.5 has no quality to read.	Noted; will be rectified	Hamideh Dalaei	climatologist at Islamic Republic of IRAN Meteorological Organisation	Iran
43447	43		43		figure 14.5 has no quality to read.	Noted; will be rectified	sadegh zeyaeayan	Head of national center for forecasting and weather hazards management of Islamic Republic of Iran Meteorological Organization (IRIMO)	Iran
48683	44	31			full title is "Long Range Transboundary Air Pollution" Convention	Accepted. Change made	Lorraine Elliott	The Australian National University	Australia
47137	44	2	44	14	Between 2003 and 2019, FDI in green technologies across 30 industrial sectors provided over USD\$1 trillion in capital investments. (FDI Intelligence 2020)	Noted; AR 6 has to provide an update since AR 5, hence the relevant information from FDI Intelligence 2020 is quoted	Clarence Tolliver	University of Michigan Law School	United States of America
27935	44	5	44	5	Delete "However".	Noted	Eleni Kaditi	Organization of the Petroleum Exporting Countries, OPEC	Austria

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
50381	44	16	47	23	Economic sanctions are one of the obstacles to the transfer and use of emission reduction technologies. Economic sanctions cause major economic disruptions and reduce income, limit economic diversification, and increase the economy's dependence on natural resources (e.g., Fossil fuels). But they also directly hinder trade, imports, and access to goods and technologies, having more pronounced effects than economic recessions. [Madani, K. (2020). How international economic sanctions harm the environment. Earth's Future, 8,e2020EF001829. https://doi.org/10.1029/2020EF001829] Under sanctions and embargos, even when the capacity to export (a product or resource) or the required funds for purchasing a product or service (e.g., GHG reduction technology) exists, the obstacles to transferring funds through official banking systems and trade sanctions limit income; reduce the capacity for the acquisition and import of goods, services, and technologies required to fulfill the mitigation plans. To give an example, one of Iran's plans to reduce GHG emissions in the power generation sector is to install 20 GW high efficiency class F gas turbine units. This will reduce the annual GHG emissions by 14 million tons compared to the BAU scenario. Iran was willing to pay for the program, despite economic pressures from the sanctions. The European companies with which the contract was signed, suspended it due to the US. Sanctions. [https://money.cnn.com/2018/05/14/investing/iran-sanctions-siemens-europe/index.html], [https://caspiannews.com/news-detail/irans-energy-grid-gets-a-jolt-from-siemens-2019-12-18-23/]	Accepted. We have added the reference.	Government of Iran	Islamic Republic of Iran Meteorological Organization (IRIMO)	Iran
58443	44	16	44	39	Are there more recent articles/reports than those cited from 2012 to support these arguments? If this is truly an assessment of progress since AR5, it seems odd that the 2012 citations are the "latest".	Noted. We did not identify any, and this is an issue that was not addressed in AR5.	Government of United States of America	U.S. Department of State	United States of America
43475	44	16	47	23	Economic sanctions are one of the obstacles to the transfer and use of emission reduction technologies. Economic sanctions cause major economic disruptions and reduce income, limit economic diversification, and increase the economy's dependence on natural resources (e.g., Fossil fuels). But they also directly hinder trade, imports, and access to goods and technologies, having more pronounced effects than economic recessions. [Madani, K. (2020). How international economic sanctions harm the environment. Earth's Future, 8,e2020EF001829. https://doi.org/10.1029/2020EF001829] Under sanctions and embargos, even when the capacity to export (a product or resource) or the required funds for purchasing a product or service (e.g., GHG reduction technology) exists, the obstacles to transferring funds through official banking systems and trade sanctions limit income; reduce the capacity for the acquisition and import of goods, services, and technologies required to fulfill the mitigation plans. To give an example, one of Iran's plans to reduce GHG emissions in the power generation sector is to install 20 GW high efficiency class F gas turbine units. This will reduce the annual GHG emissions by 14 million tons compared to the BAU scenario. Iran was willing to pay for the program, despite economic pressures from the sanctions. The European companies with which the contract was signed, suspended it due to the US. Sanctions. [https://money.cnn.com/2018/05/14/investing/iran-sanctions-siemens-europe/index.html], [https://caspiannews.com/news-detail/irans-energy-grid-gets-a-jolt-from-siemens-2019-12-18-23/]	Accepted. We have added the reference.	sadegh zeyaeayan	Head of national center for forecasting and weather hazards management of Islamic Republic of Iran Meteorological Organization (IRIMO)	Iran
58445	44	18	44	19	As formulated, it is unclear what "these" refers to. Suggest re-writing to: "... effective solutions to today's global challenges, as these cross national borders ..."	Accepted	Government of United States of America	U.S. Department of State	United States of America
58447	44	22	44	22	How have countries "made this a priority"? Seems ambiguous. Describe further how countries have done this, and what has changed since AR5.	Noted. We removed the phrase.	Government of United States of America	U.S. Department of State	United States of America
14645	44	40	44	48	This is an important new contribution to the debate on the impact of ICIs: Swithin Lui, Takeshi Kuramochi, Sybrig Smit, Mark Roelfsema, Angel Hsu, Amy Weinfurter, Sander Chan, Thomas Hale, Hanna Fekete, Katharina Lütkehermöller, Maria Jose de Villafranca Casas, Leonardo Nascimento, Sebastian Steri & Niklas Höhne (2021) Correcting course: the emission reduction potential of international cooperative initiatives, Climate Policy, 21:2, 232-250, DOI: 10.1080/14693062.2020.1806021	Accepted. We have added this reference.	Joanna Depledge	Centre for Environment, Energy and Natural Resource Governance (CEENRG), University of Cambridge	United Kingdom (of Great Britain and Northern Ireland)
52797	45	23	45	37	The argument presented in the paragraph is more about how international cooperation can strengthen scientific advance, not vice versa.	Noted. We have removed this text.	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia
52799	45	23	45	23	The geopolitical dimension is not discussed later, therefore stands as an orphaned assertion as it.	Noted. We have removed this text.	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia
22609	45	28	45	28	in the list, blockchain is too specific compared to the others. Maybe replace by "innovative algorithms" or "innovative algorithms such as blockchain"	Noted. We have removed this text.	Government of France	Ministère de la Transition écologique et solidaire	France
12121	45	31	45	33	Suggest adding artificial intelligence as a technology with large capacity to help address the challenges of climate change. See, for example, Rafael M. Almeida, Qinru Shi, Jonathan M. Gomes-Selman, Xiaojian Wu, Yexiang Xue, Hector Angarita, Nathan Barros, Bruce R. Forsberg, Roosevelt García-Villacorta, Stephen K. Hamilton, John M. Melack, Mariana Montoya, Guillaume Perez, Suresh A. Sethi, Carla P. Gomes, Alexander S. Flecker. Reducing greenhouse gas emissions of Amazon hydropower with strategic dam planning. Nature Communications, 2019; 10 (1) DOI: 10.1038/s41467-019-12179-5. Capgemini, 2020 Climate AI - How artificial intelligence can power climate action strategy https://www.capgemini.com/wp-content/uploads/2020/11/Climate-AI_Final.pdf For an overview discussion see CHO, 2018 AI – A game changer for climate change and the environment https://blogs.ei.columbia.edu/2018/06/05/artificial-intelligence-climate-environment/	Noted. We have removed this text.	Paul Rouse	Carnegie Climate Governance Initiative (C2G) - The Carnegie Council for Ethics and International Affairs	United Kingdom (of Great Britain and Northern Ireland)
10855	45	33	45	37	A word ("six") is probably missing in the title quoted in the reference list for the TWI2050, 2018 paper.	Noted. We have removed this text.	Philippe Waldteufel	CNRS	France

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
27937	47	26	47	26	Replace "commitments" with "actions".	Accepted	Eleni Kaditi	Organization of the Petroleum Exporting Countries, OPEC	Austria
61511	47	45	48	7	Beyond mentioned actors, GCF has dedicated funding window for country-level capacity building through Readiness Programme that covered 138 countries to date: https://www.greenclimate.fund/readiness	Accepted. Reference included	Galyna Uvarova	Green Climate Fund - Independent Evaluation Unit	Republic of Korea
22611	47	45	47	48	bilateral capacity building structures, which are numerous and represent a significant share of capacity building activities, are not mentioned, which gives a partial representation of the climate cooperation on this front. Given the very specific mentions of regional structures (line 2 of page 48 for example), it would only be balanced to at least mention some key tools stemming from bilateral cooperation, as mapped on the UNFCCC knowledge portal for example (among other existing reports on these tools).	Accepted. Reference included.	Government of France	Ministère de la Transition écologique et solidaire	France
61513	48	8	48	24	While local capacity is a precondition of impact investing in climate-resilient development, capacity building efforts should be country-driven in order to have lasting improvement on the national level. Pathways to adaptation to climate change impacts are highly dependent on the local context. Thus, building local capacity for channeling and operationalizing adaptation finance requires translating existing best practices to the local context, which can be done by local actors in line with existing national adaptation policies. This is easier with mitigation, where practices can be easily replicated - and still, in order to have successful projects owned and managed by local entities, the approach to capacity building should be country-owned.	Noted. Focus of comment is primarily on adaptation rather than mitigation. It is already noted in this section that implementation of capacity-building is usually at the national/sub-national level.	Galyna Uvarova	Green Climate Fund - Independent Evaluation Unit	Republic of Korea
27939	48	21	48	21	After "climate", add "adaptation and".	Rejected. Reference is focusing specifically on mitigation actions.	Eleni Kaditi	Organization of the Petroleum Exporting Countries, OPEC	Austria
78171	48	25			This section should include a discussion on the role of markets (specifically Article 6) in increasing mitigation ambition, i.e. overall mitigation in global emissions.	Taken into account. Reference to Greiner et al. 2020 is included. However, Article 6 is primarily discussed elsewhere (14.3)	Charlotte Plinke	Climate Analytics	Germany
47461	48	25			Please include a discussion on the role of markets (specifically Article 6) in increasing mitigation ambition, i.e. overall mitigation in global emissions.	Taken into account. Reference to Greiner et al. 2020 is included. However, Article 6 is primarily discussed elsewhere (14.3)	Government of Saint Lucia	Department of Sustainable Development - Ministry of Education, Innovation, Gender Relations and Sustainable Development	Saint Lucia
19825	48	26	48	26	Replace "carbon assets" by "emissions credits". Reason: "carbon assets" is not a terminology used by the scientific literature.	Accepted. Changed.	Axel Michaelowa	University of Zurich	Switzerland
19829	48	28	48	29	Delete "Progress... Uneven". Reason: This statement is not substantiated by the literature.	Rejected. Statement now substantiated with references.	Axel Michaelowa	University of Zurich	Switzerland
19557	48	28	48	29	Insert after "... Mehling 2018)": "... particularly if mechanisms are scaled up from projects and programmes. Michaelowa et al. (2019) provide evidence why a dedicated additionality determination is necessary to ensure environmental integrity under international carbon market mechanisms in a Paris Agreement context and suggest specific approaches for additionality testing of mitigation policy instruments." Reason: The quoted reference provides a detailed assessment of additionality testing in the context of the Paris Agreement. Reference: Michaelowa, Axel; Hermwille, Lukas; Obergassel, Wolfgang; Butzengeiger, Sonja (2019): Additionality revisited: guarding the integrity of market mechanisms under the Paris Agreement, in: Climate Policy, 19, p. 1211–1224.	Accepted. Text revised.	Matthias Honegger	Utrecht University, Perspectives climate research, IASS-Potsdam	Germany
86037	48	30	48	32	There is no factual basis for the claim that the CDM has a role to play under the Paris Agreement. Text for any role for the CDM under Article 6 has not been agreed. Recommend deleting the sentence, or at least amending to "may have a role to play".	Taken into account. Text amended.	Government of Australia	Department of Industry, Science, Energy and Resources	Australia
47189	48	30	40	32	Article 6 rules have not yet been agreed, with ongoing discussions over the relevance of CDM project activities under the Paris Agreement (Aosis has a clear position that the carry over of CDM units is not appropriate under the Paris Agreement. This sentence has to be rewritten to be more precise,	Taken into account. Text amended.	Stuart Minchin	The Pacific Community	Australia
27941	48	31	48	31	Replace "only the" with "a mechanism similar to" CDM.	Taken into account. Text revised.	Eleni Kaditi	Organization of the Petroleum Exporting Countries, OPEC	Austria
63383	48	31	48	32	This sentence is inaccurate there is currently no role for the CDM in the Paris Agreement and this we recommend that this should be reflected accurately.	Taken into account. Text revised.	Government of Canada	Environment and Climate Change Canada	Canada
63385	48	33	48	33	We would recommend that a more accurate framing of Article 6 would be a "framework" rather than a mechanism.	Accepted. Text changed.	Government of Canada	Environment and Climate Change Canada	Canada
19827	48	34	48	36	Replace "Although ... exploited." by "As shown by Greiner et al. (2020), there is a thriving global landscape of activities piloting Article 6, with the bilateral treaty signed under the framework of Article 6 in October 2020 by Switzerland and Peru being a key example." Reason: This reference provides a detailed overview of all Article 6 piloting initiatives. New reference: Greiner, Sandra; Krämer, Nicole; de Lorenzo, Federico; Michaelowa, Axel; Hoch, Stephan; Kessler, Juliana (2020): Article 6 piloting: state of play and stakeholder experiences, Climate Focus and Perspectives, Amsterdam/Freiburg	Taken into account. Reference included.	Axel Michaelowa	University of Zurich	Switzerland
52803	48	41	49	6	how can literature on national-regional-international linkage processes for markets other than emission trading can inform that on emission trading?	Noted. But too general to be useful.	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
14615	48	42	48	44	This is an additional seminal (highly viewed and cited) paper that provides an overview of ETS Narassimhan, E., Gallagher, K. S., Koester, S., & Alejo, J. R. (2018). Carbon pricing in practice: A review of existing emissions trading systems. <i>Climate Policy</i> , 18(8), 967-991.	Accepted. Reference included.	Joanna Depledge	Centre for Environment, Energy and Natural Resource Governance (CENRG), University of Cambridge	United Kingdom (of Great Britain and Northern Ireland)
70775	48	42	48	44	You may want to add ETS in Kazakhstan, launched in January 2013.	Accepted. Added.	Philippe Tulkens	European Union (EU) - DG Research & Innovation	Belgium
5143	48	47	48	47	"demonstrate that these can be significant" instead of "demonstrate that these are significant". Linkage is not always beneficial for all countries involved (see, for example, Gavard, C., H.D. Jacoby, N. Winchester and S. Paltsev, 2011. "What to Expect from Sectoral Trading, a US-China Example", <i>Climate Change Economics</i> , Vol. 2, No. 1, pp. 9-26).	Accepted. Text changed.	Claire Gavard	ZEW Mannheim	Germany
58449	49	1	49	2	Refer to "national" ETS linkages, which have a clear (and evidenced) pathway to the international cooperation referred to in the next line; edit also brings this commentary in line with the Executive Summary (page 14-3, line 44). Suggest the following formulation: "... et al. 2019a). Over time, the linkages of national emission trading systems can be seen as building blocks to a strategic enlargement of international cooperation (Mehling, 2018; Caparros and Perea, 2017). The ..."	Taken into account. Text amended.	Government of United States of America	U.S. Department of State	United States of America
37747	49	4	49	6	Additional paper for World Bank on new instruments for linking might be considered: J. Füssler, A. Wunderlich, L. Taschini (2016) International Carbon Asset Reserve. Prototyping for instruments reducing risks and linking carbon markets. http://pubdocs.worldbank.org/en/342101466013221524/Final-report-ICAR-Prototype-June-2016.pdf	Accepted. Reference added.	Juerg Fuessler	INFRAS	Switzerland
86039	49	7	49	10	Request this language be changed, as it suggests a process "breakdown" (read: failure) in the Australian-EU case. This was not the case: rather it was ended due to domestic policy changes. Suggest instead something like a reference to processes that were begun but changed course / did not result in ETS linkages.	Accepted. Text changed.	Government of Australia	Department of Industry, Science, Energy and Resources	Australia
67567	49	7	49	20	Please consider referring to Energy Modeling Forum 36 and a Special Issue in Energy Economics on linking ETS systems: Summary article: Böhringer et al. (SUBMITTED): Carbon Pricing after Paris_Overview of Results from EMF 36. Contact persons for all relevant Special Issue articles (SUBMITTED): Sonja.Peterson@ifw-kiel.de or christoph.boehringer@uni-oldenburg.de.	Taken into account. Will be added if published by the deadline.	Taran Fæhn	Statistics Norway, Research Dep.	Norway
14617	49	9	49	10	On delinking (1) the case of NZ could be added - Suzi Kerr, Judd Ormsby & Dominic White (2021) Delinking the New Zealand Emissions Trading Scheme from the Kyoto Protocol: comparing theory with practice, <i>Climate Policy</i> , DOI: 10.1080/14693062.2021.1879722; (2) on EU Australia, I suggest this excellent paper (still in review, but likely to be accepted in coming weeks) Evans, S. and Wu, A. (in review), What drives cooperation in carbon markets? Lessons from decision-makers in the Australia-EU ETS linking negotiations, <i>Climate Policy</i> .	Taken into account. We will consider adding the mentioned references if published by the deadline.	Joanna Depledge	Centre for Environment, Energy and Natural Resource Governance (CENRG), University of Cambridge	United Kingdom (of Great Britain and Northern Ireland)
52801	49	18	49	20	references need editing	Noted.	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia
72881	49	21	55	21	This paragraph lacks two mentions or developments: (i) the moral dilemma of carbon storage in the face of stringent abatement in all sectors (ii) the risk that industries that develop storage technologies will use it for some form of compensation with the richest sectors or countries. These two points do not remove the necessity of carbon absorption, but they constitute a risk that has to be faced by negotiators and policymakers	Noted. But frankly, we don't understand. We understand the moral dilemma associated with SRM, but not a moral dilemma arising out of CDR. Moreover the potential CDR technologies might make it possible to avoid some high cost emissions reduction seems less like a risk than an opportunity.	Antoine BONDUELLE	EE-Consultant	France
22613	49	21	49	21	This paragraph explains well the challenges in the governance of CDR and in SRM. But it lack the mention of the fundamental issue of additionality of what is needed globally in the scenarios. These mechanisms need technical and economic initiatives to climb the cost and industrialising curves. But they must not be confiscated to limited interests (e.g. private jets or luxury industries) so will need mechanisms to ensure the capture of carbon quantities needed beyond such compensation. This is a key missing part of the chapter, that should be at least mentioned.	Noted. This is not an issue for the chapter, but for the X-WG box, or chapter 2.	Government of France	Ministère de la Transition écologique et solidaire	France
75669	49	21	49	21	The Carnegie Climate Governance Initiative focuses on the dialogue of governance issues on SRM and CDR. I'd like to suggest to review the latest reports such as: 'Evidence Brief: Governing Solar Radiation Modification', and 'Governing large-scale carbon dioxide removal: are we ready? – an update' which provides an overview of the status of the SRM and CDR under the multilateral agreements, the gaps/challenges face for its governance, etc. [https://www.c2g2.net/wp-content/uploads/c2g_evidencebrief_srm.pdf] [https://www.c2g2.net/wp-content/uploads/are-we-ready_2021_fullreport.pdf]	Noted. Thank you for the suggestion.	Karla Solis	Peru	Germany
80229	49	21	54	41	"The term "schemes", as applied to SRM in this chapter, is used with perjorative effect and inconsistently with the rest of the report. In this chapter, "schemes" is consistently used to refer to the various techniques or methods by which solar radiation management might be implemented. For CDR, the collective nouns used are "technologies" or "options" (see AR6 WG3 Ch.1). A defense of this discrepancy on the basis of maturity, feasibility, or uncertainty is unwarranted, given the uncertainties and feasibility concerns with CDR. In the rest of this report, the term "scheme" is consistently used to refer to processes, policies, and structures enacted by institutions, such as certifications, incentives, and other market mechanisms. (See AR6 WG3 Ch 12, 13). The sole consistent and appropriate use of the term is AR6 WG3 Ch14 Pg. 54 line 5. Suggestion: replace instances of "scheme" with a more specific, appropriate term: method, technology, option. "	Accepted. We only found one instance of the word scheme, and have changed it to "option"	Kelly Wanser	SilverLining	United States of America
19515	49	21	54	41	The text in the section 14.4.5.1. and the cross-chapter box overlapp to quite a large extent (e.g. both discussing the very nature of the proposed techniques, and governance). It might be useful - for clarity, lucidity and substance - to rather make the complementary.	Noted. We are attempting.	Markku Rummukainen	Lund University	Sweden

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
70777	49	21	55	21	The subsection deals with SRM and CDR but a lot bigger weight is given to SRM. Recommended is to give more equitable treatments to SRM and CDM, respectively. This also needs to be better integrated into the overall scope of this WG3 report, which appears to treat SRM as out of scope (not mitigation)	Noted. Indeed there is a reason for this, namely the IPCC plenary tasked Chapter 14 with considering international governance of SRM risks. We chose to also include CDR issues, although the international risk dimensions appear less clear.	Philippe Tulkens	European Union (EU) - DG Research & Innovation	Belgium
81123	49	25	49	26	This is, unfortunately, not correct, as Chapter 1 even offers a definition of geo-engineering! Could I request authors to coordinate proactively with other chapters (I agree the AR6 should avoid the term), but also double-check usage in other Working Groups. Or modify this sentence to say that the WGIII contribution to AR6 avoids the term in its detailed assessment of those options. (I.e. chapter 1 could still refer to the term geoengineering, as a reflection of the fact that the term is used 'out there' in at least the grey literature, but we can still be clear here that the term isn't actually useful for the characterisation and assessment of CDR and SRM options).	Accepted. We have deleted the sentence.	Andy Reisinger	Ministry for the Environment	New Zealand
81125	49	27	49	28	Perhaps add that chapters 6, 7 and 12 also assess the mitigation potential, risks and co-benefits of some CDR options, not just their governance in chapter 12.	Accepted. Text added.	Andy Reisinger	Ministry for the Environment	New Zealand
81389	49	31	53	32	When the positive and negative impacts of the different technologies are being discussed it is sometimes not clear if positive impacts are related to the technology itself (SAI e.g.) or to the reduced level of global warming. For the potential negative impacts that is always very clear. Since the positive impacts of reduced global warming are so multifold maybe one option would be to discuss only the direct potential impacts from the SRM technologies. The overall impression from the SRM box is very good as it gives a very good oversight of current discussions on SRM and the associated risks and ethical questions.	Noted: the text in this section has been revised to provide a broad overview	Hans Poertner	Alfred-Wegener-Institute	Germany
29819	49	33	54	41	As a general comment to this box and section 14.4.5.1, and especially with regards to the outline to this report, we believe that the content with regards to SRM fit nicely with our expectations. Just be aware that SRM is also mentioned in Chapter 1 and 3, and there we think it is out of scope.	Noted: the text in this section has been revised to provide a broad overview	Government of Norway	Norwegian Environment Agency	Norway
76199	49	33	53	32	Good to see this xWG team of authors addressing this cross cutting issue. Please use this to update to revisions in the other WGs.	Noted: the text in this section has been revised to provide a broad overview	Jan Fuglestedt	CICERO	Norway
9415	49	33	53	32	[previously submitted with WG2 SOD] When considering any intentional action, the primary (but not only) question should be, Will the action contribute to the goal(s) at hand? Despite its limitations and risks, SRM is being considered and researched only to potentially reduce climate change, impacts, and risks. The primary question (but not only) should thus be, Could SRM reduce climate change impacts and risks, especially if mitigation remains insufficient and warming exceeds 2C (or 1.5C or 3C etc.)? For example, the Second Order Draft of AR6 WG1 concludes "Solar radiation modification (SRM) can diminish greenhouse-gas-induced warming but is likely to impact climate at regional spatial scales and seasonal timescales (high confidence)." The conclusion of IPCC SR1.5 in this regard remains true: "SAI is the most-researched SRM method, with high agreement that it could limit warming to below 1.5°C." Specifically, models consistently indicate that a moderate magnitude (one that is less than fully compensating for mean global warming) of SRM in general and SAI specifically appear able to reduce net anthropogenic anomalies of all important climatic and other environmental variables at the subregional scale. See below for some examples. SRM and SAI also appear able to do so rapidly, which neither emissions reductions, CDR, nor adaptation could. I am aware of no scientific paper that reports that moderate SRM would be expected to increase several of these relevant climatic anomalies for a substantial portion of the world's subregions. However, in this Box, this is only addressed in passing on p 75 line 38 and p 76 line 6. Meanwhile, its limitations and risks receives substantial attention throughout. For example, the first substantive sentence regarding SRM's effects as well as the table speak of neutral "climate impacts" and of negative "risks," but not potential benefit. Likewise, the section "SRM risks to human and natural systems" accounts for almost half of the box's words, but there is no parallel section on SRM's potential benefits of reducing climate change risks and impacts. This box should clearly describe SRM's potential to reduce climate change, impacts, and risks and prior to describing its own risks, limitations, and uncertainties. Furthermore, the word "impact," which is used throughout the box, carries a negative connotation. I suggest "effect" as more neutral.	Noted: the text in this section has been revised to provide a broad overview	Jesse Reynolds	University of California, Los Angeles	Netherlands
19627	49	33	53	32	The cross-working group box SRM lacks newer relevant literature in regards to offering a complete and nuanced account of current understandings regarding SRM. A systematic structure could follow the approach of Honegger et al. (2021) in specifically addressing 1. SRM's (in-)ability to limit change across climate variables, 2. potential physical non-climate related side-effects and 3. socio-economic, political or cultural dimensions of both. New reference: Honegger, M., Michaelowa, A., and Pan, J. (2021, under review). Potential implications of Solar Radiation Modification for achievement of the Sustainable Development Goals", Mitigation and Adaptation Strategies to Global Change.	Noted: the text in this section has been revised to provide a broad overview	Matthias Honegger	Utrecht University, Perspectives climate research, IASS-Potsdam	Germany
7681	49	33	54	41	The section on Solar Radiation Modification (SRM) seems disproportionately long, compared to other sections of the report, over signaling SRM with respect to other Paris Agreement pathways or means of implementation (page 39, line 31). It includes a box that extends to four pages (between pages 49 and 53). The chapter would benefit from significantly shortening this box down to two pages, or even including it as an annex, rather than a box in the main report.	Noted: the text in this section has been revised to provide a broad overview	Pablo Moreno	International Monetary Fund	United States of America

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
81129	49	41			This box (or if not within this box, in the preceding para in lines 22-31) should make clear that SRM is NOT mitigation in the way this is defined in IPCC, as it does not reduce the emission of greenhouse gases or enhances their removal by sinks. It doesn't make it irrelevant for WGIII, but this delineation is factual and important I think, and currently missing. It could also be used to clarify that CDR (even in its more unusual and speculative forms), by contrast, very clearly IS mitigation as it enhances removals by sinks.	Noted: the text in this section has been revised to provide a broad overview	Andy Reisinger	Ministry for the Environment	New Zealand
11173	49	42	49	43	I would add some language before the parenthetical: "counteract anthropogenic warming and some of its harmful impacts." SRM is an object of scientific study because it could reduce human suffering and damage to ecosystems, not merely because it could reduce global average temperatures.	Noted: the text in this section has been revised to provide a broad overview	Charles Corbett	University of California, Los Angeles School of Law	United States of America
12123	49	42	49	48	SRM is described here as 'proposals to increase the reflection of shortwave radiation'. This is inconsistent with previous IPCC definitions. The SRM literature has consistently included proposals that would allow more radiation to escape from the atmosphere i.e., CCT, as well as measures that would reflect SR away. It is suggested this text be revised, in line with the SR1.5 Glossary i.e., SRM 'refers to the intentional modification of the Earth's shortwave radiative budget with the aim of reducing warming'. Creating a new definition at this stage would be unhelpful.	Noted: the text in this section has been revised to provide a broad overview	Paul Rouse	Carnegie Climate Governance Initiative (C2G) - The Carnegie Council for Ethics and International Affairs	United Kingdom (of Great Britain and Northern Ireland)
7995	49	44	49	45	"Stratospheric Aerosol Injections (SAI)" The technique most studied is injection of SO2 gas, which later converts to aerosols. You are so careful with the other terms, but this one should be "Stratospheric Aerosol Intervention"	Noted: the text in this section has been revised to provide a broad overview	Alan Robock	Rutgers University	United States of America
9417	49	44	50	2	[previously submitted with WG2 SOD] The word "scheme" has a negative connotation, at least in American English. Consider something more neutral such as technique, technology, or method.	Noted: the text in this section has been revised to provide a broad overview	Jesse Reynolds	University of California, Los Angeles	Netherlands
22663	49				§ 14.5.1: discussion over both SRM and CDR international governance are gathered in a single paragraph. Due to the wide range of technology maturity involved and specific goals of these two items, separating paragraph should address CDR process governance on one hand, and SRM governance on the other hand.	Noted: the text in this section has been revised to provide a broad overview	Government of France	Ministère de la Transition écologique et solidaire	France
69415	49				Section 14.4.5 -- somewhere it could be added, "SRM is not climate change in reverse, but a new type of additional climate change." This is why it is so worthy of study.	Noted: the text in this section has been revised to provide a broad overview	Tyler Felgenhauer	Duke University	United States of America
19899	50	1	50	1	Please add: "...with important implications for the pursuit of the Sustainable Development Goals (Honegger, et al. 2021)." New reference: Honegger, M., Michaelowa, A., and Pan, J. (2021, under review). Potential implications of Solar Radiation Modification for achievement of the Sustainable Development Goals", Mitigation and Adaptation Strategies to Global Change.	Noted: the text in this section has been revised to provide a broad overview	Axel Michaelowa	University of Zurich	Switzerland
11175	50	1	50	6	It would be worth mentioning that SRM could reduce a range of harmful climate impacts beyond mean-average temperature, potentially leading to less sea level rise, fewer precipitation anomalies (compared to pre-industrial averages), more carbon uptake by naturally occurring carbon sinks, and fewer heatwaves. See Peter J. Irvine et al., An Overview of the Earth System Science of Solar Geoengineering, 7 WIREs Climate Change (2016), 7:815-833.	Noted: the text in this section has been revised to provide a broad overview	Charles Corbett	University of California, Los Angeles School of Law	United States of America
9419	50	1	50	1	[previously submitted with WG2 SOD] This sentence speaks of "impacts" and "risks," but not of SRM's potential benefit of reducing climate change. It should speak of the latter.	Noted: the text in this section has been revised to provide a broad overview	Jesse Reynolds	University of California, Los Angeles	Netherlands
19505	50	1	50	6	It would be useful to also mention the issue of side-effects already here as it is one of the overall issues surrounding the discussion on SRM.	Noted: the text in this section has been revised to provide a broad overview	Markku Rummukainen	Lund University	Sweden
9421	50	2	50	4	[previously submitted with WG2 SOD] SRM could counter not only the warming aspect of climate change, but, according to models, potentially also precipitation changes and extreme hot and cold events. It also appears able to slow sea level rise. The modal verb "will" is too strong as it gives the impression that SRM's effects are necessarily short lived. However, the duration of their effects depends on its regime of implementation. For example, suppose that SRM is used close to ideal, limiting warming until mitigation (including CDR) reduces atmospheric GHGs to close to preindustrial levels. In this case, SRM's preservation of terrestrial ice would not be short lived.	Noted: the text in this section has been revised to provide a broad overview	Jesse Reynolds	University of California, Los Angeles	Netherlands

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
80231	50	2	50	4	<p>"SRM schemes may be effective in alleviating climate warming either locally or globally, but these effects will be short-lived when compared to mitigation, and there is high confidence that SRM would not return the climate to a pre-industrial state (WGI AR6 Chapter 4).</p> <p>COMMENT</p> <p>This statement is misleading and obviously perjorative in intent while being in the most narrow, technical sense. To avoid misleading non-expert readers and reduce threats to neutrality, the terms "short-lived" and "return to a pre-industrial state" must be contextualized and defined more precisely. The forcing agents proposed for SRM have short atmospheric lifetimes as compared to GHGs, but the effects will be as long-lived as the institutions and economic systems that implement them. As discussed elsewhere in AR6 WG3, all climate mitigations must be similarly sustained, including CDR to compensate for continuing emissions and demand-side social transformations involving diet, land use, and consumption patterns. Furthermore, the statement that "SRM will not return the climate to pre-industrial conditions" implies an unrealistic standard that is not applied to any other mitigation or adaptation approach in AR6. No amount of mitigation or CDR will return the climate to preindustrial conditions within a hundred years or more. The perjorative intent of this statement is even clearer in the context of the possibility of climate tipping points. Given the precarious state of global tipping points (ice sheets, permafrost, etc.), which have the potential to abruptly and irreversibly alter the climate state. Against this risk, there is high confidence that SRM can "prevent the climate impacts of a temporary temperature overshoot (SR.15 Cross Chapter box 10, Section E), precisely the opposite of what is claimed in this statement. Suggested change: "...but these effects must be sustained alongside mitigation and CDR efforts. In addition, there is high confidence that SRM would compensate for some, but not all, of the climate impacts arising from existing or continued GHG emissions."</p>	Noted: the text in this section has been revised to provide a broad overview	Kelly Wanser	SilverLining	United States of America
76201	50	3	50	3	I think you need to expand and explain a bit more here: "..., but these effects will be short-lived when compared to mitigation,..."	Noted: the text in this section has been revised to provide a broad overview	Jan Fuglestedt	CICERO	Norway
9423	50	3	50	4	[previously submitted with WG2 SOD] This would be more accurately stated, "SRM could largely but imperfectly return the climate to a pre-industrial state." As it stands, the clause is not balanced, noting what SRM could not do but not what it could.	Noted: the text in this section has been revised to provide a broad overview	Jesse Reynolds	University of California, Los Angeles	Netherlands
12125	50	3	50	4	It has not been seriously proposed that SRM be used to return the climate to a pre-industrial state. This statement should be balanced by an assessment of the likelihood of SRM's capacity to cool the climate to a lesser degree – i.e., 0.5 degree.	Noted: the text in this section has been revised to provide a broad overview	Paul Rouse	Carnegie Climate Governance Initiative (CZG) - The Carnegie Council for Ethics and International Affairs	United Kingdom (of Great Britain and Northern Ireland)
69411	50	3			"short-lived" -- yes, SRM injections are short-lived, but with SAI this is not the point. SAI is short-lived but it can be injected at regular intervals (or constantly) so as to in effect make it long-lived. The slightly different point of this sentence is that SRM is not a long-term solution to climate change, because SAI address the symptoms rather than the root causes of anthropogenic climate change. We could temporarily alleviate some of the symptoms of climate change over a few decades, while we finally get action going on mitigation. Short-lived is a scientific description of the natural process, rather than how SRM might play out in reality (over several decades).	Noted: the text in this section has been revised to provide a broad overview	Tyler Felgenhauer	Duke University	United States of America
80233	50	4	50	6	<p>There is also high confidence that SRM cannot be the main policy response for addressing climate change risks and is, at best, a supplement to deep mitigation (Buck et al., 2020)."</p> <p>COMMENT</p> <p>This statement is not supported by the cited literature and applies an unrealistic standard ("main policy response") that is not applied elsewhere in AR6 WG3, with clear perjorative intent. To the contrary, AR6 WG3 continuously reinforces the message that there is no single policy response to climate change - not even deep mitigation. Instead, a wide variety of approaches must be pursued, given the diversity of potential benefits, risks, and uncertainties. The same standard should be applied in any discussion of SRM technologies. Furthermore, as discussed elsewhere in AR6, SRM is a potentially valuable element of the policy response toolbox. The difficulty of detecting and quantifying the effect of emissions reductions in the near term presents a substantial risk that must be incorporated into climate decision-making. In particular, the near-term uncertainty in climate trajectory and lagged response for both CO2 mitigation and CDR approaches justifies investigation of climate intervention (particularly SRM) approaches that can rapidly influence the climate system. This is a key and substantive policy-relevant feature of potential SRM approaches, as discussed in AR6 WG1 Ch.4 pg. 91, lines 2-4 (second order draft). And SR1.5, Cross-Chapter Box 10. In AR6 WG3, Ch. 3 discusses the value of SRM in this context, finding SRM provides unique and irreplaceable policy responses in the option value given climate uncertainty and the unique capability of responding to tipping points after they have occurred. Buck et. al 2020's central claim is that SRM provides a "stopgap" for other policy measures where currently none exist to prevent climate damages and pursue development goals.</p> <p>Suggested change: "There is high confidence that SRM could be an effective complement to deep mitigation as part of the portfolio of policy responses to climate change. This is due to SRM's ability to rapidly reduce global temperatures."</p>	Noted: the text in this section has been revised to provide a broad overview	Kelly Wanser	SilverLining	United States of America

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
8005	50	5	50	5	"SRM cannot be the main policy response" is not correct. By "cannot" do you mean the technology does not exist and can never be deployed? How do you know that? If by "cannot" you mean "should not," then this a value-laden policy recommendation, and is not a scientific assessment. I agree, based on my own values, but such a policy recommendation should not be in an IPCC report.	Noted: the text in this section has been revised to provide a broad overview	Alan Robock	Rutgers University	United States of America
81387	50	6	50	6	I'm not sure that "deep mitigation" is an established concept which is understood without further explanation. Could be solved by adding a reference to the section/ chapter where it is explained, or ideally also explain briefly here.	Noted: the text in this section has been revised to provide a broad overview	Hans Poertner	Alfred-Wegener-Institute	Germany
76203	50	6	50	6	You have a high confidence statement but only refer to one single paper. I think you need a broader basis leading up to this statement.	Noted: the text in this section has been revised to provide a broad overview	Jan Fuglestad	CICERO	Norway
7997	50	9	50	9	Delete "counterfactual." This is jargon that is confusing to scientists. It is not necessary in the sentence. Neither SRM nor future global warming scenarios are factual, so why confuse us with this word?	Noted: the text in this section has been revised to provide a broad overview	Alan Robock	Rutgers University	United States of America
81427	50	9	50	9	"counterfactual" is probably the correct term but I would worry that it could be misunderstood by non-experts who would read the box.	Noted: the text in this section has been revised to provide a broad overview	Hans Poertner	Alfred-Wegener-Institute	Germany
9425	50	9	50	10	(previously submitted with WG2 SOD) The choice of scenarios is important in assessing not only risks, but also potential SRM's benefits of reducing climate change.	Noted: the text in this section has been revised to provide a broad overview	Jesse Reynolds	University of California, Los Angeles	Netherlands
80235	50	9	50	10	The importance of clarity of the counterfactual is well-made and well-founded. Unfortunately, this cross-chapter box does not follow its own advice. Without a "trade-off" framing, the results of the studies discussed in this bare mutually inconsistent and confusing. To address this issue, the following sentence could be added at the beginning: "The specific climate response to SRM depends greatly on the details of implementation and must be assessed in context with the explicit or implicit climate "goals" or "targets" of each study." Reference: • Tilmes, S. ... Robock, A. (2020). Reaching 1.5 and 2.0 °C global surface temperature targets using stratospheric aerosol geoengineering. Earth System Dynamics, 11(3), 579–601. https://doi.org/10.5194/esd-11-579-2020	Noted: the text in this section has been revised to provide a broad overview	Kelly Wanser	SilverLining	United States of America
19897	50	10	50	10	Please add: "... is crucial in the assessment of SRM risks and its effectiveness in attenuating climate change risks (Honegger et al. 2021)." Reason: This sentence is exclusively focussing on SRM risk and should also take into account its benefits. New reference: Honegger, M., Michaelowa, A., and Pan, J. (2021, under review). Potential implications of Solar Radiation Modification for achievement of the Sustainable Development Goals", Mitigation and Adaptation Strategies to Global Change	Noted: the text in this section has been revised to provide a broad overview	Axel Michaelowa	University of Zurich	Switzerland
7999	50	11	50	11	"coverage of the potential scenario space is insufficient" What does this mean? This is full of jargon. What does "coverage" mean? What is "potential scenario space?" And how is sufficiency measured? What is the metric? What is the research to which this refers? Are you saying we need more research with more scenarios of SRM and more scenarios of global warming? Which ones? Why? How many?	Noted: the text in this section has been revised to provide a broad overview	Alan Robock	Rutgers University	United States of America
8007	50	11	50	12	Why is the number of papers important? You ignore how research works. The first simulations used artificial scenarios, such as G1 in GeoMIP, to get a large signal to noise ratio. But you ignore Tilmes et al. (2020), which used an overshoot scenario, and may be more likely, if SRM is ever used. As research progresses, and scientific questions become more sophisticated, such "realistic" scenarios come into use. Tilmes, Simone, Douglas G. MacMartin, Jan T. M. Lenaerts, Leo van Kampenhout, Laura Muntjewerf, Lili Xia, Cheryl S. Harrison, Kristen Krumhardt, Michael J. Mills, Ben Kravitz, and Alan Robock, 2020: Reaching 1.5 and 2.0°C global surface temperature targets using stratospheric aerosol geoengineering in CMIP6. Earth System Dynamics, 11, 579-601, doi:10.5194/esd-11-579-2020.	Noted: the text in this section has been revised to provide a broad overview	Alan Robock	Rutgers University	United States of America

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
80239	50	11	50	13	<p>"Most climate 11model simulations have used highly idealized deployment scenarios or high-emission scenarios with 12large radiative forcing in order to enhance the signal-to-noise ratio of climate responses to SRM"</p> <p>COMMENT</p> <p>"Highly idealized" is a term with perjorative intent. It does not appear elsewhere in AR6 WG1. Furthermore, term "idealized" is not warranted or accurate, given the current state or trajectory of model development and studies of SRM, and sophistication of the model ensembles in the two papers cited. In particular, Kravitz 2017 uses the GLENS ensemble, which includes multiple members with fully coupled interactive chemistry at high resolution. Recent modeling studies simulating a gradual introduction of aerosols in a controlled regime to hold global average temperature constant indicated significantly reduced impacts from warming in most parts of the world. The studies also indicated substantially fewer side effects than less realistic previous studies that simulated reduced energy from the sun. It is not clear that these scenarios are any more or less "idealized" than those positing rapid and universal global action on mitigation, or dramatic expansion of CDR capabilities in pathways consistent with the Paris Agreement. The reference to "signal-to-noise" is similarly perjorative in intent, implying a lack of "realism" relative to other literatures. This implication is inconsistent with the rest of the report - studying large perturbations to take advantage of statistical signal is a common methodology in climate science, and frequently used to discern impacts, especially at a regional scale.</p> <p>Reference: • Tilmes, S. ... Robock, A. (2020). Reaching 1.5 and 2.0 °C global surface temperature targets using stratospheric aerosol geoengineering. Earth System Dynamics, 11(3), 579–601. https://doi.org/10.5194/esd-11-579-2020 B</p>	Noted: the text in this section has been revised to provide a broad overview	Kelly Wanser	SilverLining	United States of America
8001	50	12	50	12	What does "highly idealized" mean? What is an ideal deployment?	Noted: the text in this section has been revised to provide a broad overview	Alan Robock	Rutgers University	United States of America
80237	50	12	50	13	The statement that the coverage of scenarios space is insufficient is narrowly true but not contextualized with the other response options discussed in the report. This inconsistency is particularly notable given the substantial discussion of scenario space adequacy in Technical Annex C of AR6 WG3	Noted: the text in this section has been revised to provide a broad overview	Kelly Wanser	SilverLining	United States of America
9427	50	14	50	16	[previously submitted with WG2 SOD] These IAM studies have not focused only on risks, but also on its potential benefit of reducing climate change.	Noted: the text in this section has been revised to provide a broad overview	Jesse Reynolds	University of California, Los Angeles	Netherlands
80241	50	14	50	17	<p>"There are only a few Integrated Assessment Model scenarios on SAI (Arino et al., 2016; Emmerling and Tavoni, 2018), which mostly focused on risks from SAI since the direct cost of SAI is deemed low (Moriyama et al., 2017; Smith and Wagner, 2018)."</p> <p>COMMENT</p> <p>This comment completely mischaracterizes the IAM literature by failing to mention benefits in addition to risks. Instead, the literature universally supports nearly the opposite formulation: that even when accounting for risks and impacts, globally optimum SRM reduces climate impacts, lowers the costs of mitigation, and extends the window for sociotechnical transition. It is therefore a complement to mitigation, but not a replacement. Furthermore, these effects are substantial and ethically meaningful; Emmerling and Tavoni 2018a reports 11 Trillion USD in avoided climate impacts, most of which accrue to Africa and Asia. Ariona 2016 quantify the value of the mere availability of SRM as a potential response as at least 2.3 Trillion USD. Huetel 2016 shows the welfare differences are very high in magnitude in the presence of multiple types of tipping points, including economic. A more warranted and policy-relevant reformulation of the statement follows: "...finding that globally optimum SRM may reduce climate impacts and extend the time available to achieve mitigation and just transition. These findings are robust to uncertainty in costs and risks of SRM; however, these uncertainties are large and can dramatically change the amount of SRM used in optimal climate policies."</p> <p>References: Tavoni, M., Bosetti, V., Shayegh, S., Drouet, L., Emmerling, J., Fuss, S., Goeschl, T., Guivarch, C., Lontzek, T.S., Manoussi, V. and Moreno-Cruz, J., 2017. Challenges and opportunities for integrated modeling of climate engineering. Heutel, G., Moreno-Cruz, J. and Shayegh, S., 2018. Solar geoengineering, uncertainty, and the price of carbon. Journal of Environmental Economics and Management, 87, pp.24-41. Helweggen, Koen G., Claudia E. Wieners, Jason E. Frank, and Henk A. Dijkstra. "Complementing CO 2 emission reduction by solar radiation management might strongly enhance future welfare." Earth System Dynamics 10, no. 3 (2019): 453-472.</p>	Noted: the text in this section has been revised to provide a broad overview	Kelly Wanser	SilverLining	United States of America
8003	50	18	50	19	I don't understand this sentence. How can "numerous aspects" depend on a choice whether to deploy?	Noted: the text in this section has been revised to provide a broad overview	Alan Robock	Rutgers University	United States of America
80243	50	18	50	19	<p>"Numerous aspects of SRM scenarios fundamentally depend on societal choices about deployment, including whether deployment happens at all (Sugiyama et al., 2018a)."</p> <p>COMMENT</p> <p>As written, this statement is misleading and prejudicial in intent. Substantively the point made is true of any climate simulation, and is discussed positively throughout the rest of the report (See AR6 WG3 Ch.1 pg.21 lines 6-15), so this statement is inconsistent as well.</p>	Noted: the text in this section has been revised to provide a broad overview	Kelly Wanser	SilverLining	United States of America

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
80245	50	19	50	21	<p>"The plausibility of many SRM scenarios is highly contested and not all scenarios are equally plausible because of socio-political considerations (Talberg et al., 2018)."</p> <p>COMMENT As written, this statement is misleading and prejudicial in intent. Substantively the point made is true of any climate simulation, and is discussed positively throughout the rest of the report (See AR6 WG3 Ch.1 pg.21 lines 6-15), so this statement is inconsistent as well. This statement needs to be relativized to CDR, mitigation, etc.</p>	Noted: the text in this section has been revised to provide a broad overview	Kelly Wanser	SilverLining	United States of America
8009	50	21	50	33	<p>There is a paper which does this. Why don't you include it? Tilmes, Simone, Douglas G. MacMartin, Jan T. M. Lenaerts, Leo van Kampenhout, Laura Muntjewerf, Lili Xia, Cheryl S. Harrison, Kristen Krumhardt, Michael J. Mills, Ben Kravitz, and Alan Robock, 2020: Reaching 1.5 and 2.0°C global surface temperature targets using stratospheric aerosol geoengineering in CMIP6. Earth System Dynamics, 11, 579-601, doi:10.5194/esd-11-579-2020.</p>	Noted: the text in this section has been revised to provide a broad overview	Alan Robock	Rutgers University	United States of America
80247	50	21	50	23	<p>"Choice of scenarios should reflect a diverse set of societal values, as depending on the focus of a limited climate model scenario, SRM could look grossly risky or highly beneficial (Pereira et al. forthcoming)."</p> <p>next sentences: "In terms of the Paris 2°C or 1.5°C limits, there are many potential scenarios of SRM deployment. Each scenario will present different levels and distributions of SRM benefits, side effects, and risks."</p> <p>COMMENT The statement of value embedding in scenario design is non-substantive, and raising it in the context of SRM is inconsistent with the framing of the rest of the report, suggesting perjorative intent. In particular, AR6 WG3 Ch.1 Pg. 13 Lines 43-46 establishes the validity of the Paris temperature goals. If the 1.5°C target is legitimate, then the next sentence would suggest that SAI would be a legitimate expression of societal values too. Scenario choices aren't themselves statements of value - societal values can be reflected in analysis of the scenarios.</p> <p>The second statement about scenario diversity is misleading and mischaracterizes the literature. There are substantial numbers of SRM modeling scenarios that limit warming to 1.5, as mentioned earlier in this chapter and in SR1.5 Ch.4, in addition to holding temperature at various arbitrary levels based on ensemble spin-up averages. In all three scenarios (halving warming, limiting to 1.5, holding some arbitrary value), results show a decline in extremes versus unmitigated GHG pathways. Omitting this consistent agreement despite scenario and model variation is substantively misleading. See for example:</p> <p>Pinto, Izidine, et al. "Africa's Climate Response to Solar Radiation Management With Stratospheric Aerosol." Geophysical Research Letters 47.2 (2020): e2019GL086047. https://doi.org/10.1029/2019GL086047</p> <p>Curry, Charles L., et al. "A multimodel examination of climate extremes in an idealized geoengineering experiment." Journal of Geophysical Research: Atmospheres 119.7 (2014): 3900-3923.</p>	Noted: the text in this section has been revised to provide a broad overview	Kelly Wanser	SilverLining	United States of America
19621	50	21	50	21	<p>Please revise as follows: "Development of scenarios (Low and Honegger, 2020) as well as their selection in assessments should reflect a diverse set of societal values, ..."</p> <p>Reason: Not only choice of- but the development of scenarios should be done in a way that reflects for value diversity</p> <p>New reference: Low, S., & Honegger, M. (2020). A Precautionary Assessment of Systemic Projections and Promises From Sunlight Reflection and Carbon Removal Modeling. Risk analysis. https://doi.org/10.1111/risa.13565</p>	Noted: the text in this section has been revised to provide a broad overview	Matthias Honegger	Utrecht University, Perspectives climate research, IASS-Potsdam	Germany
69403	50	21			"The" choice of scenarios...	Noted: the text in this section has been revised to provide a broad overview	Tyler Felgenhauer	Duke University	United States of America
58451	50	23	50	23	Refer to these as the "temperature goal of the Paris Agreement" (encompassing both 1.5 and 2°C).	Noted: the text in this section has been revised to provide a broad overview	Government of United States of America	U.S. Department of State	United States of America
19507	50	23	50	23	"Paris Agreement" would be clearer than "Paris".	Noted: the text in this section has been revised to provide a broad overview	Markku Rummukainen	Lund University	Sweden
19513	50	23	50	24	Looking at just the temperature would seem to be relatively uninformative, as there is more at play than only temperature. It is not clear what the idea being captured here is. Also, Harding et al also note that the poorest part of the world would be negatively impacted, so the present "division of countries" is not representative for the study's findings.	Noted: the text in this section has been revised to provide a broad overview	Markku Rummukainen	Lund University	Sweden
69405	50	23			"targets" rather than limits	Noted: the text in this section has been revised to provide a broad overview	Tyler Felgenhauer	Duke University	United States of America
19511	50	24	50	24	Delete "will" and change "present" to "presents", or suchlike.	Noted: the text in this section has been revised to provide a broad overview	Markku Rummukainen	Lund University	Sweden
58453	50	25	50	25	"the more significant the uncertainty" on what? On the actual decrease in temperatures and/or impacts on other sectors/systems? And/or is this getting at the highly uncertain impacts when SRM is ended?	Noted: the text in this section has been revised to provide a broad overview	Government of United States of America	U.S. Department of State	United States of America

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
80249	50	25	50	27	<p>"The larger the SRM deployment, the more significant the uncertainty. Relying on SRM alone to enable underlying GHG emissions to increase, while holding global average temperature constant, poses very large risks."</p> <p>COMMENT This statement is sloppily written and therefore misleading, and is particularly egregious in obfuscating the counterfactual baseline scenario against which SRM deployments must be analyzed.</p> <p>First, large SRM deployments are only simulated to offset large forcings from GHGs, and demonstrate lower uncertainty, as measured by ensemble spread, than the high-forcing baseline climate. In this sense, SRM decreases uncertainty about realized climate pathways. See: MacMartin, D.G., Kravitz, B. and Rasch, P.J., 2015. On solar geoengineering and climate uncertainty. <i>Geophysical Research Letters</i>, 42(17), pp.7156-7161.</p> <p>Second, the statement about "relying on SRM to enable GHG emissions to increase" imports normative assumptions about SRM deployments that neither reflect the scenarios prevalent in the literature nor correspond to a risk-management framework of allowing for the comparative evaluation of strategies to achieve resilient outcomes despite uncertainty. SRM is most accurately characterized as a policy measure to prevent damaging climate impacts should mitigation ambition or climate sensitivity estimates prove optimistic to avoid overshoot - as the rest of the report definitively claims. Furthermore, the IAM and climate literature consistently show that SRM mitigates these impacts substantially but not completely. This claim is therefore misleading in two senses - SRM is NOT riskier than rising GHG concentrations, and SRM does not ENABLE GHGs to increase, either as a strategic or ethical necessity.</p>	Noted: the text in this section has been revised to provide a broad overview	Kelly Wanser	SilverLining	United States of America
19565	50	25	50	25	<p>Suggest to specify 'larger' as follows: "The greater the SRM-induced cooling (relative to GHG concentration-induced warming), the greater the uncertainties. Larger-scale regional forms of SRM, furthermore, may also come with more significant uncertainties (regarding local changes in weather patterns) than more globally uniform SRM."</p>	Noted: the text in this section has been revised to provide a broad overview	Matthias Honegger	Utrecht University, Perspectives climate research, IASS-Potsdam	Germany
12129	50	25	50	25	<p>Suggest revising this sentence. It is ambiguous. Some clarification about the significance of the uncertainty would be helpful. Does the significance relate to, for example, uncertainty about temperature effects, or potential benefits or risks?</p>	Noted: the text in this section has been revised to provide a broad overview	Paul Rouse	Carnegie Climate Governance Initiative (C2G) - The Carnegie Council for Ethics and International Affairs	United Kingdom (of Great Britain and Northern Ireland)
19509	50	26	50	26	<p>"to enable ... increase" may be too singular. Perhaps, rather "to compensate for lack of mitigation action", or suchlike. Or both flavours.</p>	Noted: the text in this section has been revised to provide a broad overview	Markku Rummukainen	Lund University	Sweden
80251	50	27	50	29	<p>"Indeed the majority of studies have examined scenarios where SAI is deployed to hold average global temperature constant despite high emissions, with a subset simulating the injection of sulphur particles to form a global stratospheric aerosol cloud."</p> <p>COMMENT This characterization of simulations doesn't make sense, because the issue of how SAI is modeled (as a cloud with different injection times and latitudes or as an overall dimming of incoming solar radiation) is different than the issue of what the deployment objectives are (holding average global temperature constant, or regional effects, or something else). It is not a subset. In conjunction with the preceding and following statements, this statement implies that the benefits from SRM are not significant in high emissions scenarios. This is completely wrong as a matter of climate impacts when compared to the unmitigated baseline.</p> <p>Reference for objectives of SAI other than holding temperatures constant: Lee, W. ... Kravitz, B. (2020). Expanding the Design Space of Stratospheric Aerosol Geoengineering to Include Precipitation-Based Objectives and Explore Trade-offs. In <i>Management of the Earth system: engineering responses to climate change</i>. https://doi.org/10.5194/esd-2020-58</p>	Noted: the text in this section has been revised to provide a broad overview	Kelly Wanser	SilverLining	United States of America

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
19567	50	27	50	33	<p>Please rephrase: "In an initial phase, many modeling studies examined scenarios where SAI is deployed to hold average global temperature constant while net-emissions remain above-zero and find large risks from the resulting climate change and forced increase in SRM volumes. More recently modeling studies have examined the effects of scenarios in which warming was only partly counteracted (e.g. holding it at 1.5°C above pre-industrial) while net-emissions gradually lowered toward zero (e.g. on a 2 or 3°C pathway) finding significant reduction in change across key climate variables and across world regions compared to the counterfactual warming scenario (without SRM) of 2-3°C (Irvine et al., 2019; MacMartin et al., 2018; Jones et al., 2018, Pretis et al., 2018, Keith and McMartin, 2015)."</p> <p>Reason: This sentence is problematic for several reasons; it oddly addresses two unrelated (irrelevant) issues and (along with the following sentence) ignores new publications and findings.</p> <p>New references: Irvine, P., Emanuel, K., He, J., Horowitz, L. W., Vecchi, G., & Keith, D. (2019). Halving warming with idealized solar geoengineering moderates key climate hazards. <i>Nature Climate Change</i>, 9(4), 295-299. Jones, A., Hawcroft, M., Haywood, J., Jones, A., Guo, X., Moore, J. (2018). Regional climate impacts of stabilizing global warming at 1.5 K using solar geoengineering. <i>Earth's Future</i>, 6, 2, 230-251. Pretis, F., Schwarz, M., Tang, K., Hausteine, K. & Allen, M. (2018). Uncertain impacts on economic growth when stabilizing global temperatures at 1.5°C or 2°C warming. <i>Philosophical Transactions of the Royal Society A</i>, 376, 1-31.</p>	Noted: the text in this section has been revised to provide a broad overview	Matthias Honegger	Utrecht University, Perspectives climate research, IASS-Potsdam	Germany
12127	50	27	50	29	It would be useful to have a reference included to demonstrate the claim that the majority of SRM studies have examined high emissions temperature stabilisation scenarios.	Noted: the text in this section has been revised to provide a broad overview	Paul Rouse	Carnegie Climate Governance Initiative (C2G) - The Carnegie Council for Ethics and International Affairs	United Kingdom (of Great Britain and Northern Ireland)
58455	50	29	50	33	This sentence is confusing as it appears to say that the risks from SRM are small relative to the anticipated benefits. There are immense risks of impacts on human and natural systems, as well as termination effects. Moreover, the introductory paragraph in this table states that SRM cannot be a main policy response. The later paragraphs even state that recent studies raise concerns about distribution of SRM impacts across countries and vulnerable groups.	Noted: the text in this section has been revised to provide a broad overview	Government of United States of America	U.S. Department of State	United States of America
80253	50	29	50	33	<p>"Only a few studies have examined the use of SAI to reduce global average warming alongside ambitious conventional mitigation, such as to achieve a temperature target 1.5°C in the context of emissions scenarios that would otherwise constrain warming to below 2°C, finding the risks from SRM to be small in relation to the anticipated benefits (MacMartin, Ricke, and Keith 2018; Keith and MacMartin 2015)."</p> <p>COMMENT This statement mischaracterizes the literature. There are substantial numbers of SRM modeling scenarios that limit warming to 1.5, as mentioned in SR1.5 Ch.4, in addition to holding temperature at various arbitrary levels based on ensemble spin-up averages. Despite these differences, (halving warming, limiting to 1.5, holding some arbitrary value, across multiple mitigation baselines), results show a decline in climate impacts versus GHG pathways without SRM. Omitting this consistent agreement despite scenario and model variation, to focus only on the comparative risk/benefits of SRM in an unjustifiably narrow scenario space is substantively misleading and policy-perscriptive.</p> <p>See for example: Pinto, Izidine, et al. "Africa's Climate Response to Solar Radiation Management With Stratospheric Aerosol." <i>Geophysical Research Letters</i> 47.2 (2020): e2019GL086047. https://doi.org/10.1029/2019GL086047 Curry, Charles L., et al. "A multimodel examination of climate extremes in an idealized geoengineering experiment." <i>Journal of Geophysical Research: Atmospheres</i> 119.7 (2014): 3900-3923. Ji, Duoying, et al. "Extreme temperature and precipitation response to solar dimming and stratospheric aerosol geoengineering." <i>Atmospheric Chemistry and Physics (Online)</i> 18.PNNL-SA-132309 (2018). Tilmes, S. ... Robock, A. (2020). Reaching 1.5 and 2.0 °C global surface temperature targets using stratospheric aerosol geoengineering. <i>Earth System Dynamics</i>, 11(3), 579–601. https://doi.org/10.5194/esd-11-579-2020</p>	Noted: the text in this section has been revised to provide a broad overview	Kelly Wanser	SilverLining	United States of America
12179	50	30	50	33	Given that the most likely future scenario for SAI is its use in conjunction with mitigation to achieve temperature targets, the dearth of studies that examine this scenario noted here is important. Suggest a comment be added noting that further modelling research on such scenarios would be valuable to help inform understandings of potential SAI risks and benefits within the context of the most probable deployment scenarios.	Noted: the text in this section has been revised to provide a broad overview	Paul Rouse	Carnegie Climate Governance Initiative (C2G) - The Carnegie Council for Ethics and International Affairs	United Kingdom (of Great Britain and Northern Ireland)
58457	50	31	50	31	Replace "temperature target" with "temperature goal"	Noted: the text in this section has been revised to provide a broad overview	Government of United States of America	U.S. Department of State	United States of America
69407	50	31			1.5C temperature target rather than temperature target 1.5C	Noted: the text in this section has been revised to provide a broad overview	Tyler Felgenhauer	Duke University	United States of America

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
8011	50	34	50	34	Table CWGB SRM.1, SAI description box: There are also proposals to inject particles directly and not gases, such as sulfate aerosols, calcite, and other chemicals.	Noted: the text in this section has been revised to provide a broad overview	Alan Robock	Rutgers University	United States of America
8013	50	34	50	34	Table CWGB SRM.1, SAI scale box: Can also be regional if deployed at high latitudes.	Noted: the text in this section has been revised to provide a broad overview	Alan Robock	Rutgers University	United States of America
8015	50	34	50	34	Table CWGB SRM.1, MCB termination risks: Absolutely wrong. If MCB was done for a while and was successful, producing a cooler climate, it would have the same termination risks as SAI, but the warming would take place even faster, as the forcing would go away faster.	Noted: the text in this section has been revised to provide a broad overview	Alan Robock	Rutgers University	United States of America
8017	50	34	50	34	Table CWGB SRM.1, SAI impacts boxes: You are missing a number of potential impacts. See Table 2 in Robock, Alan, 2020: Benefits and risks of stratospheric solar radiation management for climate intervention (geoengineering). The Bridge, 50, 59-67. http://climate.envsci.rutgers.edu/pdf/RobockBridge.pdf	Noted: the text in this section has been revised to provide a broad overview	Alan Robock	Rutgers University	United States of America
11179	50	34	50	34	Column 2, Row 3 (SAI, Scale): regional and local deployments of SAI are also studied. See e.g., D.N. Bernstein, J.D. Neelin & D. Chen, Could Aerosol Emissions Be Used for Regional Heat Wave Mitigation, 13 Atmospheric Chemistry & Physics 6373, 6388–89 (2013)	Noted: the text in this section has been revised to provide a broad overview	Charles Corbett	University of California, Los Angeles School of Law	United States of America
11185	50	34	50	34	Column 3, row 3 (MCB, Scale) I'm not sure what the authors' technical distinction between "regional" and "global" is, but I have only seen examination of MCB as a regional technique (albeit sometimes over very large regions). See, e.g., Eli Kintisch, "Technologies," chapter in Climate Engineering and the Law (Gerrard and Hester, eds. 2018) pp.33-37.	Noted: the text in this section has been revised to provide a broad overview	Charles Corbett	University of California, Los Angeles School of Law	United States of America
9481	50	34	50	34	[previously submitted with WG2 SOD] SAI could use liquid or solid aerosols. The third row would be better called "Possible climate effects other than reduced warming." SAI's "Changes in rainfall patterns" is too ambiguous and unhelpful, as SAI of moderate intensity is expected to mostly reduce precipitation anomalies as well as potentially also precipitation changes and extreme hot and cold events. It also appears able to slow sea level rise. Cessation of SRM would need to be sudden "and sustained", and of a substantially strong SRM magnitude, to result in "termination shock." It is unclear why MCB poses less risk of termination shock than SAI. Trisos et al 2020 (which the text cites further below at p. 77 line 54, in the context of potential termination, conclude, in their abstract, that "Compared to a moderate climate change scenario (RCP4.5), rapid geoengineering implementation reduces temperature velocities towards zero in terrestrial biodiversity hotspots." But the only reference to biodiversity in the box is that GBAM would have "side effects on biodiversity."	Noted: the text in this section has been revised to provide a broad overview	Jesse Reynolds	University of California, Los Angeles	Netherlands
9483	50	34	50	34	[previously submitted with WG2 SOD] Trisos et al 2020 (which the text cites further below at p. 77 line 54, in the context of potential termination), conclude, in their abstract, that "Compared to a moderate climate change scenario (RCP4.5), rapid geoengineering implementation reduces temperature velocities towards zero in terrestrial biodiversity hotspots." But the only reference to biodiversity in the box is that GBAM would have "side effects on biodiversity."	Noted: the text in this section has been revised to provide a broad overview	Jesse Reynolds	University of California, Los Angeles	Netherlands
80255	50	34	50	34	Table CWGB SRM.1: "Termination effects". Comment: SAI: Termination effects are not immediate as aerosols persist in the stratosphere for a year or more and recede gradually. This would provide a period of time for addressing a disruption of aerosol delivery. MCB: termination effects are not negligible if MCB is performed at the scale of changing regional or global climate, and would occur much more rapidly (on the order of a few days).	Noted: the text in this section has been revised to provide a broad overview	Kelly Wanser	SilverLining	United States of America
12131	50	34	50	34	Change 'injection of gas' to 'injection of particles'.	Noted: the text in this section has been revised to provide a broad overview	Paul Rouse	Carnegie Climate Governance Initiative (C2G) - The Carnegie Council for Ethics and International Affairs	United Kingdom (of Great Britain and Northern Ireland)

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
22665	50				<p>§ 14.5.1, Cross-Working Group Box SRM: A functional assessment of SRM should weigh the limitations and risks of SRM against its potential effects on reducing climate impacts. As SRM risks, limitations, and uncertainties are well accounted for in the cross-working group box, the state of knowledge on SRM's potential to reduce climate change, impacts, and risks are not as developed.</p> <p>Without including SRM in the baseline scenarios, which would be premature at this stage, the report should indicate to policymakers the elements allowing a comparison between the risks and effects of a climate with SRM, against the risks and effects of a climate with the same greenhouse gas emissions trajectory but without SRM. This will better correspond to the real alternative that policymakers are faced with.</p> <p>In particular, different models indicate that a limited dose of SRM would reduce extreme temperatures, extreme precipitation and tropical cyclones across all regions of the world. (see Irvine, Peter, Kerry Emanuel, Jie He and al. "Halving Warming with Idealized Solar Geoengineering Moderates Key Climate Hazards." Nature Climate Change 9 (2019): 295–99. https://doi.org/10.1038/s41558; Irvine, Peter J., and David W. Keith. "Halving Warming with Stratospheric Aerosol Geoengineering Moderates Policy-Relevant Climate Hazards." Environmental Research Letters 15, no. 4 (2020): 044011. https://doi.org/10.1088/1748-9326/ab76de)</p> <p>Similarly, when risks to human health or economies from SRM are considered, so should be its benefits and costs, building on research examining SRM's expected net economic impacts, which are sometimes found positive when compared to a world of climate change. (see Rickels, Wilfried, Martin Quaas, Kate Ricke, Johannes Quaas, Juan Moreno-Cruz, and Sjak Smulders. "Who Turns the Global Thermostat and by How Much?" Energy Economics, August 14, 2020, 104852. https://doi.org/10.1016/j.eneco.2020.104852; Harding, Anthony R., Katharine Ricke, Daniel Heyen, Douglas G. MacMartin, and Juan Moreno-Cruz. "Climate Econometric Models Indicate Solar Geoengineering Would Reduce Inter-Country Income Inequality." Nature Communications 11, no. 1 (January 13, 2020): 1–9. https://doi.org/10.1038/s41467-019-13957-x; Helweggen, K. G., C. E. Wieners, J. E. Frank, and H. A. Dijkstra. "Complementing CO2 Emission Reduction by Solar Radiation Management Might Strongly Enhance Future Welfare." Earth Syst. Dynam. 10, no. 3 (2019): 453–72. https://doi.org/10.5194/esd-10-453-2019.)</p> <p>Allowing for a better understanding and a balancing of these different dimensions and trade-offs will better support the decisions policymakers face.</p>	Noted: the text in this section has been revised to provide a broad overview	Government of France	Ministère de la Transition écologique et solidaire	France
69409	50				<p>Table CWGB SRM.1 -- Row 1 needs to have parallel grammar, i.e., choose: "inject," "injection of," or "injecting" in cell one and keep the style across the row.</p> <p>Also, last row, sell on urban roof whitening -- this is not consistent with the other cells in the row. The termination effects of urban roof whitening are negligible. This is separate from whether or not we'd be able to paint them black again.</p>	Noted: the text in this section has been revised to provide a broad overview	Tyler Felgenhauer	Duke University	United States of America
11181	51	1	51	1	Column 2, Rows 4 & 5 (SAI, climate impacts & human/natural impacts): please see comments 2 and 9 above.	Noted: the text in this section has been revised to provide a broad overview	Charles Corbett	University of California, Los Angeles School of Law	United States of America
11183	51	1	51	1	Column 2, Row 5 (SAI, Termination effects). The significance of warming observed after cessation of SRM activities would depend on the amount of aerosols used, the duration of maintenance, and carbon removal / mitigation efforts by humans during the meanwhile. Andy Parker & Peter J. Irvine, The Risk of Termination Shock from Solar Geoengineering, Earth's Future (2018) 6: 456-467. One way to rephrase this could be: "Sudden termination could result in rapid warming in non-ideal deployment scenarios."	Noted: the text in this section has been revised to provide a broad overview	Charles Corbett	University of California, Los Angeles School of Law	United States of America
11187	51	1	51	1	Column 5, rows 4 - 6 (GBAM): this category covers a range of disparate albedo modification techniques, so it is very hard to generalize about their impacts as a group. I would add that centralized, rapid changes in land use patterns can produce political and social conflict and potentially also pose risks to ecosystems. See IPCC, Climate Change and Land: Summary for Policymakers (2019)	Noted: the text in this section has been revised to provide a broad overview	Charles Corbett	University of California, Los Angeles School of Law	United States of America
11177	51	3	51	3	I would add "SRM potential benefits and risks to..." in the sub-section title because the following passage discusses both in detail.	Noted: the text in this section has been revised to provide a broad overview	Charles Corbett	University of California, Los Angeles School of Law	United States of America

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
80257	51	3	51	3	<p>“SRM risks to human and natural systems” (line 3)</p> <p>COMMENT</p> <p>“Risks” is a negative framing and isn’t conclusive (see line 8: “There is low confidence in projected impacts of SRM on crop yields” and line 21 “Few studies have examined risk to human health or economies from SAI”). Thus, we suggest replacing “risks” with “effects on” or “impacts.”</p> <p>Justification: At a global level, preliminary studies and natural experiments indicate that constraining surface temperatures by reflecting sunlight is likely to yield many of the benefits associated with reducing greenhouse gases to mitigate global warming. These include benefits to specific systems, such as agriculture, the Arctic, and regional drought frequency, that have not been fully studied. However, climate intervention is not a substitute for large-scale greenhouse gas reduction and removal.</p> <p>Examples of such studies:</p> <ul style="list-style-type: none"> • Robock, A. ... Tilmes, S. (2020, December). Global Agricultural Impacts of Stratospheric Aerosol Intervention With An Overshoot Scenario. In AGU Fall Meeting 2020. AGU. • Chen, Y., Liu, A., & Moore, J. C. (2020). Mitigation of Arctic permafrost carbon loss through stratospheric aerosol geoengineering. Nature Communications, 11(1), 2430. https://doi.org/10.1038/s41467-020-16357-8 • Odoulami, R. C. ... Tilmes, S. (2020). Stratospheric Aerosol Geoengineering could lower future risk of “Day Zero” level droughts in Cape Town. Environmental Research Letters, 15(12), 124007. https://doi.org/10.1088/1748-9326/abbf13 	Noted: the text in this section has been revised to provide a broad overview	Kelly Wanser	SilverLining	United States of America
12143	51	3	53	10	<p>The sections on risks and ethics only address potential negative consequences of SRM. This presents an unbalanced assessment of SRM. To balance the potential risks, the text should also address the potential benefits of SRM. Specifically, if SRM were used successfully, it would be the only known method for quickly stopping the rise in global temperatures. This could have very large benefits to earth systems, biodiversity, the delivery of the SDGs etc. There is a substantive ethical risk that decisions are not taken in the context of the potential benefits of SRM – the balancing argument would be that not pursuing SRM research may mean humanity loses an opportunity to avoid intergenerational, interspecies and ecosystems harm. For a summary of potentially benefits see KEITH, D. W. 2013. A Case for Climate Engineering, Cambridge, USA, MIT Pres s.</p>	Noted: the text in this section has been revised to provide a broad overview	Paul Rouse	Carnegie Climate Governance Initiative (C2G) - The Carnegie Council for Ethics and International Affairs	United Kingdom (of Great Britain and Northern Ireland)
81425	51	4	52	31	<p>This is a crucial section on SRM which will receive high attention from policy makers and the public in general. What I see problematic is that general positive effects of a cooler climate due to SRM are mixed with direct positive and negative effects of SRM. The distinction between these levels could be clearer.</p>	Noted: the text in this section has been revised to provide a broad overview	Hans Poertner	Alfred-Wegener-Institute	Germany
80259	51	4	51	6	<p>“Since AR5, hundreds of studies have explored the effects of SRM on the climate (Kravitz et al., 2015; Tilmes et al., 2018) and large uncertainties exist for climate processes associated with SRM options (WGI ARSChapter 4).”</p> <p>COMMENT</p> <p>Uncertainties in SRM-related processes are common to processes related to climate sensitivity more generally. SRM-related processes are not unique, unusual, or uncommon - instead, they are simply “normal” climate processes that have been identified as targets for manipulation. Limitations in current understanding of these climate processes in the context of SRM should not be distinguished or assessed differently than they are assessed in the context of human influences on the climate system more broadly.</p> <p>Proposed edit: There are large uncertainties in understanding of SRM-related climate processes, such as aerosol microphysics and aerosol-cloud-radiation interaction, though it should be noted these processes uncertainties affect all climate change projections, not just those involving SRM. Aerosol radiative forcing uncertainty remains as the largest contributor to the overall ERF uncertainty since 1750 (WG1 Ch.2, pg.25, lines 35-36, WG1 Ch.7, 8)”.</p>	Noted: the text in this section has been revised to provide a broad overview	Kelly Wanser	SilverLining	United States of America
12145	51	4	51	7	<p>Suggest adding more recent literature on studies that have explored the effects of SRM. I suggest Kravitz (2020). A review that finds consistency of findings over the past 20 years of study, suggesting that the modelling is reliable (... reliably trustworthy, or not). KRAVITZ, B. M., DOUGLAS G. 2020. Uncertainty and the basis for confidence in solar geoengineering research. Nature Reviews Earth & Environment, 1, 64-75.</p>	Noted: the text in this section has been revised to provide a broad overview	Paul Rouse	Carnegie Climate Governance Initiative (C2G) - The Carnegie Council for Ethics and International Affairs	United Kingdom (of Great Britain and Northern Ireland)
80261	51	6	51	7	<p>“Many fewer studies have examined potential impacts of SRM for people, ecosystems, or impact-relevant climate indices (Curry et al., 2014; Irvine et al., 2017).”</p> <p>COMMENT</p> <p>As discussed in the rest of the report, these statements are equally true of CDR methods. This statement should be relativized to ensure consistency with the calibrated language for evidence.</p>	Noted: the text in this section has been revised to provide a broad overview	Kelly Wanser	SilverLining	United States of America

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
19895	51	7	51	7	Please add: "...or on a broad set of social objectives such as the Sustainable Development Goals (Honegger et al. 2021) New reference: Honegger, M., Michaelowa, A., and Pan, J. (2021, under review). Potential implications of Solar Radiation Modification for achievement of the Sustainable Development Goals", Mitigation and Adaptation Strategies to Global Change.	Noted: the text in this section has been revised to provide a broad overview	Axel Michaelowa	University of Zurich	Switzerland
8019	51	8	51	9	First of all, change "does not" to "would not." SRM does not exist yet, if ever. Second, there are feedbacks involving the carbon cycle which do affect CO2 in response to SRM. Caldeira and Bala have published papers on this.	Noted: the text in this section has been revised to provide a broad overview	Alan Robock	Rutgers University	United States of America
8023	51	8	51	20	You could also include this reference: Singh, Jyoti, Sandeep Sahany, and Alan Robock, 2020: Can stratospheric geoengineering alleviate global-warming-induced changes in deciduous fruit cultivation? The case of Himachal Pradesh (India). Climatic Change, 162, 1323-1343, doi:10.1007/s10584-020-02786-3.	Noted: the text in this section has been revised to provide a broad overview	Alan Robock	Rutgers University	United States of America
80263	51	8	51	8	"There is low confidence in projected impacts of SRM on crop yields." COMMENT This statement should be calibrated to the language used to assess the sufficiency of global crop projections under future climate pathways in the rest of AR6. This is particularly important because of the high agreement between studies investigating SRM and global crop productivity that yields increase relative to a baseline of insufficiently mitigated warming.	Noted: the text in this section has been revised to provide a broad overview	Kelly Wanser	SilverLining	United States of America
80265	51	11	51	13	"Models suggest SAI cooling would reduce crop productivity at higher latitudes, but benefit crop productivity in lower latitudes by reducing heat stress (Pongratz et al., 2012; Xia et al., 2014; Zhan et al., 2019)." COMMENT These results are relative to unmitigated warming - high latitude yields are a side effect of a significantly warmer world. To enable a risk-management framework for policymaking, greater care must be taken to clearly specify the counterfactual.	Noted: the text in this section has been revised to provide a broad overview	Kelly Wanser	SilverLining	United States of America
9429	51	13	51	15	[previously submitted with WG2 SOD] A more recent paper from Yang et al shows that SRM would bring groundnut crop failure rates closer to the preindustrial areas. Specifically, climate change would reduce failure rates in 3 of 4 areas (and in India overall) and increase them in 1 of the 4; SRM would increase and decrease these rates, respectively. Yang, Huiyi, Steven Dobbie, Julian Ramirez-Villegas, Bing Chen, Shaojun Qiu, Sat Ghosh, and Andy Challinor. "South India Projected to Be Susceptible to High Future Groundnut Failure Rates for Future Climate Change and Geo-Engineered Scenarios." Science of The Total Environment 747 (December 10, 2020): 141240. https://doi.org/10.1016/j.scitotenv.2020.141240 .	Noted: the text in this section has been revised to provide a broad overview	Jesse Reynolds	University of California, Los Angeles	Netherlands
80267	51	13	51	15	"Crop productivity is also projected to be reduced where SAI reduces rainfall, including scenarios indicating a drier Asian summer monsoon reducing groundnut yields, but these reductions due to water stress might be moderated by CO2 fertilization effects (Xia et al., 2014; Yang et al., 2016)." COMMENT See also: Simpson, I. R. ... Pendergrass, A. G. (2019). The Regional Hydroclimate Response to Stratospheric Sulfate Geoengineering and the Role of Stratospheric Heating. Journal of Geophysical Research, D: Atmospheres, 124(23), 12587–12616. https://doi.org/10.1029/2019JD031093 ... "Notable features of the late 21st century hydroclimate response, relative to present day, include a reduction in precipitation in the Indian summer monsoon, over much of Africa, Amazonia and southern Chile and a wintertime precipitation over the Mediterranean. over most of these regions, the soil desiccation that occurs with global warming is, however, largely offset by the geoengineering. A notable exception is India, where soil desiccation and an approximate doubling of the likelihood of monsoon failures occurs. ... Stratospheric heating is found to play a key role in many aspects of projected hydroclimate change, resulting in a general wet-get-drier, dry-get-wetter pattern in the tropics and extratropical precipitation changes through midlatitude circulation shifts. While a rather extreme geoengineering scenario has been considered, many but not all of the precipitation features scale linearly with the offset global warming." And: Irvine, P. ... Keith, D. (2019). Halving warming with idealized solar geoengineering moderates key climate hazards. Nature Climate Change, 9(4), 295–299. https://doi.org/10.1038/s41558-019-0398-8 ... "for both extreme precipitation and water availability, less than 0.4% of the ice-free land surface sees exacerbation. Thus, while concerns about the inequality of solar geoengineering impacts are appropriate, the quantitative extent of inequality may be overstated."	Noted: the text in this section has been revised to provide a broad overview	Kelly Wanser	SilverLining	United States of America

Comment Id	From Page	From Line To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country	
80269	51	16	51	18	<p>"SAI will increase the fraction of diffuse sunlight, which is projected to increase photosynthesis, but will reduce total available sunlight, which tends to reduce photosynthesis, with the result that any benefits to crops from avoided heat stress may be offset by reduced photosynthesis (Proctor et al., 2018)."</p> <p>COMMENT These results from one paper do not resolve the many uncertainties associated with these effects across the broad array of crops world-wide. This should be expressed as an area of possible offset, and a great deal of uncertainty requiring research. Additional relevant citations should be included, that address considerations including varying impacts depending on plant heights, e.g. ground-level or canopy level:</p> <p>In SAI, sunlight intensity at the surface is likely to be reduced and diffused due to scattering by aerosols. However, more diffuse sunlight arriving from different directions could illuminate plant canopies more fully, increasing photosynthesis, with possible impacts on ecosystems and agriculture. Each of these effects increases with the level of SAI activity. Madronich, S. ... Richter, J. H. (2018). Response of Surface Ultraviolet and Visible Radiation to Stratospheric SO₂ injections. <i>Atmosphere</i>, 9(11), 432. https://doi.org/10.3390/atmos9110432</p> <p>Parkes, B., Challinor, A., & Nicklin, K. (2015). Crop failure rates in a geoengineered climate: impact of climate change and marine cloud brightening. <i>Environmental Research Letters</i>, 10(8), 084003. https://doi.org/10.1088/1748-9326/10/8/084003</p> <p>Yang, H. ... Challinor, A. (2020). South India projected to be susceptible to high future groundnut failure rates for future climate change and geo-engineered scenarios. <i>The Science of the Total Environment</i>, 747, 141240. https://doi.org/10.1016/j.scitotenv.2020.141240</p> <p>Smith, C. J. ... Forster, P. M. (2017). Impacts of Stratospheric Sulfate Geoengineering on Global Solar Photovoltaic and Concentrating Solar Power Resource. <i>Journal of Applied Meteorology and Climatology</i>, 56(5), 1483–1497. https://doi.org/10.1175/JAMC-D-16-0298.1</p>	Noted: the text in this section has been revised to provide a broad overview	Kelly Wanser	SilverLining	United States of America
9431	51	18	51	20	<p>[previously submitted with WG2 SOD] Why is Parkes et al 2015, which "suggests MCB may reduce crop failure rates compared to climate change from a doubling of CO₂ pre-industrial concentrations described as a "single study"? Other single citations are not.</p>	Noted: the text in this section has been revised to provide a broad overview	Jesse Reynolds	University of California, Los Angeles	Netherlands
9433	51	21	51	21	<p>[previously submitted with WG2 SOD] This sentence implies that only risks to human health or economies from SAI should be considered here. Both benefits and costs should be considered. Many papers have looked at SRM's expected net economic impacts, which are almost always positive when compared to a world of climate change. Some examples: Rickels, Wilfried, Martin Quaas, Kate Ricke, Johannes Quaas, Juan Moreno-Cruz, and Sjak Smulders. "Who Turns the Global Thermostat and by How Much?" <i>Energy Economics</i>, August 14, 2020, 104852. https://doi.org/10.1016/j.eneco.2020.104852. Harding, Anthony R., Katharine Ricke, Daniel Heyen, Douglas G. MacMartin, and Juan Moreno-Cruz. "Climate Econometric Models Indicate Solar Geoengineering Would Reduce Inter-Country Income Inequality." <i>Nature Communications</i> 11, no. 1 (January 13, 2020): 1–9. https://doi.org/10.1038/s41467-019-13957-x. Helweggen, K. G., C. E. Wieners, J. E. Frank, and H. A. Dijkstra. "Complementing CO₂ Emission Reduction by Solar Radiation Management Might Strongly Enhance Future Welfare." <i>Earth Syst. Dynam.</i> 10, no. 3 (2019): 453–72. https://doi.org/10.5194/esd-10-453-2019. Heutel, Garth, Juan Moreno-Cruz, and Soheil Shayegh. "Solar Geoengineering, Uncertainty, and the Price of Carbon." <i>Journal of Environmental Economics and Management</i> 87 (2018): 24–41. https://doi.org/10.1016/j.jeem.2017.11.002.</p>	Noted: the text in this section has been revised to provide a broad overview	Jesse Reynolds	University of California, Los Angeles	Netherlands
80271	51	21	51	22	<p>"Use of sulphur aerosols for SAI would degrade the ozone layer, with changes in mortality from skin cancer due to UV-B exposure projected to be relatively small (Eastham et al., 2018)."</p> <p>COMMENT The effect of SAI on ozone is ambiguous, and therefore the statement is inaccurate. Furthermore, the impact on human health (which is the real subject of this statement) is obscured by the choice of conjunction ("with"). "However" would be a less misleading choice.</p>	Noted: the text in this section has been revised to provide a broad overview	Kelly Wanser	SilverLining	United States of America
19619	51	21	52	2	<p>Please revise the last sentence as follows: "The overall effects of various forms of SAI under various scenarios on human health and economies are currently very uncertain and depend among other factors strongly on mitigation efforts. "</p> <p>Reason: The current wording seems to be an inappropriate conclusion if the preceding findings highlighted that SAI may have the potential to significantly reduce climate-induced health, economic and social pressures.</p>	Noted: the text in this section has been revised to provide a broad overview	Matthias Honegger	Utrecht University, Perspectives climate research, IASS-Potsdam	Germany
12147	51	21	51	21	<p>Change 'Few studies have examined risk to human health or economies from SAI' to Few studies have examined risks or benefits to human health or economies from SAI' .</p>	Noted: the text in this section has been revised to provide a broad overview	Paul Rouse	Carnegie Climate Governance Initiative (C2G) - The Carnegie Council for Ethics and International Affairs	United Kingdom (of Great Britain and Northern Ireland)
12149	51	21	51	23	<p>Amend to note that other potential particles are not expected to degrade ozone. KEITH, D. W. W., DEBRA K.: DYKEMA, JOHN A.: KEUTSCH, FRANK N. 2016. Stratospheric solar geoengineering without ozone loss. <i>Proceedings of the National Academy of Sciences</i>, 113, 14910-14914.</p>	Noted: the text in this section has been revised to provide a broad overview	Paul Rouse	Carnegie Climate Governance Initiative (C2G) - The Carnegie Council for Ethics and International Affairs	United Kingdom (of Great Britain and Northern Ireland)

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
75055	51	21	52	2	<p>This is an important paragraph and an important point regarding the influence of SRM on development. The reference Harding et al. (2020) is definitely an important contribution regarding this question; however the paper is based on rather extreme assumptions as it uses the impact function of Burke et al. (2015) (i.e. strong influence of climate change on growth) and assumes as BAU scenario RCP85 which is then fully offset by SRM; i.e. neglecting that there are climate change winners. In general, once relatively poor and warm countries start developing, we may expect a shift from agriculture to manufacturing and the service sectors and hence reduced vulnerability to weather and climate change. At the same time, development increases adaptive capacity (Yohe and Tol, 2002; Adger, 2006).</p> <p>In turn, efficient SRM levels would decrease. On the other hand, if we allowed climate change to affect economic growth we cannot rule out a scenario in which hot countries grow at a slower rate (e.g., Moyer et al., 2014; Dietz and Stern, 2015; Moore and Diaz, 2015) and might even be trapped in poverty (Tol, 2018). In turn, efficient SRM levels would increase. These aspects and the implications of the growth convergence assumptions in the SSPs and their effect on optimal SRM deployment are discussed in Rickels et al (2020). They show that global mean (area) temperature is a poor indicator and GDP weighted temperature is increasing much stronger (due to the growth convergence assumption), increasing therefore the efficient level of SRM.</p> <p>Adger, W.N., 2006. Vulnerability. <i>Glob. Environ. Chang.</i> 16 (3), 268–281.</p> <p>Dietz, S., Stern, N., 2015. Endogenous growth, convexity of damage and climate risk: how Nordhaus' framework supports deep cuts in carbon emissions. <i>Econ. J.</i> 125 (583), 574–620.</p> <p>Moore, F.C., Diaz, D.B., 2015. Temperature impacts on economic growth warrant stringent mitigation policy. <i>Nat. Clim. Chang.</i> 5, 127–131.</p> <p>Moyer, E.J., Woolley, M.D., Matteson, N.J., Glotter, M.J., Weisbach, D.A., 2014. Climate impacts</p>	Noted: the text in this section has been revised to provide a broad overview	Wilfried Rickels	Kiel Institute for the World Economy	Germany
9435	51	22	51	23	<p>[previously submitted with WG2 SOD] Evidence indicates that SAI would not degrade the ozone layer, but only slow its recovery.</p> <p>When considering SAI's potential effects on stratospheric ozone, the potential of substances other than sulfur (such as calcium carbonate) to not reduce or even restore stratospheric ozone should also be mentioned (Keith et al 2016; but see Dai et al 2020)</p> <p>Dai, Zhen, Debra K. Weisenstein, Frank N. Keutsch, and David W. Keith. "Experimental Reaction Rates Constrain Estimates of Ozone Response to Calcium Carbonate Geoengineering." <i>Communications Earth & Environment</i> 1, no. 1 (December 15, 2020): 1–9. https://doi.org/10.1038/s43247-020-00058-7.</p> <p>Keith, David W., Debra K. Weisenstein, John A. Dykema, and Frank N. Keutsch. "Stratospheric Solar Geoengineering Without Ozone Loss." <i>Proceedings of the National Academy of Sciences</i> 113, no. 52 (December 12, 2016): 14910–14. https://doi.org/10.1073/pnas.1615572113.</p>	Noted: the text in this section has been revised to provide a broad overview	Jesse Reynolds	University of California, Los Angeles	Netherlands
8025	51	23	51	23	<p>What does "relatively small" mean? Relative to what? Why don't you actually say how many additional people would die?</p>	Noted: the text in this section has been revised to provide a broad overview	Alan Robock	Rutgers University	United States of America
9437	51	25	51	26	<p>[previously submitted with WG2 SOD] The modal verb "would" seems too strong. Models suggest this, and it seems likely, but whether SAI "would" would significantly do so depend on, for example, its magnitude.</p>	Noted: the text in this section has been revised to provide a broad overview	Jesse Reynolds	University of California, Los Angeles	Netherlands
80273	51	25	51	26	<p>"However, SAI would also shift climate suitability for infectious diseases (Carlson and Trisos, 2018)."</p> <p>COMMENT A single study is insufficient to support a statement in an entire category of impacts, particularly without reference to how this disease burden would shift under probable warming pathways.</p>	Noted: the text in this section has been revised to provide a broad overview	Kelly Wanser	SilverLining	United States of America
9439	51	26	51	28	<p>[previously submitted with WG2 SOD] Carlson et al., 2020 is a commentary that has not yet been peer reviewed and should be relied upon with some caution. It reports that climate change would decrease malaria transmission suitability (and that SRM could nullify this effect), which is contrary to much of the literature. It only considers the tropics, yet the greatest increase in malaria transmission suitability under climate change is expected in the mid-latitudes. Furthermore, the sentence here uses the neutral "suitability" when speaking of reduction and the negative "risk" to "hundreds of millions of people" when speaking of increases.</p>	Noted: the text in this section has been revised to provide a broad overview	Jesse Reynolds	University of California, Los Angeles	Netherlands
80275	51	26	52	2	<p>"SAI deployment could reduce transmission suitability for malaria in highland East Africa, but exacerbate transmission risk for hundreds of millions of people in West Africa and south Asia (Carlson et al., 2020)."</p> <p>COMMENT These results are not keeping the null hypothesis straight. It will exacerbate that risk versus RCP8.5 by keeping the temperatures within today's range, whereas in 8.5 it gets so hot that mosquitoes all die out (along with the humans!) at 32+ degrees. As written, this statement is an irresponsible representation of the evidence, and does not support the following sentence about the distributional impacts across vulnerable groups.</p>	Noted: the text in this section has been revised to provide a broad overview	Kelly Wanser	SilverLining	United States of America

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
9441	51	28	52	2	[previously submitted with WG2 SOD] This paragraph cites one scientific paper that shows that increases in UV-B exposure could be relatively small, a scientific paper that shows that economic inequality could be decreased, a "comment" that states that suitability for infections would shift, and a scientific paper that shows that paper that shows that the risk of malaria transmission could shift. Roughly, this is three neutral outcomes and one positive one. They do not "raise serious concerns about the distribution of SRM impacts across countries and vulnerable groups." There "are" reasons to be concerned about the distributions of SRM's potential benefits and harms, and decision-makers should be especially vigilant regarding potential harms to already vulnerable groups. At the same time, there is not clear evidence that vulnerable groups would disproportionately experience potential harms, as this sentence currently implies. In fact, because vulnerable groups live disproportionately at low latitudes, they are expected to disproportionately experience benefits. See Harding, Anthony R., Katharine Ricke, Daniel Heyen, Douglas G. MacMartin, and Juan Moreno-Cruz. "Climate Econometric Models Indicate Solar Geoengineering Would Reduce Inter-Country Income Inequality." Nature Communications 11, no. 1 (January 13, 2020): 1–9. https://doi.org/10.1038/s41467-019-13957-x .	Noted: the text in this section has been revised to provide a broad overview	Jesse Reynolds	University of California, Los Angeles	Netherlands
12133	51	34	51	34	The 'impacts' rows are misleading. Change 'Climate impacts other than reduced warming' to 'Potential impacts other than reducing warming' The evidence regarding the techniques is highly uncertain. As drafted the table implies the potential impacts are known and agreed. Clearly not the case yet.	Noted: the text in this section has been revised to provide a broad overview	Paul Rouse	Carnegie Climate Governance Initiative (C2G) - The Carnegie Council for Ethics and International Affairs	United Kingdom (of Great Britain and Northern Ireland)
12135	51	34	51	34	The 'impacts' rows are misleading. Change 'Impacts on human and natural systems' to 'Potential impacts on human and natural systems. The evidence regarding the techniques is highly uncertain. As drafted the table implies the potential impacts are known and agreed. Clearly not the case yet.	Noted: the text in this section has been revised to provide a broad overview	Paul Rouse	Carnegie Climate Governance Initiative (C2G) - The Carnegie Council for Ethics and International Affairs	United Kingdom (of Great Britain and Northern Ireland)
12137	51	34	51	34	Deposition of sea salt on land is dependent on the location of the MCB. The text implies additional deposition is inevitable. This is not the case. Further, deposition of sea salt on land is not a Climate impact. It could not affect the climate. Suggest deleting from this cell entirely.	Noted: the text in this section has been revised to provide a broad overview	Paul Rouse	Carnegie Climate Governance Initiative (C2G) - The Carnegie Council for Ethics and International Affairs	United Kingdom (of Great Britain and Northern Ireland)
12139	51	34	51	34	In the cell SA/I/impacts on human and natural systems change 'reduced risk of heat stress to corals' to 'reduced risk of heat stress to natural and human systems'. A successful reduction of global temperature would not only reduce stress to coral, but the entire planet.	Noted: the text in this section has been revised to provide a broad overview	Paul Rouse	Carnegie Climate Governance Initiative (C2G) - The Carnegie Council for Ethics and International Affairs	United Kingdom (of Great Britain and Northern Ireland)
12141	51	34	51	34	Were MCB or OAC to have successfully had a global cooling effect, as suggested possible in the table (column 3, row 3 and column 4 row 3), a termination effect may occur. Suggest amending table to show regional cooling - unlikely to have termination effect; global cooling - potential termination effect	Noted: the text in this section has been revised to provide a broad overview	Paul Rouse	Carnegie Climate Governance Initiative (C2G) - The Carnegie Council for Ethics and International Affairs	United Kingdom (of Great Britain and Northern Ireland)
22615	51		51		Table CWGB last row 2nd column : in line with line 28 to 31 of page 52, the implications of the "termination shock" in terms of ability for the ecosystems and humans to adapt to a rapid warming should be explicitly mentioned here, as "termination shock" on its own is not very conclusive	Noted: the text in this section has been revised to provide a broad overview	Government of France	Ministère de la Transition écologique et solidaire	France
80277	51		51		Table CWGB SRM.1 "degrade ozone (if using sulphur particles)" COMMENT Direction of sign is debatable. See: • Mills, M. J. ... Kinnison, D. E. (2017). Radiative and chemical response to interactive stratospheric sulfate aerosols in fully coupled CESM1(WACCM); Stratospheric aerosols in CESM1(WACCM). Journal of Geophysical Research, 122(23), 13,061–13,078. https://doi.org/10.1002/2017jd027006 ... "for winter middle and high northern latitudes, low-altitude injections result in greater column ozone values than without geoengineering. These changes are mostly driven by dynamics and advection."	Noted: the text in this section has been revised to provide a broad overview	Kelly Wanser	SilverLining	United States of America
80279	51		51		Table CWGB SRM.1 "change in geography of infectious disease" COMMENT What is the direction of the sign on this change in geography? How does the geography change?	Noted: the text in this section has been revised to provide a broad overview	Kelly Wanser	SilverLining	United States of America
8021	52	3	52	19	The result from Trisos et al. on lines 28-31 also applies to this paragraph, and should be mentioned here.	Noted: the text in this section has been revised to provide a broad overview	Alan Robock	Rutgers University	United States of America
9443	52	3	52	3	[previously submitted with WG2 SOD] This sentence implies that only risks to ecosystems from SRM should be considered here. Both benefits and costs should be considered.	Noted: the text in this section has been revised to provide a broad overview	Jesse Reynolds	University of California, Los Angeles	Netherlands

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
80281	52	3	52	4	<p>"Few studies have assessed SRM risk to ecosystems. SAI and MCB may reduce risk of coral reef bleaching compared to global warming with no SAI (Latham et al., 2013; Kwiatkowski et al., 2015)."</p> <p>COMMENT There is now more extensive literature on these topics. See also:</p> <p>McCormack, C. G. ... Sutherland, W. J. (2016). Key impacts of climate engineering on biodiversity and ecosystems, with priorities for future research. <i>Journal of Integrative Environmental Sciences</i>, 13(2-4), 103–128. https://doi.org/10.1080/1943815X.2016.1159578</p> <p>Plazzotta, M. ... Tjiputra, J. (2018). Land surface cooling induced by sulfate geoengineering constrained by major volcanic eruptions. <i>Geophysical Research Letters</i>, 45(11), 5663–5671. https://doi.org/10.1029/2018gl077583</p> <p>Proctor, J. ... Schlenker, W. (2018). Estimating global agricultural effects of geoengineering using volcanic eruptions. <i>Nature</i>, 560(7719), 480–483. https://doi.org/10.1038/s41586-018-0417-3</p> <p>Visioni, D. ... Xia, L. (2020). What goes up must come down: impacts of deposition in a sulfate geoengineering scenario. <i>Environmental Research Letters</i>, 15(9), 094063. https://doi.org/10.1088/1748-9326/ab94eb</p>	Noted: the text in this section has been revised to provide a broad overview	Kelly Wanser	SilverLining	United States of America
80283	52	3	52	19	These statements ignore the null hypothesis and baseline comparison scenario. Maintaining consistency in the discussion of potential effects is essential for a risk-management framework to enable the comparison of tradeoffs.	Noted: the text in this section has been revised to provide a broad overview	Kelly Wanser	SilverLining	United States of America
19573	52	3	52	3	Replace "will" with "may". Reason: Social phenomena are not deterministic:	Noted: the text in this section has been revised to provide a broad overview	Matthias Honegger	Utrecht University, Perspectives climate research, IASS-Potsdam	Germany
65613	52	3	52	19	Should integrate and recognize SROCC	Noted: the text in this section has been revised to provide a broad overview	Mônica M. C. Muelbert	UNIFESP	Brazil
12157	52	7	52	10	If there are 'proponents' who have stated they are in favour of SAI, references for this should be given. The authors named in the reference here have explicitly state that they are NOT proponents of SAI. They do though support more research on SAI. This is a critically important difference. Suggest revising to 'researchers working on SAI are more explicitly addressing.'	Noted: the text in this section has been revised to provide a broad overview	Paul Rouse	Carnegie Climate Governance Initiative (C2G) - The Carnegie Council for Ethics and International Affairs	United Kingdom (of Great Britain and Northern Ireland)
12151	52	8	52	10	Suggest balancing the statement 'Regional precipitation change and sea salt deposition over land from MCB could affect primary productivity in tropical rainforests (Muri et al., 2015).' To 'In very large-scale deployments, in some locations, regional precipitation change and sea salt deposition over land from MCB could affect primary productivity in tropical rainforests (Muri et al., 2015). However, it is not necessary to deploy MCB in locations where this may be a risk.'	Noted: the text in this section has been revised to provide a broad overview	Paul Rouse	Carnegie Climate Governance Initiative (C2G) - The Carnegie Council for Ethics and International Affairs	United Kingdom (of Great Britain and Northern Ireland)
80285	52	10	52	13	<p>"On land, compared to a high CO2 world without SRM, global-scale SRM will limit plant growth at high latitudes due to cooling (Glienke et al., 2015); reduced heat stress in low latitudes would increase plant productivity, but there would be less Nitrogen mineralization which could decrease plant productivity (Glienke et al., 2015; Duan et al., 2020)."</p> <p>COMMENT These results are relative to unmitigated warming - high latitude yields are a side effect of a significantly warmer world.</p>	Noted: the text in this section has been revised to provide a broad overview	Kelly Wanser	SilverLining	United States of America
69413	52	11	52	12	I would add "very" in front of "high CO2 world." These are extreme 4xCO2 runs that no one expects in real life, but which are done for modeling purposes.	Noted: the text in this section has been revised to provide a broad overview	Tyler Felgenhauer	Duke University	United States of America
58459	52	12	52	12	Nitrogen does not need to be capitalized.	Noted: the text in this section has been revised to provide a broad overview	Government of United States of America	U.S. Department of State	United States of America
80287	52	17	52	19	<p>"Yet SAI using sulphur injection could shift the spatial distribution of acid-induced aluminium soil toxicity into relatively undisturbed ecosystems in Europe and North America (Visioni et al., 2020)."</p> <p>COMMENT This toxicity problem is tiny compared to existing emissions.</p>	Noted: the text in this section has been revised to provide a broad overview	Kelly Wanser	SilverLining	United States of America
19623	52	18	52	19	<p>Please revise "Yet ...Visioni et al. 2020" as follows: "SAI using sulphur injection could shift the spatial distribution of acid-induced aluminium soil toxicity into relatively undisturbed ecosystems in Europe and North America (Visioni et al., 2020) while calcite aerosols could counter acidification of land and water bodies and avoid some negative effects on tropospheric pollution and stratospheric ozone."</p> <p>Reason: The current list of SAI types is incomplete.</p>	Noted: the text in this section has been revised to provide a broad overview	Matthias Honegger	Utrecht University, Perspectives climate research, IASS-Potsdam	Germany

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
9445	52	20	52	25	[previously submitted with WG2 SOD] Why describe only "simulations [that] fully offsetting mean global warming", when such a scenario appears to be a supra-optimal magnitude of SRM? Even Curry et al report, as the first conclusory sentence in their abstract, "Compared to the preindustrial climate, changes in climate extremes under G1 [wherein an instantaneous quadrupling of CO2 from its preindustrial control value is offset by a commensurate reduction in solar irradiance] are generally much smaller than under 4 × CO2 alone." This seems relevant, yet this paragraph reports only the negative effects (besides fully offsetting mean global warming). Irvine et al 2019 and Irvine and Keith 2020 show that using SRM in general or SAI specifically, respectively, to reduce the global temperature anomaly by half would also, according their models, reduce extreme temperature, extreme precipitation, and tropical cyclones across almost the entire globe. Irvine, Peter, Kerry Emanuel, Jie He, Larry W. Horowitz, Gabriel Vecchi, and David Keith. "Halving Warming with Idealized Solar Geoengineering Moderates Key Climate Hazards." <i>Nature Climate Change</i> 9 (2019): 295–99. https://doi.org/10.1038/s41558 . Irvine, Peter J., and David W. Keith. "Halving Warming with Stratospheric Aerosol Geoengineering Moderates Policy-Relevant Climate Hazards." <i>Environmental Research Letters</i> 15, no. 4 (March 2020): 044011. https://doi.org/10.1088/1748-9326/ab76de .	Noted: the text in this section has been revised to provide a broad overview	Jesse Reynolds	University of California, Los Angeles	Netherlands
9447	52	23	52	24	[previously submitted with WG2 SOD] Climate change, which SRM appears able to reduce, "creates novel climate characteristics, which do not reflect pre-industrial conditions." The relevant question is whether the novel climate conditions of climate change + SRM would be preferable or not.	Noted: the text in this section has been revised to provide a broad overview	Jesse Reynolds	University of California, Los Angeles	Netherlands
80289	52	23	52	25	"This creates novel climate characteristics, which do not reflect pre-industrial conditions and which are fundamentally unstable in the case of SAI since they depend on the continuous injection of further sulfate aerosols." COMMENT It is true that SAI implementation will not be able to replicate exact pre-industrial conditions around the globe, however that is not the point of SAI. The goal would be to prevent overshoot and tipping point instabilities in the climate system. But it is important to note the danger of the termination effect of SAI. See: Lee, H. ... Schwinger, J. (2019). The Response of Permafrost and High-Latitude Ecosystems Under Large-Scale Stratospheric Aerosol Injection and Its Termination. <i>Earth's Future</i> , 7(6), 605–614. https://doi.org/10.1029/2018EF001146 Trisos, C. H. ... Zambri, B. (2018). Potentially dangerous consequences for biodiversity of solar geoengineering implementation and termination. <i>Nature Ecology & Evolution</i> , 2(3), 475–482. https://doi.org/10.1038/s41559-017-0431-0	Noted: the text in this section has been revised to provide a broad overview	Kelly Wanser	SilverLining	United States of America
11189	52	26	52	31	The political risk of "termination shock" seems rather low, given the relatively low direct costs of maintaining SAI and the high costs of sudden cessation, among other factors. Andy Parker & Peter J. Irvine, The Risk of Termination Shock from Solar Geoengineering, <i>Earth's Future</i> (2018) 6: 456-467. Given the vividness of some of the language in this paragraph (i.e., "A sudden termination of SAI—even if SI was used to only partly offset warming—could place thousands of species at risk for extinction"), it may make sense to add that some scholars reasonably doubt the practical feasibility of this scenario.	Noted: the text in this section has been revised to provide a broad overview	Charles Corbett	University of California, Los Angeles School of Law	United States of America
9449	52	26	52	31	[previously submitted with WG2 SOD] Cessation of SRM would need to be sudden *and sustained*, and of a substantially strong SRM magnitude, to result in "termination shock." A consideration of the risk of termination shock should also note that the likelihood of such an event is contested. See Parker and Irvine 2018, Rabitz 2018. Parker, Andy, and Peter J. Irvine. "The Risk of Termination Shock From Solar Geoengineering." <i>Earth's Future</i> 6, no. 3 (2018): 456–67. https://doi.org/10.1002/2017EF000735 . Rabitz, Florian. "Governing the Termination Problem in Solar Radiation Management." <i>Environmental Politics</i> 28, no. 3 (2019): 502–22. https://doi.org/10.1080/09644016.2018.1519879 .	Noted: the text in this section has been revised to provide a broad overview	Jesse Reynolds	University of California, Los Angeles	Netherlands
69419	52	26	52	31	Yes, termination shock would be horrible. But what is the probability of this happening, and hence the risk (probability x consequence)? This para. could use a small rebuttal from Andy Parker and Peter J. Irvine, The Risk of Termination Shock From Solar Geoengineering, <i>Earth's Future</i> , 11 March 2018 https://doi.org/10.1002/2017EF000735 , which finds the risk to be low.	Noted: the text in this section has been revised to provide a broad overview	Tyler Felgenhauer	Duke University	United States of America
80291	52	28	52	31	"A sudden termination of SAI—even if SAI was used to only partly offset warming—could place thousands of species at risk of extinction, because the resulting rapid warming would be too fast for species to track the changing climate (Trisos et al., 2018)." COMMENT This comment is the mirror image of a climate tipping point, which SRM would be deployed to avoid. This symmetry should be mentioned here, as the same effect is likely if unabated warming induces abrupt changes with rapid escalating feedbacks, to enable a risk-management framework to evaluate strategies in the context of tradeoffs and uncertainties.	Noted: the text in this section has been revised to provide a broad overview	Kelly Wanser	SilverLining	United States of America

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
19625	52	31	52	31	Please add: "...however Parker and Irvine (2018) suggest the likelihood of such disruption may be very limited." New reference: Parker, A., Irvine, P. J. (2018). The risk of termination shock from solar geoengineering. <i>Earth's Future</i> , 6(3), 456-467.	Noted: the text in this section has been revised to provide a broad overview	Matthias Honegger	Utrecht University, Perspectives climate research, IASS-Potsdam	Germany
12153	52	33	52	43	Suggest more recent studies are reviewed and included – For example, MERK, C. K., GERALDINE: POHLERS, JULIA: ERNST, ANDREAS: OTT, KONRAD: REHDANZ, KATRIN 2019. Public perceptions of climate engineering: Laypersons' acceptance at different levels of knowledge and intensities of deliberation. <i>GAIA - Ecological Perspectives for Science and Society</i> , 28, 348-355. And . NELSON, J. P., KAPLAN, L. & TOMBLIN, D. 2020. Assessing solar geoengineering research funders: Insights from two US public deliberations. <i>The Anthropocene Review</i> , 0, 2053019620964845.	Noted: the text in this section has been revised to provide a broad overview	Paul Rouse	Carnegie Climate Governance Initiative (C2G) - The Carnegie Council for Ethics and International Affairs	United Kingdom (of Great Britain and Northern Ireland)
12155	52	33	52	43	Studies have conflated SRM techniques of widely varying nature under a generic term, such as SRM or solar-engineering, and report findings about publics' views of those, without any clarity regarding which technologies are being explored (Burns, 2016). This creates uncertainty in the findings. This should be noted. Burns, E. T. et al. (2016) 'What do people think when they think about solar geoengineering? A review of empirical social science literature, and prospects for future research', <i>Earth's Future</i> , 4(11), pp. 536–542. doi: 10.1002/2016ef000461.	Noted: the text in this section has been revised to provide a broad overview	Paul Rouse	Carnegie Climate Governance Initiative (C2G) - The Carnegie Council for Ethics and International Affairs	United Kingdom (of Great Britain and Northern Ireland)
11191	52	34	53	43	This paragraph overlooks an important aspect of public reception of SRM research. The general public (at least in the U.S. and U.K.) frequently confuses SRM with chemtrail conspiracy theories, and a significant portion of the public expresses belief in those conspiracy theories. Dustin Tingley & Gernot Wagner, <i>Solar Geoengineering and the Chemtrails Conspiracy on Social Media</i> , Palgrave Communications (2017) 3: 12. Other studies have shown high-prevalence of misinformation about SRM on social media. E.g., Joachim Allgaier, <i>Science and Environmental Communication on YouTube: Strategically Distorted Communications in Online Videos on Climate Change and Climate Engineering</i> , <i>Frontier Communications</i> (2019), https://doi.org/10.3389/fcomm.2019.00036 . Given the extent to which misinformation drives public perception and political action, especially regarding climate change, Matthew T. Ballew et al., <i>Does Socioeconomic Status Moderate the Political Divide on Climate Change? The Roles of Education, Income, and Individualism</i> , <i>Global Evtl. Change</i> (2020) 60: 102024, it may make sense to mention SRM's misinformation problem in this section.	Noted: the text in this section has been revised to provide a broad overview	Charles Corbett	University of California, Los Angeles School of Law	United States of America
52805	52	34	52	43	differentiating between levels of analysis of these studies could help policy makers. How do perceptions of SRM for the public in general change vis-à-vis perceptions of elites, for instance?	Noted: the text in this section has been revised to provide a broad overview	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia
58461	52	37	52	37	Carbon does not need to be capitalized.	Noted: the text in this section has been revised to provide a broad overview	Government of United States of America	U.S. Department of State	United States of America
9457	52	37	52	37	Why mention that respondents largely prefer SRM to CDR? They also prefer it to emissions reductions, but SRM's potential role in managing climate risks seems distinct from those of CDR and emissions reduction. Furthermore, the IPCC has decided that SRM and CDR and no longer collectively "geoengineering."	Noted: the text in this section has been revised to provide a broad overview	Jesse Reynolds	University of California, Los Angeles	Netherlands
9451	52	38	52	39	[previously submitted with WG2 SOD] Surveys indicate caution of SRM deployment (not research) and rejection of SRM deployment at this time (not necessarily in the future).	Noted: the text in this section has been revised to provide a broad overview	Jesse Reynolds	University of California, Los Angeles	Netherlands
80293	52	42	52	43	"Limited studies for developing countries show a tendency for respondents to be more open to SRM (Visschers et al., 2017; Sugiyama et al., 2020), perhaps because they experience climate change more directly (Carr and Yung, 2018)." COMMENT This statement couldn't be more weakly and confusingly phrased. That developing countries are more open to SRM is a major and ethically overwhelming finding in the context of distributional concerns and climate justice.	Noted: the text in this section has been revised to provide a broad overview	Kelly Wanser	SilverLining	United States of America
80295	52	45	52	45	"Ethics" COMMENT Ethics in the sense of avoiding harm are not included in this section, but should be. Safety in the context of climate, and human welfare, starting with the preservation of life, are part of the mandate of UNFCCC and fundamental considerations for ethics. Consideration of physical welfare and the avoidance of harm should be in the treatment of, and among the primary considerations for, ethics.	Noted: the text in this section has been revised to provide a broad overview	Kelly Wanser	SilverLining	United States of America
11199	52	46	53	10	This paragraph could be strengthened by explicitly mentioning Global North/South dynamics and/or anti-colonial perspectives on SAI. See, e.g., Kyle Powys Whyte, <i>Indigeneity in Geoengineering Discourses: Some Considerations, Ethics, Policy & Env't</i> (2018) 21: 289-307.	Noted: the text in this section has been revised to provide a broad overview	Charles Corbett	University of California, Los Angeles School of Law	United States of America
11193	52	47	53	2	There is low agreement and mixed evidence about the relationship between researching SRM and moral hazard on mitigation. See Elizabeth T. Burns et al., <i>What Do People Think About When They Think About Solar Geoengineering? A Review of Empirical Social Science Literature, and Prospects for Future Research</i> , <i>Earth's Future</i> (2016) 4: 536-542. It would be more accurate to strike the phrase "high agreement" with "disagreement whether"	Noted: the text in this section has been revised to provide a broad overview	Charles Corbett	University of California, Los Angeles School of Law	United States of America
11195	52	47	53	2	There is low agreement and mixed evidence about the relationship between researching SRM and moral hazard on mitigation. See Elizabeth T. Burns et al., <i>What Do People Think About When They Think About Solar Geoengineering? A Review of Empirical Social Science Literature, and Prospects for Future Research</i> , <i>Earth's Future</i> (2016) 4: 536-542. It would be more accurate to strike the phrase "highly likely obstructing" and replacing it with "possibly interfering with"	Noted: the text in this section has been revised to provide a broad overview	Charles Corbett	University of California, Los Angeles School of Law	United States of America

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
43381	52	47	53	2	<p>The claim that a moral hazard is highly likely is an empirical claim that is not substantiated by the cited literature at all. The cited literature makes a valuable contribution to understanding the underlying assumptions of the argument but are not empirical analyses.</p> <p>The extensive scientific discussion of the argument surely shows that there is high interest and high concern in the research community that talking about or researching SRM could cause mitigation obstruction. There are empirical findings that the moral hazard argument, i.e. that once SRM is available politicians would reduce efforts in mitigation policy or people would reduce their individual mitigation efforts, are very credible in the laypersons' eyes (Corner & Pidgeon 2014). But the persuasiveness or perceived credibility of the argument is neither evidence nor counterevidence for the occurrence of the empirical phenomenon of moral hazard.</p> <p>While there are empirical findings that support the reverse moral hazard hypotheses, that efforts to reduce emissions among laypersons might increase once they learn about stratospheric aerosol injection (Merk et al. 2016), the jury is still out on the interplay between SRM and mitigation efforts on the societal level and will be for a long time. To date, there is no empirical analysis of SRM's effects on the mitigation behavior of interest groups, (climate) policymakers, firms, or others. Thus, we cannot say anything about the actual changes in the discourse, the power dynamics, and the changes in framing caused by SRM.</p> <p>Corner, A., & Pidgeon, N. (2014). Geoengineering, climate change scepticism and the 'moral hazard' argument: An experimental study of UK public perceptions. <i>Philosophical Transactions. Series A, Mathematical, Physical, and Engineering Sciences</i>, 372(2031).</p> <p>Merk, C., Pönitzsch, G., & Rehdanz, K. (2016). Knowledge about aerosol injection does not reduce individual mitigation efforts. <i>Environmental Research Letters</i>, 11(5), 54009.</p>	Noted: the text in this section has been revised to provide a broad overview	Christine Merk	Kiel Institute for the World Economy	Germany
9453	52	47	53	2	<p>[previously submitted with WG2 SOD] There is not high agreement that the "moral hazard" effect is highly likely. Morrow 2014, cited here, concludes "it is difficult to know in advance whether the existence of these mechanisms [that might cause policy-makers to choose inferior policy portfolios] means that climate engineering research really would lead to a worse outcome." See also Reynolds 2015; Lockley and Coffman 2016; Halstead 2018; Wagner and Merk 2018; Fabre and Wagner (2020), all of which argue and/or offer evidence that such an effect is unlikely or that the reverse may even be expected. Of the dozen or so empirical studies of how people actually respond to learning of SRM, none show that it reduces their interest in mitigation or willingness to mitigate. In fact, most show the opposite. (Shepherd et al. 2009, 43; Ipsos MORI 2010, 1–2; Mercer, Keith, and Sharp 2011, 5; Kahan et al. 2015, 203–4; Integrated Assessment of Geoengineering Proposals 2014, 3; Wibeck, Hansson, and Anshelm 2015, 29; Wibeck et al. 2017, 8; Fairbrother 2016; Merk, Ponitzsch, and Rehdanz 2016; Merk, Ponitzsch, and Rehdanz 2019)</p> <p>HALSTEAD, JOHN. (2018) Stratospheric Aerosol Injection Research and Existential Risk. <i>Futures</i> 102: 63–77.</p> <p>LOCKLEY, ANDREW, and D'MARIS COFFMAN. (2016) Distinguishing Morale Hazard from Moral Hazard in Geoengineering. <i>Environmental Law Review</i> 18: 194–204.</p> <p>REYNOLDS, JESSE. (2015) A Critical Examination of the Climate Engineering Moral Hazard and Risk Compensation Concern. <i>The Anthropocene Review</i> 2: 174–191.</p> <p>WAGNER, GERNOT, and CHRISTINE MERK. (2018) The Hazard of Environmental Morality. <i>Foreign Policy</i>. Available at: https://foreignpolicy.com/2018/12/24/the-hazard-of-environmental-morality/. (Accessed August 21, 2019).</p> <p>Fabre, Adrien, and Gernot Wagner. "Availability of Risky Geoengineering Can Make an Ambitious Climate Mitigation Agreement More Likely." <i>Humanities and Social Sciences Communications</i> 7, no. 1 (June 17, 2020): 1–4. https://doi.org/10.1057/s41599-020-0492-6.</p> <p>Fairbrother, Malcolm. "Geoengineering, Moral Hazard, and Trust in Climate Science: Evidence from a Survey Experiment in Britain." <i>Climatic Change</i> 139, no. 3–4 (2016): 477–89. https://doi.org/10.1007/s10584-016-1818-7.</p> <p>Integrated Assessment of Geoengineering Proposals. "Views about Geoengineering: Key Findings from Public Discussion Groups," 2014.</p>	Noted: the text in this section has been revised to provide a broad overview	Jesse Reynolds	University of California, Los Angeles	Netherlands

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
80297	52	47	53	2	<p>"There is high agreement that publicly debating, researching and potentially deploying SAI involves a 'moral hazard', highly likely to obstruct ongoing and future mitigation efforts (Morrow, 2014; Baatz, 2016; McLaren, 2016)."</p> <p>COMMENT We strongly disagree.</p> <p>1) Empirical research suggests that SRM research could increase rather than decrease support for greenhouse gas reductions among both experts and the general public. <ul style="list-style-type: none"> • Merk, C., Pönitzsch, G., & Rehdanz, K. (2019). Do climate engineering experts display moral-hazard behaviour? <i>Climate Policy</i>, 19(2), 231–243. https://doi.org/10.1080/14693062.2018.1494534 </p> <p>2) Uncertainty and lack of research can exacerbate the moral hazard problem by enabling over-optimistic attitudes about technological feasibility. <ul style="list-style-type: none"> • Bodansky, D., & Biniiaz, S. (2020). Climate Intervention: The Case for Research. <i>C2ES and SilverLining</i>. https://www.c2es.org/site/assets/uploads/2020/10/climate-intervention-the-case-for-research.pdf </p> <p>3) It is possible that exploration of emergency measures is consistent with a level of urgency that bolsters the case for immediate mitigation measures. <ul style="list-style-type: none"> • Aldy, J. E., & Zeckhauser, R. (2020). Three prongs for prudent climate policy. <i>Southern Economic Journal</i>, 87(1), 3–29. https://doi.org/10.1002/soej.12433 </p>	Noted: the text in this section has been revised to provide a broad overview	Kelly Wanser	SilverLining	United States of America
19571	52	47	53	2	<p>Please replace "There is high ... Mc Laren 2016" by "While some literature states that publicly debating, researching and potentially deploying SAI involves a 'moral hazard', obstructing ongoing and future mitigation efforts (Morrow, 2014; Baatz, 2016; McLaren, 2016) other literature finds evidence for an inverse phenomenon among some populations (sometimes referred to as negative-moral-hazard), whereby awareness of SAI increases stated preference for rapid mitigation (Corner and Pidgeon 2014, Sütterlin et al. 2017, Mahajan et al. 2019, Merk et al. 2019)."</p> <p>Reason: Current wording is imbalanced and ignores important literature.</p> <p>New references: Mahajan, A., Tingley, D., & Wagner, G. (2019). Fast, cheap, and imperfect? US public opinion about solar geoengineering. <i>Environmental Politics</i>, 28(3), 523-543. Sütterlin, B., & Siegrist, M. (2017). Public perception of solar radiation management: the impact of information and evoked affect. <i>Journal of Risk Research</i>, 20(10), 1292-1307. Merk, C., Pönitzsch, G., & Rehdanz, K. (2019). Do climate engineering experts display moral-hazard behaviour?. <i>Climate Policy</i>, 19(2), 231-243. Corner, A., & Pidgeon, N. (2014). Geoengineering, climate change scepticism and the 'moral hazard' argument: an experimental study of UK public perceptions. <i>Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences</i>, 372(2031), 20140063.</p>	Noted: the text in this section has been revised to provide a broad overview	Matthias Honegger	Utrecht University, Perspectives climate research, IASS-Potsdam	Germany
11169	53	34	54	41	<p>A global problem with SRM research is that states and large institutions seem generally unwilling to champion the technology and drive its development forward (with a few limited exceptions). See Ella Necheles et al., <i>Funding for Solar Geoengineering from 2008 to 2018</i>, Harvard's Solar Geoengineering Research Program (Nov. 13, 2018). It seems in many ways a technology without advocates. It may be worth noting this ambivalence at the end of the last paragraph as an explanation for the lack of "targeted international law relating to SRM."</p>	Noted. We already highlight the importance of national governance of SRM that goes in the direction of research funding, as well as the importance of enabling research.	Charles Corbett	University of California, Los Angeles School of Law	United States of America
9467	53	34	53	41	<p>First, I wish to acknowledge that this section is balanced and well-written, with the greatest largely unavoidable shortcoming of its brevity. My comments here are thus minor and meant constructively. Second, it seems like about 1/4 of the text reiterates what has or should have been said elsewhere about SRM's capabilities, limitations, and risks. Given the word limit, perhaps this could be tightened. Third, two of risks that generally receive great attention are those of sudden and sustained termination and of lessened mitigation ("moral hazard"). These might warrant at least a mention. The former may be addressed by governance (see below) but the latter is more challenging. Parker, Andy, and Peter J. Irvine. 2018. "The Risk of Termination Shock From Solar Geoengineering." <i>Earth's Future</i> 6 (3): 456–67. https://doi.org/10.1002/2017EF000735. Rabitz, Florian. 2019. "Governing the Termination Problem in Solar Radiation Management." <i>Environmental Politics</i> 28 (3): 502–22. https://doi.org/10.1080/09644016.2018.1519879.</p>	Accepted. We have added these references and a note about ermination risk	Jesse Reynolds	University of California, Los Angeles	Netherlands
12161	53	34	53	47	<p>SRM is described here is inconsistent with previous IPCC definitions. The SRM literature has consistently included proposals that would allow more radiation to escape form the atmosphere i.e., CCT, as well as measures that would reflect SR away. It is suggested this text be revised, in line with the SR1.5 Glossary i.e., SRM 'refers to the intentional modification of the Earth's shortwave radiative budget with the aim of reducing warming'. Creating a new definition at this stage would be unhelpful. Not least when cross referencing to early SRM material in previous IPCC reports.</p>	Accepted. We have moved towards the glossary definition	Paul Rouse	Carnegie Climate Governance Initiative (C2G) - The Carnegie Council for Ethics and International Affairs	United Kingdom (of Great Britain and Northern Ireland)
9469	53	35	53	37	<p>Be sure that this definition aligns with that of the glossary.</p>	Accepted. We have moved towards the glossary definition.	Jesse Reynolds	University of California, Los Angeles	Netherlands
14619	53	35	53	39	<p>These first sentences directly repeat those in the cross-chapter box.</p>	Noted. We have changed the wording. It is our understanding that the box is a stand-alone thing.	Joanna Depledge	Centre for Environment, Energy and Natural Resource Governance (CEENRG), University of Cambridge	United Kingdom (of Great Britain and Northern Ireland)

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
8029	53	37	53	38	"Stratospheric Aerosol Injection (SAI)" The technique most studied is injection of SO2 gas, which later converts to aerosols. You are so careful with the other terms, but this one should be "Stratospheric Aerosol Intervention"	Accepted. Thanks for pointing this out.	Alan Robock	Rutgers University	United States of America
9471	53	37	54	5	The word "scheme" has a negative connotation, at least in American English. Consider something more neutral such as technique, technology, or method.	Accepted. We have changed.	Jesse Reynolds	University of California, Los Angeles	Netherlands
75047	53	41	53	43	I would argue that the Crutzen argument is more nuanced and that his point might be relevant in the 1.5°C context. His calculation is based on the mind experiment to replace industrial sulphur emissions with stratospheric sulphur emissions. Deep emission cuts in line with 1.5 also involve a loss of cooling from aerosol emissions; replacing this "missing" cooling on the path towards 1.5 stabilization, would that be considered to be SRM?	Noted, but not accepted. This falls within the idea of using it as a mitigation option, and provides more detail than we have space for.	Wilfried Rickels	Kiel Institute for the World Economy	Germany
8031	53	43	53	43	Add reference to another overshoot paper: Tilmes, Simone, Douglas G. MacMartin, Jan T. M. Lenaerts, Leo van Kampenhout, Laura Muntjewerf, Lili Xia, Cheryl S. Harrison, Kristen Krumhardt, Michael J. Mills, Ben Kravitz, and Alan Robock, 2020: Reaching 1.5 and 2.0°C global surface temperature targets using stratospheric aerosol geoengineering in CMIP6. Earth System Dynamics, 11, 579-601, doi:10.5194/esd-11-579-2020.	Accepted. Thanks!	Alan Robock	Rutgers University	United States of America
80303	53	43	53	45	"SRM assessments of potential benefits and risks still primarily rely on modelling efforts and their underlying scenario assumptions (Sugiyama et al. 2018a), for example in the context of the Geoengineering Model Intercomparison Project GeoMIP6 (Kravitz et al. 2015). " COMMENT True but misleading. What does Sugiyama actually say? "While acknowledging important caveats, including uncertainty in modeling studies and the potential for SSAI to carry its own risks of injustice, the paper argues that there is a strong case for continued research into SSAI, especially if attention is paid to how it might be used to reduce emissions-driven injustice. This point should be emphasized: the case for research! See: • Bodansky, D., & Biniarz, S. (2020). Climate Intervention: The Case for Research. C2ES and SilverLining. https://www.c2es.org/site/assets/uploads/2020/10/climate-intervention-the-case-for-research.pdf	Accepted. We have made note of this.	Kelly Wanser	SilverLining	United States of America
69417	53		54		A few sections are repeated in the main text from the boxes: p. 53 lines 35-40, p. 54 lines 26-31, and p. 54 lines 38-41.	Rejected. The two pieces are stand-alone.	Tyler Felgenhauer	Duke University	United States of America
12183	53	1	53	1	The text as drafted suggests that moral hazard is a foregone conclusion. However, in the context of the very limited evidence about public and others views regarding SAI in countries outside North America and Europe, this sentence should be amended. Suggested revision - 'There is high agreement that publicly debating, researching and potentially deploying SAI, at least in North America and Europe may involve a "moral hazard" and obstruct ongoing and future mitigation efforts. However, evidence regarding potential responses from elsewhere in the world, and their implications for any 'moral hazard' is lacking.'	Noted: the text in this section has been revised to provide a broad overview	Paul Rouse	Carnegie Climate Governance Initiative (CZG) - The Carnegie Council for Ethics and International Affairs	United Kingdom (of Great Britain and Northern Ireland)
11197	53	3	53	5	Given my comment on "moral hazard," I would replace "There is much less agreement" with "There is also low agreement"	Noted: the text in this section has been revised to provide a broad overview	Charles Corbett	University of California, Los Angeles School of Law	United States of America
43383	53	3	53	5	The questions whether a slippery slope will occur is an empirical one. Ethical analysis can certainly look into arguments for or against it's occurrence and these can be more or less convincing. But whether the phenomenon occurs in the end is a different question.	Noted: the text in this section has been revised to provide a broad overview	Christine Merk	Kiel Institute for the World Economy	Germany
19893	53	5	53	7	Please add after "Regarding potential deployment of SRM" and before "... procedural: "...potential implications for the SDGs (Honegger et al., 2021). New reference: Honegger, M., Michaelowa, A., and Pan, J. (2021, under review). Potential Implications of Solar Radiation Modification for achievement of the Sustainable Development Goals", Mitigation and Adaptation Strategies to Global Change.	Noted: the text in this section has been revised to provide a broad overview	Axel Michaelowa	University of Zurich	Switzerland
11201	53	7	53	8	I would strike "climate modelling community" after SRM and replace it with "scientific research community," given that researchactivities now encompass field research. See , e.g. , P. Hardisty et al., Reef Restoration and Adaptation Program, Investment Case: A Report to the Australian Government from the Reef Restoration and Adaptation Program pp. 65-69 (Oct. 2019) (report analyzing marine cloud brightening and other local solar geoengineering techniques to protect the Great Barrier Reef). If authors wish to include disciplines beyond the natural sciences studying SRM, it could simply read as "SRM research community" (especially given Horton, Flegal, and Gupta, cited in line 10, are governance scholars and/or socialscientists).	Noted: the text in this section has been revised to provide a broad overview	Charles Corbett	University of California, Los Angeles School of Law	United States of America
9455	53	7	53	9	[previously submitted with WG2 SOD] The SRM climate community has always focused on reducing climate change. There are no "proponents of SAI," but only "proponents of SAI research"	Noted: the text in this section has been revised to provide a broad overview	Jesse Reynolds	University of California, Los Angeles	Netherlands
22617	53	8	53	8	Please clarify what "minimize climate change" means. Do you mean "minimize climate change impacts"?	Noted: the text in this section has been revised to provide a broad overview	Government of France	Ministère de la Transition écologique et solidaire	France
19615	53	9	53	10	Please revise "With the SRM climate..." as follows: "SAI researchers have since the beginning actively sought to build capacities and enable diverse global communities to engage on the subject as well as addressed SRM as an issue of global relevance with particular relevance to vulnerable populations (Horton and Keith, 2016; Flegal and Gupta, 2018). Reason: Researchers should not be labelled as "proponents of SAI".	Noted: the text in this section has been revised to provide a broad overview	Matthias Honegger	Utrecht University, Perspectives climate research, IASS-Potsdam	Germany

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
81127	53	12	53	32	It seems duplicative to discuss governance within the SRM box and then again in a separate section. I recommend that the governance elements are removed from the SRM box and incorporated as appropriate in the SRM governance section itself. I would consider this to be consistent with the approach recommended by the WGIII bureau that cross-WG boxes can and should be adopted to ensure they fit within their report-specific context. The information would not be lost, it's simply integrated into the more detailed discussion in section 14.4.5.1, which is valuable.	Noted: the text in this section has been revised to provide a broad overview	Andy Reisinger	Ministry for the Environment	New Zealand
9479	53	12	54	14	This appears to apply to SRM more broadly, not just SAI.	Noted: the text in this section has been revised to provide a broad overview	Jesse Reynolds	University of California, Los Angeles	Netherlands
8027	53	13	53	13	Why does this line have a reference to the same chapter? This is Chapter 14.	Noted: the text in this section has been revised to provide a broad overview	Alan Robock	Rutgers University	United States of America
11203	53	13	53	13	I would revise the opening to "Currently, there is no dedicated, formal international SRM governance." There are SRM research activities occurring under national supervision, see, e.g., American Inst. of Physics, FY21 Budget Outlook: National Oceanic and Atmospheric Administration (Oct. 15, 2020) (reporting U.S. gov't's plans to increase its annual solar geoengineering research budget to \$9 million), or subject to substantial non-state governance structures, see, e.g., SCoPEX Advisory Committee, https://scopexac.com/ (non-state governance mechanism for Harvard University field experiments on SRM). There are also informal governance activities that coordinate governance activities between stakeholders of different nationalities. E.g., SCoPEX Advisory Committee; Carnegie Climate Governance Initiative, https://www.c2g2.net/ .	Noted: the text in this section has been revised to provide a broad overview	Charles Corbett	University of California, Los Angeles School of Law	United States of America
9459	53	13	53	13	[previously submitted with WG2 SOD] There is dedicated governance. In the IPCC AR6 definition, "governance" is "The structures, processes, and actions through which private and public actors interact to address societal goals. This includes formal and informal institutions and the associated norms, rules, laws and procedures for deciding, managing, implementing and monitoring policies and measures at any geographic or political scale, from global to local." Several countries publicly fund SRM research and have released official reports. The proposed SCoPEX outdoor experiment has an independent advisory commission. Several academics have proposed principles and best practices, including Nicholson et al., 2018, cited in the following paragraph. One set of principles (The Oxford Principles) were endorsed by the UK government. The German government endorsed SRM research. The paragraph could be improved by distinguishing between international, state, and nonstate governance; SRM-specific versus merely applicable governance; and governance of SRM research versus deployment. Rayner, Steve, Clare Heyward, Tim Kruger, Nick Pidgeon, Catherine Redgwell, and Julian Savulescu. "The Oxford Principles." <i>Climatic Change</i> 121, no. 3 (January 1, 2013): 499–512. https://doi.org/10.1007/s10584-012-0675-2 . UK House of Commons, Science and Technology Committee. "The Regulation of Geoengineering." Fifth Report of Session 2009–10. London: The Stationery Office, 2010. Schütte, Georg. 2014. "Speech by State Secretary Dr Georg Schütte, Federal Ministry of Education and Research, at the International Conference on 'Climate Engineering – Critical Global Discussions' of the Institute for Advanced Sustainability Studies Berlin, 18 August 2014." www.bmbf.de/pub/reden/Rede_StSchuette_IASS_Konferenz_18_08__engl.pdf .	Noted: the text in this section has been revised to provide a broad overview	Jesse Reynolds	University of California, Los Angeles	Netherlands
11205	53	15	53	15	I would revise "cover parts" to "partially cover SRM" or "apply to aspects of SRM" for clarity.	Noted: the text in this section has been revised to provide a broad overview	Charles Corbett	University of California, Los Angeles School of Law	United States of America
11207	53	15	53	19	All governance structures set forth rules and therefore restrict conduct in some way, so the use of "aiming to restrict" read as off. Furthermore, the examples listed on lines 31-32 also sound more like goals of governance, rather than rationales. Goals are the objectives or hoped-for outcomes of a particular governance design, whereas rationales are the policy or moral reasons underlying those goals. I would therefore revise this sentence for clarity and accuracy: "While governance objectives range broadly, from prohibition to enabling research and potentially deployment..."	Noted: the text in this section has been revised to provide a broad overview	Charles Corbett	University of California, Los Angeles School of Law	United States of America
46317	53	15	53	15	Please add information on the decision X/33 of the CBD, it is the one and only multilateral decision on Geoengineering. Though not strictly binding on states, it is comprehensive on SRM-Governance insofar all relevant criteria for governance are mentioned in a generic manner.	Noted: the text in this section has been revised to provide a broad overview	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany
22619	53	17	53	19	governance emerges when there is something to govern; hence anticipatory governance is creative writing but does not mean much. Nothing so far prevents experiments to be conducted at national level. The question is governance for what purpose: controlling a risky technology or enabling its development. Behind those proposing a more robust governance there are two constituencies peaching exactly the opposite one from another	Noted: the text in this section has been revised to provide a broad overview	Government of France	Ministère de la Transition écologique et solidaire	France
46319	53	17	53	17	Please add: "In-between the enabling and the restrictive approaches some authors stress the operationalization of the precautionary approach. This means no deployment should take place before specific criteria regarding scientific consensus, impact assessments and governance issues are met. (cf. CBD Decision X/33 para 8 w; Wieding/Stubenrauch, in Sustainability 2020, Human Rights and Precautionary Principle: Limits to Geoengineering, SRM, and IPCC Scenarios, DOI: https://doi.org/10.3390/su12218858 ;) "	Noted: the text in this section has been revised to provide a broad overview	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany
46321	53	17	53	18	Please delete "there is broad agreement". This is important since the next sentence explains this agreement by stating that governance should reflect the given, evolving SRM techniques. Those authors that suggest a SRM Moratorium or stress a precautionary approach (e.g. Wieding/Stubenrauch, in Sustainability 2020, Human Rights and Precautionary Principle: Limits to Geoengineering, SRM, and IPCC Scenarios, DOI: https://doi.org/10.3390/su12218858 ; Tedsen/Homann in CCLR 2013 (2) 90, DOI: https://doi.org/10.21552/CCLR/2013/2/250) would not support this statement. The assertion of broad agreement is wrong.	Noted: the text in this section has been revised to provide a broad overview	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
9461	53	17	53	18	[previously submitted with WG2 SOD] Climate change, which SRM appears able to reduce, would also be potentially disruptive. Why describe SRM as potentially disruptive? The perhaps more relevant question is whether the novel climate conditions of climate change + SRM would be more or less potentially disruptive.	Noted: the text in this section has been revised to provide a broad overview	Jesse Reynolds	University of California, Los Angeles	Netherlands
9463	53	17	53	21	[previously submitted with WG2 SOD] The degree to which governance must stay at least one step ahead of research is contested. Current governance arrangements may be adequate for SRM research. See e.g. Parker, Andy. "Governing Solar Geoengineering Research as It Leaves the Laboratory." Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences 372, no. 2031 (December 28, 2014): article 20140173. https://doi.org/10.1098/rsta.2014.0173 .	Noted: the text in this section has been revised to provide a broad overview	Jesse Reynolds	University of California, Los Angeles	Netherlands
11209	53	18	53	19	"[G]overned in an anticipatory manner" is somewhat ambiguous. All rules are forward looking, and even the ex post review of a court will apply the rules that regulated the conduct at the time the conduct occurred. Maybe strike and replace with "governed by a clear set of standards, rules, and institutions"?	Noted: the text in this section has been revised to provide a broad overview	Charles Corbett	University of California, Los Angeles School of Law	United States of America
46323	53	19			Please explain the concept of "anticipatory" governance, which is referred to here. Clarify that the main rationale is to prevent unilateral deployment. If this were not the case the assumption that SRM will be developed and deployed without governance or decisions by authorities is not in line with the Oxford Principles (Governance before deployment) and the Precautionary Principle.	Noted: the text in this section has been revised to provide a broad overview	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany
46325	53	19	53	19	Please add: Bodle/Oberthür et al., 2014, Umweltbundesamt, Climate Change - 14/2014 , Options and Proposals for the International Governance of Geoengineering, https://www.umweltbundesamt.de/publikationen/options-proposals-for-the-international-governance .	Noted: the text in this section has been revised to provide a broad overview	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany
80299	53	19	53	21	"Accordingly, governance arrangements are, and should continue, co-evolving with respective SRM technologies, aiming to be at least one step ahead of research, development, demonstration, and—potentially—deployment (Rayner et al., 2013; Parson, 2014)." COMMENT The problem with this approach (governance ahead of research) is that research is needed to inform governance. Rapid generation of information should be promoted in support of informed dialogue with the public.	Noted: the text in this section has been revised to provide a broad overview	Kelly Wanser	SilverLining	United States of America
11211	53	21	53	22	I don't quite understand "This potential needs to be realized already in." If authors are saying Australia's MCB trials are an example of good governance, perhaps strike the phrase and replace with : "For example, stakeholders are developing robust governance...." If however authors are saying stronger governance is needed for the MCB trials, and I would agree with that, then perhaps: "Accordingly, there have been calls to develop more robust and internationally coordinated governance..."	Noted: the text in this section has been revised to provide a broad overview	Charles Corbett	University of California, Los Angeles School of Law	United States of America
46327	53	21	53	22	Please delete: "This potential needs to be realized already in outdoors research; for example, in developing robust governance for MCB and OAC experiments on the Great Barrier Reef (McDonald et al., 2019)." Or clearly indicate that this is a proposal. IPCC is not to make policy prescriptions.	Noted: the text in this section has been revised to provide a broad overview	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany
9465	53	21	53	23	[previously submitted with WG2 SOD] The IPCC aims to be "policy-relevant and yet policy-neutral, never policy-prescriptive." This sentence is policy prescriptive.	Noted: the text in this section has been revised to provide a broad overview	Jesse Reynolds	University of California, Los Angeles	Netherlands
46329	53	28	53	28	Please add before "guard": "operationalize the precautionary principle and", COMMENT: "guard against risks" is a vague wording, some risks have to be outruled before decisions on deployment can be taken; guard against risks could mean monitoring the risks when SRM is deployed (See e.g. Tedsen/Homann in CCLR 2013 (2) 90, DOI: https://doi.org/10.21552/CCLR/2013/2/250). The governance proposals in literature should not be "distilled" by citing only one author.	Noted: the text in this section has been revised to provide a broad overview	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany
11213	53	29	53	29	I would add "and relevant expertise" after "development of scientific knowledge." Expertise in relevant areas of law, public engagement, and the social sciences are also seen as necessary for governing SRM over the long-term See Simon Nicholson et al., Solar Radiation Management: A Proposal for Immediate Polycentric Governance, Climate Policy (2017) 18: 322-334	Noted: the text in this section has been revised to provide a broad overview	Charles Corbett	University of California, Los Angeles School of Law	United States of America
11215	53	29	53	30	"any future research" reads as over-inclusive. Afterall, there could be research or policy-making on SRM not worth legitimizing (such as unilateral, rogue deployment of SAI, or research activities by a country without serious mitigation policy). I would strike "any" after "Legitimize".	Noted: the text in this section has been revised to provide a broad overview	Charles Corbett	University of California, Los Angeles School of Law	United States of America
46331	53	31	53	32	Please delete: "(4) ensure that SRM is considered only as a part of a broader portfolio of responses to climate change". COMMENT: even if the author Nicholson writes this, this is not a distillation of the literature on SRM Governance. This sentence contains the assumption that SRM is a legitimate response to climate change, which is not consensus. This report should give an overview of the literature on its own.	Noted: the text in this section has been revised to provide a broad overview	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany
8033	54	1	54	1	"Stratospheric Aerosol Injection (SAI)" You have already defined this several times. And it should be Intervention.	Accepted. We made the change.	Alan Robock	Rutgers University	United States of America
69421	54	2			There seems to be a need to at least mention the "free driver" concept by name, and to devote a few sentences to it, as for many this could be one of the most important risks of geoengineering. It is mentioned only here implicitly with the word "uni-". See Weitzman 2015 and multiple other recent works on this risk, including efforts to govern it by e.g., Reynolds, J.	Accepted. We have made an additional refernece to this idea.	Tyler Felgenhauer	Duke University	United States of America

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
75049	54	4	54	4	You are using here the reference Parson 2014; usually I expect to see in this context the reference: "Parson, E.A., Ernst, L.N., 2013. International governance of climate engineering. Theor. Inquir. Law 14, 307–337." where it is acknowledged that unilateral deployment is possible, pointing at the same time to the fact that in terms of financial, technological, logistical, and military strength, only a very small number of states would be capable of upholding SRM against international opposition; implying that the risk of unilateral deployment should not be confused with a scenario where various states might consider using SRM	Noted. Later in the paragraph we refer to a small number of states, rather than asingle one.	Wilfried Rickels	Kiel Institute for the World Economy	Germany
43385	54	6	54	6	unclear formulation: Whose "perceptions" of what?	Accepted. We have changed to "Perceived local harm"	Christine Merk	Kiel Institute for the World Economy	Germany
76205	54	6	54	11	The points made here are in my view essential in this assessment of SRM. You may consider expanding this a bit further. A paper that could be useful here is "Detecting sulphate aerosol geoengineering with different methods" by Eunice et al, 2016. https://www.nature.com/articles/srep39169	Noted. We will keep the points that you like.	Jan Fuglestedt	CICERO	Norway
80305	54	6	54	11	First order draft said: "Perceptions could exacerbate geopolitical are part of a deployment coalition (Maas and Scheffran 2012; Zürn and Schäfer 2013). conflicts, not the least depending on which countries Premature deployment triggered by perceived climate emergencies would create international tensions (Corry 2017; Lederer and Kreuter 2018)." Second order draft says roughly the same thing but replaces would with could, and premature with uncoordinated. COMMENT These statements are speculative rather than evidence based. Further study is warranted on the drivers for international cooperation and coordinated response induced by rapidly unfolding crises of the commons such as those manifested during disease outbreaks. These dynamics may not be adequately represented in literature on SRM. See for example (Kamradt-Scott, A. and McInnes, C., 2012. The securitisation of pandemic influenza: framing, security and public policy. Global Public Health, 7(sup2), pp.595-5110.) The words "premature" and "perceived" are presumptive and judgmental in several respects. First, an SRM deployment may be justified before dramatic climate harms are experienced, both as a matter of saving lives and as a matter of technical feasibility. Second, "perceived" climate emergencies may be correctly experienced as current and ongoing by some (often already vulnerable) communities - a significant contributor to climate injustice. In this context, timeliness of SRM deployment may not be objectively determinable, a fact that indeed would be a likely cause of tension - but justifiably and reasonably so.	Noted. We have done our best to reflect the literature -- much of which is theory rather than evidence based -- in a manner that is balanced.	Kelly Wanser	SilverLining	United States of America
8035	54	8	54	9	This is wrong. It would be easy to immediately detect deployment. We can easily see small volcanic eruptions with satellites and ground-based instruments, and could also see artificial stratospheric clouds, as well as see the airplanes or other means of deployment. Attribution to the actors would not be hard either. Attribution of the impacts would be hard, but that is a different topic.	Accepted. We have reworded.	Alan Robock	Rutgers University	United States of America
80307	54	8	54	11	"..because immediate detection and attribution of SAI deployment would not be possible. Uncoordinated deployment triggered by perceived climate emergencies could create international tensions (Corry 2017; Lederer 10and Kreuter 2018)." COMMENT Detection and attribution is inappropriately identified as a driver of tension, because the climate detection problem is not equivalent to the detection of injection aircraft flying around.	Accepted. We have changed the text, to note that detection is not hard.	Kelly Wanser	SilverLining	United States of America
1589	54	9			srn attribution is normally trivial, but a citation for clandestine srm is https://jstpub.org/v26.1/lockley.htm#:~:text=Geoengineering%2C%20specifically%20Solar%20Radiation%20Management,to%20counteract%20Anthropogenic%20Global%20Warming . Geoengineering: A war on climate change? Andrew Lockley Journal of Evolution and Technology - Vol. 26 Issue 1 – February 2016 - pgs 26-49	Noted. We have changed this text.	Andrew Lockley	Andrew Lockley	United Kingdom (of Great Britain and Northern Ireland)

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
11165	54	9	54	11	"Emergency governance" is when a state or states act contrary to the prevailing legal and social order to respond to a crisis, justified by perceived necessity. See European Commission for Democracy Through Law, Compilation of Venice Commission Opinions and Reports on States of Emergency (Apr. 16, 2020), CDL-PI(2020)003; Adrian Vermeule, Holmes on Emergencies, 161 Stan. L. Rev. 163, 168 (2008); John Ferejohn & Pasquale Pasquino, The Law of the Exception: A Typology of Emergency Powers, 2 Int'l J. Con. L. 210 (2004); cf. International Law Commission, Draft Articles on Responsibility of States for Internationally Wrongful Acts (2001) art. 25 (comments on international necessity doctrine). It is hence difficult to imagine SAI deployment occurring in anything other than in an "emergency" mindset, given SAI deployment would almost certainly be justified by a sense of necessity and that deployment would conflict with the prevailing social and legal order structuring both international relations and human relations with the planet. See Charles R. Corbett, "The Climate Emergency and Solar Geoengineering" (Harvard Envtl. Law Rev., forthcoming); see also Royal Society, Geoengineering the Climate (2009) (cataloging SAI's governance, political, and ethical conflicts with normal state-relations). It follows that both a coordinated "risk-management" deployment scenario and a rash, uncoordinated deployment scenarios would arise from a sense of "climate emergency." As a result, this paragraph's attempt to distinguish between risk management and emergency deployment scenarios makes a semantic and theoretical error. I would therefore revise this sentence to state "Uncoordinated, rash, or poorly researched deployment triggered by perceived climate crises could create international tensions." (Adding "rash" and "poorly researched" since that is really what critiques of so-called "emergency" deployment scenarios are concerned about).	Accepted. We have added the idea of poor planning in response to a perceived climate emergency	Charles Corbett	University of California, Los Angeles School of Law	United States of America
22621	54	15	54	16	The link with the "moral hazard" mentioned in the ethics paragraph above could be more explicit here.	Noted. We aren't sure how to do this, and have left the text stand.	Government of France	Ministère de la Transition écologique et solidaire	France
46333	54	18	54	21	Please delete "there is broad agreement". This is important since the next sentence explains this agreement by stating that governance should reflect the given, evolving SRM techniques. Those authors that suggest a SRM Moratorium or stress a precautionary approach would not support this statement (e.g. Wieding/Stubenrauch, in Sustainability 2020, Human Rights and Precautionary Principle: Limits to Geoengineering, SRM, and IPCC Scenarios, DOI: https://doi.org/10.3390/su12218858 , Tedsen/Homann in CCLR 2013 (2) 90, DOI: https://doi.org/10.21552/CCLR/2013/2/250). The assertion of broad agreement is wrong.	Accepted. We have changed the wording.	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany
46335	54	18	54	18	Please add: "In-between the enabling and the restrictive approaches some authors stress the operationalization of the precautionary approach. This means no deployment should take place before specific criteria regarding scientific consensus, impact assessments and governance issues are met. (cf. CBD Decision X/33 para 8 w; Wieding/Stubenrauch, in Sustainability 2020, Human Rights and Precautionary Principle: Limits to Geoengineering, SRM, and IPCC Scenarios, DOI: https://doi.org/10.3390/su12218858 , Tedsen/Homann in CCLR 2013 (2) 90, DOI: https://doi.org/10.21552/CCLR/2013/2/250).	Accepted. We have added text and these references.	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany
8993	54	18	54	20	The text reads "there is broad agreement in the literature that emerging and potentially disruptive SRM techniques should be governed in an anticipatory manner (Gupta et al. 2020)." "Anticipatory governance" has a very specific, relatively restrictive meaning (e.g., Guston 2014) that would not attract broad agreement. Perhaps inserting the word "broadly" prior to "anticipatory" would solve this.	Noted. We have reworded this text.	Joshua Horton	Harvard University	United States of America
8037	54	19	54	19	Please make clear whether "SRM techniques should be governed" applies to research or to deployment, and if research, please distinguish between indoor and outdoor research.	Accepted. We have in any event differentiated indoor and outdoor. Beyond this is going into more detail than we have space for.	Alan Robock	Rutgers University	United States of America
22623	54	19	54	19	About "governed in an anticipatory manner", governance emerges when there is something to govern; hence anticipatory governance is creative writing but does not mean much. Nothing so far prevents experiments to be conducted at national level. The question is governance for what purpose: controlling a risky technology or enabling its development. Behind those proposing a more robust governance there are two constituencies peaching exactly the opposite one from another	Accepted. We agree. We have removed this idea, coming from a single source.	Government of France	Ministère de la Transition écologique et solidaire	France
9473	54	19	54	19	Climate change, which SRM appears able to reduce, would also be potentially disruptive. Why describe SRM as potentially disruptive? The perhaps more relevant question is whether the novel climate conditions of climate change + SRM would be more or less potentially disruptive.	Accepted. We have changed the text to remove the potentially disruptive language for SRM.	Jesse Reynolds	University of California, Los Angeles	Netherlands
1591	54	20			If agreement is broad, you can find more than one cite. not just gupta. I think its not broad or agreed	Accepted. We have removed this.	Andrew Lockley	Andrew Lockley	United Kingdom (of Great Britain and Northern Ireland)
11167	54	20	54	22	It may be worth briefly defining what is meant by "anticipatory" governance and its relationship to "governance arrangements [that] co-evolve". A reader unfamiliar with this area may find those terms contradictory	Noted. We have removed this idea.	Charles Corbett	University of California, Los Angeles School of Law	United States of America
69423	54	20			For an emerging (and anticipatory) risk framework, see: Emerging risk governance for stratospheric aerosol injection as a climate management technology, Khara D. Grieger, Tyler Felgenhauer, Ortwin Renn, Jonathan Wiener & Mark Borsuk Environment Systems and Decisions volume 39, pages371–382(2019)	Noted. We have removed this idea.	Tyler Felgenhauer	Duke University	United States of America
9475	54	21	54	22	The degree to which governance must stay at least one step ahead of research is contested. Current governance arrangements may be adequate for SRM research. See e.g. Parker, Andy, "Governing Solar Geoengineering Research as It Leaves the Laboratory." Philosophical Transactions of the Royal Society A: Mathematical, Physical and Engineering Sciences 372, no. 2031 (December 28, 2014): article 20140173. https://doi.org/10.1098/rsta.2014.0173 .	Accepted. We have added this idea and reference.	Jesse Reynolds	University of California, Los Angeles	Netherlands

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
80313	54	22	54	25	<p>"With the modelling community's increasing focus on showing how SAI could help to minimise climate change impacts in the Global South, considerations about equity and justice dimensions take a prominent role in the SRM governance literature (Flegal and Gupta 2018; Hourdequin 2018; Horton and Keith 2016)."</p> <p>COMMENT This literature is highly germane in the context of WG3, but discussion of actual results, dynamics, or substantive content is minimal. This omission is notable and potentially pejorative to policy-prescriptive effect. These papers should be centered in this chapter.</p>	Accepted. We have rewritten this sentence to make the point stronger.	Kelly Wanser	SilverLining	United States of America
19629	54	22	54	22	<p>Please add after "... Parson 2014)": "Accounting for the risk-risk nature of decisions on SRM, risk management strategies based on risk-superior moves have been proposed, such as conducting research in ways that strengthen, rather than undermine, international cooperation and trust (Florin et al., 2020)."</p> <p>Reason: Risk-risk governance approaches to SRM need to be covered.</p> <p>New reference: Florin, M. V., Rouse, P., Hubert, A. M., Honegger, M., & Reynolds, J. (2020). International governance issues on climate engineering. Information for policymakers. International Risk Governance Council, Lausanne, Switzerland.</p>	Noted. We are not including this for reasons of space, and the fact that this paper has not yet been published in a clearly peer-reviewed place.	Matthias Honegger	Utrecht University, Perspectives climate research, IASS-Potsdam	Germany
46337	54	25	54	25	<p>Please add: Wieding/Stubenrauch, in Sustainability 2020, Human Rights and Precautionary Principle: Limits to Geoengineering, SRM, and IPCC Scenarios, DOI: https://doi.org/10.3390/su12218858 - the authors show the relevance for human rights.</p>	Accepted. We have added.	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany
8995	54	25	54	25	<p>Minor quibble, but since both Flegal and Gupta 2018 and Hourdequin 2018 are partly responses to Horton and Keith 2016, the latter should be listed first.</p>	Accepted. We have changed the order.	Joshua Horton	Harvard University	United States of America
46973	54	26	54	37	<p>With respect to governance of SRM, the authors may be interested in a forthcoming paper by Sikina Jinnah, myself, and Simon Nicholson (in press at Global Policy), which argues that given the problem structures of SRM research and deployment, governance is likely to differ for the two, with states likely to prefer decentralized, flexible agreements for SRM research and centralized agreements with wide scope for SRM deployment. (This paper might also be helpful to cite in the preamble to Section 14.4.5, as it argues that SRM and CDR have different problem structures and so will likely be governed in different ways.)</p>	Noted. Thanks for the suggestion, but this too much detail for the space we have.	David Morrow	American University	United States of America
58463	54	26	54	37	<p>Some of this text was located in the Cross-Working Group box on SRM. Even if the purpose of the Cross-Working Group Box is to showcase synthesis across WGs, is it worth repeating text in both places?</p>	It is our understanding that these need to be stand alone.	Government of United States of America	U.S. Department of State	United States of America
9477	54	26	54	26	<p>Not just the risks, but also the potential benefits of SRM proposals vary substantially.</p>	Accepted. We have added text.	Jesse Reynolds	University of California, Los Angeles	Netherlands
9729	54	26	54	37	<p>What form of international cooperation can be advocated to support R&D and development of SRM technologies. A paragraph or two to elaborate on this will be welcomed by decision making and policy community.</p>	Rejected. We worry that this would have to be incredibly inclusive, vastly exceeding space limitations, to avoid being policy prescriptive.	Mustafa Babiker	Saudi Aramco	Saudi Arabia
46339	54	28	54	28	<p>Please add before "guard": "operationalize the precautionary principle and", COMMENT: "guard against risks" is a vague wording, some risks have to be outruled before decisions on deployment can be taken; guard against risks could mean monitoring the risks when SRM is deployed (See e.g. Tedsen/Homann in CCLR 2013 (2) 90, DOI: https://doi.org/10.21552/CCLR/2013/2/250). The governance proposals in literature should not be "distilled" by citing only one author.</p>	Noted. We have added this idea to a previous paragraph.	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany
46341	54	31	54	32	<p>Please delete: "(4) ensure that SRM is considered only as a part of a broader portfolio of responses to climate change" COMMENT: even if the author Nicholson writes this, this is not a distillation of the literature on SRM Governance. This sentence contains the assumption that SRM is a legitimate response to climate change, which is not consensus. This report should give an overview of the literature on its own.</p>	Noted. We have rewritten this sentence to be clear that these four principles are not universal; the position you describe is included in the text above.	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany
9727	54	31	54	32	<p>Why limiting SRM to mitigation only while it can contribute to adaptation.</p>	Noted. Indeed our view is that SRM is primarily a means of adaptation, not mitigation. The IPCC plenary nevertheless asked for it to be covered in this chapter. Nevertheless, the concern is that there would be a moral hazard issue with mitigation.	Mustafa Babiker	Saudi Aramco	Saudi Arabia
12771	54	36	54	36	<p>(Suggestion) Right after the sentence containing four core principles of Nichoseon et al. (2018), I would like to suggest the insertion of a following sentence: "Besides these four principles, further stronger approaches in consideration of the marginalized global south, particularly the least developed countries, in geoengineering science are considered (Biermann and Möller 2019)."</p> <p><Reference> Biermann, F. and Möller, I. (2019). Rich man's solution? Climate engineering discourses and the marginalization of the global south. International Environmental Agreements: Politics, Law and Economics, 19, 151-167.</p>	Noted. We already cover this issue above, in terms of equity concerns.	Chaewoon Oh	Green Technology Center	Republic of Korea

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
16651	54	36	54	36	(Suggestion) Right after the sentence containing four core principles of Nichoseon et al. (2018), I would like to suggest the insertion of a following sentence: "Besides these four principles, further stronger approaches in consideration of the marginalized global south, particularly the least developed countries, in geoeengineering science are considered (Biermann and Möller 2019)." -Reference- Biermann, F. and Möller, I. (2019). Rich man's solution? Climate engineering discourses and the marginalization of the global south. <i>International Environmental Agreements: Politics, Law and Economics</i> , 19, 151-167.	Noted. We already cover this issue above, in terms of equity concerns.	Government of Republic of Korea	Korea Meteorological Administration (KMA)	Republic of Korea
8039	54	38	54	41	Add the ENMOD Treaty here.	Accepted. We have added.	Alan Robock	Rutgers University	United States of America
80399	54	38	54	41	"Currently, there is no targeted international law relating to SRM, although some multilateral agreements—such as the Convention on Biological Diversity, the UN Convention on the Law of the Sea or the Vienna Convention on the Protection of the Ozone Layer and its Montreal Protocol—contain provisions applicable to SRM (Bodansky 2013; Reynolds 2019; Jinnah and Nicholson 2019)." COMMENT For a great outline of governance options and gaps, see: Biniac, S., & Bodansky, D. (2020). <i>Solar Climate Intervention: Options for International Assessment and Decision-Making</i> . SilverLining and C2ES. https://www.c2es.org/site/assets/uploads/2020/07/solar-climate-intervention-options-for-international-assessment-and-decision-making.pdf See also for a discussion on how existing environmental, tort, property, and contract laws might apply to SRM: Carlin, N. F., & James, R. A. (2018). <i>Pratt's Energy Law Report: Geoeengineering Research under U.S. Law</i> . <i>Pratt's Energy Law Report</i> , 18(3), 67–75. https://www.pillsburylaw.com/images/content/1/1/v4/116652/Geoengineering-Research-under-U.S.-Law.pdf	Noted. Thanks for suggesting to us to read these documents.	Kelly Wanser	SilverLining	United States of America
46343	54	41	54	41	Please add information on the decision X/33 of the CBD, it is the one and only multilateral decision on Geoeengineering. Though not strictly binding on states, it is comprehensive on SRM-Governance insofar all relevant criteria for governance are mentioned in a generic manner.	Noted. We have already described these criteria, and do not feel like we need to do so again in the context of X/33.	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany
22625	54	42	54	42	In a similar way to table SRM.1, it could be useful to make a link with the table in chapter 12 (12.6) summarizing the description, uncertainties, impacts and their scale, and risks of various CDR removal options, in order to help visualize the difference of governance stakes between the CDR options already used (afforestation/reforestation, soil carbon sequestration) and other options.	Accepted. We have made this cross reference.	Government of France	Ministère de la Transition écologique et solidaire	France
12165	54	42	55	21	The interrelationships between CDR and the SDGs is likely to be key – for example in relation to water, food security etc. This is referenced in Chapter 12. Suggest cross referencing to this and to section 14.5.1.2, and providing a brief summary of some key governance issues	Accepted. We cross reference these issues in chapter 12.	Paul Rouse	Carnegie Climate Governance Initiative (C2G) - The Carnegie Council for Ethics and International Affairs	United Kingdom (of Great Britain and Northern Ireland)
12167	54	42	55	21	In the context of the debate regarding the potential for SRM as a temporary measure to slow the rate of warming or address temperature overshoot whilst CDR removals capacity scales up Page 53 line 42 to 43, suggest some cross referencing to the interrelationships an interdependencies of CDR and SRM are discussed.	Noted. We will leave this in the box alone, as it goes beyond international risk governance.	Paul Rouse	Carnegie Climate Governance Initiative (C2G) - The Carnegie Council for Ethics and International Affairs	United Kingdom (of Great Britain and Northern Ireland)
12169	54	42	55	21	International common law duties not to cause harm and to protect the environment will apply in meaningful ways to CDR (and SRM). Suggest this is referenced. Further, countries own laws and governance processes will also apply, again these should be discussed.	Noted. If there had been a good citation for this we would have included it.	Paul Rouse	Carnegie Climate Governance Initiative (C2G) - The Carnegie Council for Ethics and International Affairs	United Kingdom (of Great Britain and Northern Ireland)
19891	54	43	54	45	Please add after "...products": "In contrast to SRM, CDR contributes to- and is a form of 'mitigation of climate change' and is subject to the corresponding provisions of both the UNFCCC and the Paris Agreement regarding obligations of conduct by their parties (Honegger et al., 2021)." New reference: Honegger, M., Burns, W., and Morrow, D. (2021, under review): Is carbon dioxide removal 'mitigation of climate change'? <i>Review of European, Comparative & International Environmental Law</i> .	Accepted. We have included part of this language. We could not include the paper as currently in review.	Axel Michaelowa	University of Zurich	Switzerland
8785	54	43	54	45	The text just refers to removal of CO2 from the atmosphere. However, the ocean CDR techniques remove CO2 from the water that then causes a re-equilibration with the atmosphere i.e. the ocean CDR techniques indirectly remove CO2 from the atmosphere.	Accepted. We added coean.	Chris Vivian	Retired ex Cefas	United Kingdom (of Great Britain and Northern Ireland)
22627	54	45	54	46	We recommend a clarification on who decides that these are harder to abate than others. Changes in production systems, transport systems and demand-side policies might change this perspective. 'hard to abate' is a social construction relying on preconceived assumptions about which policies are legitimate and feasible. It also varies from country to country.	Accepted. We have changed the wording to suggest that these "may prove" hard to abate, rather than suggesting that this has already been determined.	Government of France	Ministère de la Transition écologique et solidaire	France
12171	55	22	79	33	There is no reference to CDR in the sectors addressed in Section 14.5. Suggest this is reviewed and the sector texts reflect CDR agenda	Noted. Reviewed in relevant sectoral areas.	Paul Rouse	Carnegie Climate Governance Initiative (C2G) - The Carnegie Council for Ethics and International Affairs	United Kingdom (of Great Britain and Northern Ireland)
52807	55	37	55	37	What does "this" exactly refer to?	Accepted. Clarified in text.	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
50113	55	37	55	47	Propose to include a reference to transboundary haze pollution at line 45. "...for instance, other international environmental agreements dealing with a particular subset of GHGs; linkages with, or leveraging of, efforts or agreements in other spheres such as adaptation, transboundary pollution, human rights or trade; agreements within particular economic sectors; or transnational initiatives involving global cooperative efforts by different types of non-state actors."	Rejected. This sentence is providing illustrative examples of areas covered in the following sections, including 'transboundary pollution' which includes specific agreements on transboundary haze pollution	Government of Singapore	Ministry of Sustainability and the Environment (MSE)	Singapore
1593	55	1			cdr can return climateto pre industrial,needed for sea level rise	Accepted. We have changed to a generic idea of reducing concentrations, not presupposing that there is one ideal concentration, be it pre.-industrial or something higher.	Andrew Lockley	Andrew Lockley	United Kingdom (of Great Britain and Northern Ireland)
83559	55	1	55	1	A reference to Chapter 2 of the IPCC SR1.5 would also support this statement. In addition, information on the need for CDR in achieving net zero can also be found in the following paper: Rogelj, Geden, Cowie & Reisinger, Nature, 2021.	Noted. We think the statement is unproblematic enough that the existing references are sufficient.	Joeri Rogelj	Imperial College London	United Kingdom (of Great Britain and Northern Ireland)
81131	55	2	55	12	Clarify that in contrast to SRM (which almost inevitably has a trans-boundary effect, unless deployed in a very specific and localised way within a very large country), CDR in itself does not necessarily have features that require international policies to manage its deployment and risks - only agreed accounting methods. It would be useful make clearer at the beginning of this section the different roles of international policy related to CDR, which can range from simply agreeing accounting rules but leaving deployment entirely up to individual countries (e.g. afforestation), to policies necessary to manage transboundary risks from large-scale deployment (e.g. effects on regional climate from large-scale afforestation, water demand in shared watersheds, storage and potential leakage from underground reservoirs with unclear territorial rights), to implications for vulnerable groups from teleconnections (e.g. food price rises, displacement etc) related to transnational transactions such as demand for biofuels. "Transboundary risks" is perhaps too generic a term to reflect the different nature of risks. Overall I feel this section should be expanded (in coordination with chapters 7 and 12) to provide more details on those rather diverse and nuanced issues.	Accepted. We have added a sentence near the beginning making these points. Perhaps at the short September 2021 meeting we can resolve these cross-chapter issues.	Andy Reisinger	Ministry for the Environment	New Zealand
22629	55	6	55	7	even if these stakes are already mentioned in AFOLU section of 14.5.2 below, it would be relevant for balance purposes with the above SRM section to develop this CDR section more, to cover all existing governance stakes of CDR for afforestation/reforestation, soil carbon sequestration and BECCS (even if it is to synthesize it or to indicate that these issues are covered in the next sub-section in more details); the current image rendered in this sections seems incomplete in terms of capturing the literature on governance of CDR.	Noted. This chapter isn't the place for this.	Government of France	Ministère de la Transition écologique et solidaire	France
78173	55	7	55	9	This part could be further elaborated.	Noted. It could be, but we are lacking space.	Charlotte Plinke	Climate Analytics	Germany
22631	55	7	55	8	The purpose of governance is not primarily to "accelerate" CDR but to assess in a transparent manner to what extent CDR must be developed and the alternatives. It is also to facilitate the management of impacts and risks associated with CDR. Chapter 3 provides many insights in terms of demand-side policy options and risks of CDR. They should have been taken into account here	Accepted. We have included "and to better manage"	Government of France	Ministère de la Transition écologique et solidaire	France
46345	55	8	55	9	Please clearly indicate that you are reporting proposals in the literature and not directly making proposals. The current wording is too policy prescriptive. Please delete the sentence or reformulate as follows: "and project-based market mechanisms are SUGGESTED in the literature"	Accepted. We have changed the wording.	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany
46347	55	9	55	9	Please add: "some authors stress that targets and accounting for negative emissions should be explicitly set and managed separately from existing and future targets for emissions reduction, to avoid mitigation deterrence" (Mc Larren et al., Front. Clim.2019, Beyond "Net-Zero": A Case for Separate Targets for Emissions Reduction and Negative Emissions, https://doi.org/10.3389/fclim.2019.00004).	Accepted. Thanks for this. We have included.	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany
19517	55	9	55	9	"are needed" would seem to be prescriptive. Another formulation could perhaps be explored, such as "could promote" or "could contribute" or suchlike, worked into the sentence, as appropriate.	Accepted. We have reworded.	Markku Rummukainen	Lund University	Sweden
12163	55	9	55	12	Suggest adding that whilst developed countries may carry the burden of RDD&D of CDR, governance scholars note that less developed countries should be involved in the process if maximal outcomes are to be achieved.	Noted. This is implicit in the statement on finance.	Paul Rouse	Carnegie Climate Governance Initiative (C2G) - The Carnegie Council for Ethics and International Affairs	United Kingdom (of Great Britain and Northern Ireland)
19889	55	12	55	12	Plse insert after "Poza et al. 2020)": "As a public good which largely lacks incentives to be pursued as a business case, most types of CDR require a suite of dedicated policy instruments that address both near-term needs (through financing of R&D and piloting activities) as well as long-term continuity at scale (through inclusion in broader carbon pricing instruments) (Honegger et al. 2021)." Reason: Literature on policy instruments for CDR needs to be covered. New reference: Honegger, M., Poralla, M., Michaelowa, A., and Ahonen H-M. (2021, under review): Who is paying for carbon dioxide removal? Designing policy instruments for mobilizing negative emissions technologies. <i>Frontiers in Climate</i> .	Accepted. We have included an edited version of this text, and the reference	Axel Michaelowa	University of Zurich	Switzerland
12773	55	12	55	12	(Suggestion) At the end of the paragraph, I would like to suggest the insertion of a following sentence: "Like the SRM, there is a demand for tabling CDR agenda under the UNFCCC (Fuss et al. 2000)". <Reference> Fuss, S., Canadell, J.G., Clais, P., Jackson, R.B., Jones, C.D., Lyngfelt, A., Peters, G.P., and Van Vuuren, D.P. (2000). Moving toward net-zero emission requires new alliances for carbon dioxide removal. <i>One Earth</i> , 3, 145-149.	Rejected. First, the citation is too id. Second, it gets too policy prescriptive.	Chaewoon Oh	Green Technology Center	Republic of Korea

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
16653	55	12	55	12	(Suggestion) At the end of the paragraph, I would like to suggest the insertion of a following sentence: "Like the SRM, there is a demand for tabling CDR agenda under the UNFCCC (Fuss et al. 2000)". <Reference> Fuss, S., Canadell, J.G., Ciais, P., Jackson, R.B., Jones, C.D., Lyngfelt, A., Peters, G.P., and Van Vuuren, D.P. (2000). Moving toward net-zero emission requires new alliances for carbon dioxide removal. One Earth, 3, 145-149.	Rejected. First, the citation is too old. Second, it gets too policy prescriptive.	Government of Republic of Korea	Korea Meteorological Administration (KMA)	Republic of Korea
8787	55	13	55	21	This text does not give an accurate reflection of the current situation and there a number of issues with the text: 1. As the London Convention/London Protocol and the CBD are the only instruments that have pronounced on ocean fertilisation, "such as" is inappropriate. 2. The text in this paragraph refers to the London Convention and London Protocol in several different ways that may confuse readers. Note that the London Convention has not been referred to as the "London Dumping Convention" since 1992. 3. The London Convention/London Protocol resolution of November 2008 was a non-binding resolution whereas the London Protocol amendments of October 2013 will be legally binding when they enter into force. 4. As clearly explained by Reynolds et al. (2016), the assertion of a binding CBD moratorium or ban on outdoor research is inaccurate on several counts. Reynolds, J. L., Parker, A. and Irvine, P. (2016). Five solar geoengineering tropes that have outstayed their welcome. Earth's Future, 4, 562–568. doi:10.1002/2016EF000416. I suggest replacing the existing text of this paragraph with the following text: "The London Convention/London Protocol and the CBD have adopted a precautionary approach to ocean fertilisation. The London Convention/London Protocol Parties adopted a non-binding resolution on ocean fertilisation in November 2008 that stated "...given the present state of knowledge, ocean fertilization activities other than legitimate scientific research should not be allowed". In October 2010 the London Convention/London Protocol Parties adopted the Ocean Fertilization Assessment Framework for assessing field research experiments. In October 2013, the London Protocol Parties adopted a legally binding decision on marine geoengineering that amends the Protocol and that explicitly regulates ocean iron fertilisation and allows parties to govern other marine CDR methods like ocean alkalinity enhancement (GESAMP 2019; Burns and Corbett 2020; Ginzky and Frost 2014; Ginzky 2018; Sands and Peel 2018). The amendment states that "An ocean fertilization activity may only be considered for a permit if it is assessed as constituting legitimate scientific research taking into account any specific placement assessment framework." These amendments	Accepted. We have changed the text, including pieces of what you suggest.	Chris Vivian	Retired ex Cefas	United Kingdom (of Great Britain and Northern Ireland)
22633	55	13	55	13	It would improve clarity to precise again which of the CDR options mentioned here pose transboundary risks and what these transboundary risks are.	Accepted. We have added text early in the section.	Government of France	Ministère de la Transition écologique et solidaire	France
1595	55	17			cbd not a moratorium	Accepted. We have changed the language.	Andrew Lockley	Andrew Lockley	United Kingdom (of Great Britain and Northern Ireland)
19887	55	21	55	21	Please add after "... ocean fertilisation.": "Morrow et al. (2020) propose principles to structure emerging governance challenges, while Honegger et al. (2021) propose six necessary policy functions for CDR to play a Paris Agreement compatible role in the mitigation of climate change: 1. clarity on the intended role of CDR 2. accelerate learning to unlock a sufficient range of affordable and reliable CDR options 3. ensure appropriate public participation 4. transition from piloting to effective continuous, scaled operation of CDR 5. ensure proper measuring, reporting, verification and accounting of results to track domestic and global progress toward net-zero emissions 6. and prevent adverse side-effects to sustainable development goals and maximise positive co-benefits (Honegger et al., 2020)." Reason: There is relevant new literature with proposals for policy instrument design that draws on existing instruments and institutions to plan Paris Agreement compatible short to long-term instruments for CDR. New references: Honegger, M., Poralla, M., Michaelowa, A., and Ahonen H-M. (in review): Who is paying for carbon dioxide removal? Designing policy instruments for mobilizing negative emissions technologies. Frontiers in Climate. Morrow, D. R., Thompson, M. S., Anderson, A., Batres, M., Buck, H. J., Dooley, K., ... & Wilcox, J. (2020). Principles for Thinking about Carbon Dioxide Removal in Just Climate Policy. One Earth, 3(2), 150-153. Honegger, M., Michaelowa, A., & Roy, J. (2020). Potential implications of carbon dioxide removal for the sustainable development goals. Climate Policy, 1-21.	Noted. We have cited the paper, but space limitations prevent us from including the text you suggest.q	Axel Michaelowa	University of Zurich	Switzerland

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
8441	55	1			The authors have done wonderful job taking up Paris Agreement in detail as well as relevant international cooperative activities at multi-levels. Meanwhile, I found one important element missing: political leaders' initiatives, which are G7(8), and G20. Although they are not formal multilateral forum for climate change, they play important roles in nurturing common understanding as to how major countries need to respond to climate change, especially when the US was not part of UN agreements (Kyoto and Paris). Publications as below emphasize role of G7 or G20 that supplemented UN negotiation, as well as how hosting G7 or G20 meetings helped some countries form more positive position on climate change than otherwise. Kirton and Kokotsis (2015) The Global Governance of Climate Change: G7, G20 and UN Leadership Kameyama, Yasuko (2017) Climate Change Policy in Japan: From the 1980s to 2015, Abingdon: Routledge. Livingston, David (2016) The G7 Climate Mandate and the Tragedy of Horizons, Carnegie Endowment for International Peace, https://www.jstor.org/stable/resrep12840 It should also be noted that some non-state actors' transnational activities such as TCFD (as referred to in page 76 line 27) was initiated by an agreement reached at the G20 Finance Ministers agreed in 2015 to request FSB to start such initiative.	Accepted. We have included this point and a reference.	Yasuko Kameyama	National Institute for Environmental Studies	Japan
65615	56	13	65	12	There are important international cooperation initiatives following the Declaration of Belwm, The Galloway Agreement and several EU initiatives of scientific diplomacy.	Rejected. Out of the scope of this section, not referenced.	Mônica M. C. Muelbert	UNIFESP	Brazil
72347	56	17	57	7	The role of the Montreal Protocol and the Kigali amendment is also presented in section 9.9.7.1.	Noted.	bertoldi paolo	European commission	Italy
76187	56	17	57	7	Regarding the Montreal Protocol and Kigali Amendment, I suggest you check the WMO/UNEP 2018 Ozone assessment to ensure that you are consistent and updated.	Accepted.	Jan Fuglestedt	CICERO	Norway
14623	56	23	56	34	Delete "Kyoto Protocol", to read "over the period from 1990-2010" (1990-2010 doesn't equate to any KP period...)	Accepted.	Joanna Depledge	Centre for Environment, Energy and Natural Resource Governance (CEENRG), University of Cambridge	United Kingdom (of Great Britain and Northern Ireland)
76189	56	26	56	26	I suggest using a more recent reference here. See WMO/UNEP 2018 Ozone assessment	Accepted.	Jan Fuglestedt	CICERO	Norway
14625	56	28	56	29	Somewhere in these sentences, it would be useful to make the point that HFCs are not ODS.	Accepted.	Joanna Depledge	Centre for Environment, Energy and Natural Resource Governance (CEENRG), University of Cambridge	United Kingdom (of Great Britain and Northern Ireland)
76191	56	29	56	29	I guess this is for a 100 years time horizon? Please indicate that.	Accepted.	Jan Fuglestedt	CICERO	Norway
14627	56	32	56	34	I would rephrase this rather generous assessment. The Kigali Amendment belatedly addresses the conflict between ozone and climate protection, which was first identified as a problem in 1998, after the KP included HFCs in its Annex A.	Rejected. Not referenced.	Joanna Depledge	Centre for Environment, Energy and Natural Resource Governance (CEENRG), University of Cambridge	United Kingdom (of Great Britain and Northern Ireland)
86063	56		56		It would be worth clearly noting here or elsewhere that a major reason for the success of the Montreal Protocol - and why it is lauded - is due to (i) the relative ease for substitute products; and (ii) that the chemical industry swooped in behind the substitution idea (out of self-interested profit making intentions). Neither point is readily directly applicable or analogous to GHGs that cause climate change, which have few substitutes and fractured and incumbent industrial interests to contend with. Reference: see generally Elizabeth R. DeSombre, 'The Experience of the Montreal Protocol: Particularly Remarkable, Remarkably Particular', (2000-2002) 19 UCLA Journal of Environmental Law and Policy 49	Rejected. The reference is too dated for inclusion.	Stuart Bruce	KPMG; International Chamber of Commerce Energy and Environment Committee Co-Chair; IUCN Energy Transition Project Co-Chair	United Kingdom (of Great Britain and Northern Ireland)
52849	56	3	56	5	Sections 14.5.4 and 14.5.5 were articulated to be within section 14.5.3, this is not the case	Accepted. Amended.	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia
48685	56	8		11	suggest reference to debates about fragmentation and climate change governance eg Harro van Asselt The Fragmentation of Global Climate Governance: Consequences and Management of Regime Interactions, Edward Elgar Publishing 2014; for example, '... significant uncertainty remains over the feasibility and costs of these efforts, as well as whether they constitute manageable forms of fragmentation (van Asselt 2014) and whether they ultimately strengthen progress ...	Noted. Sufficient references along similar lines are already included and this reference is pre AR5.	Lorraine Elliott	The Australian National University	Australia
52851	57	44	61	2	This whole section should be reflected in SPM section D as it studies the linkages with sustainable development and mitigation	Rejected. Yes the topic should be included in SPM but as input of Ch. 17	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia
70781	57	44	59	61	This section on linkages seems excessively long given that linkages with sustainable development are dealt with in detail in the chapters. In particular it is rather unbalanced with most attention paid to Loss & Damage. This should be scaled back. Dealing with the issue properly would require discussion of issues such as the degree to which limits to adaptation are dynamic, and the potential role of transformative (rather than incremental) adaptation. But all this is really for the WG2 report.	Rejected, this comment does not apply.	Philippe Tulkens	European Union (EU) - DG Research & Innovation	Belgium
70783	57	44			The title of the subsection '14.5.1.2 Linkages with sustainable development, adaptation, loss and damage, and human rights' had better change to '14.5.1.2 Linkages with adaptation, loss and damage, sustainable development, and human rights' to match the order in the text or change the order of text to match the title.	Accepted. Title changed.	Philippe Tulkens	European Union (EU) - DG Research & Innovation	Belgium
70785	57	44			Please think about adding 'gender' as one of linkages in this subsection.	Rejected. In the opinion of the authors "gender" is implicit in human rights.	Philippe Tulkens	European Union (EU) - DG Research & Innovation	Belgium

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
7669	57		61		Omission: the chapter lacks a reference to the International Monetary Fund's (IMF) work on climate change (https://www.imf.org/en/Topics/climate-change). Climate change is considered macrocritical, and thereby, the Fund has been increasing its involvement on it, mainly through its bilateral and multilateral surveillance both: by including climate change considerations in macroeconomic policies (fiscal, monetary, financial and macroprudential), and through building to the international peer pressure and best practices on mitigation and adaptation policies. The IMF is currently involved in a major overhaul of its surveillance policy (the Comprehensive Surveillance Review, CSR), to be finalized in 2021, which will further increase the focus on climate change. The Fund has the potential to play a key surveillance and peer pressure role over the macroeconomic elements of NDCs through its annual Article IV surveillance. A reference to the IMF can fit in section 14.5.1.2, for instance, in page 60, with a new paragraph after line 14 making a reference to climate change as macrocritical to ensure a sustainable macroeconomic policies and the involvement of the IMF on it.	Rejected. IMF belongs to the finance section.	Pablo Moreno	International Monetary Fund	United States of America
80725	57	3	57	4	The success of the Kigali Amendment is dependent on national implementation, which typically follows ratification but can proceed ratification as in the case of the US with the recent passage of the Consolidated Appropriations Act that was signed into law on 27 December 2020, mandating the phasedown of HFCs consistent with the Kigali Amendment schedule. The HFC phase-down provisions are included in Section 103, known as the American Innovation and Manufacturing Act of 2020, which provides federal authority to phase down HFC production and consumption in line with the Kigali Amendment to the Montreal Protocol. The law mandates a reduction in the climate impacts of HFCs produced and consumed in the USA by 85% over the next 15 years, and provides EPA with the authority to regulate HFCs even faster in key sectors. CITATIONS: Passage into law: https://www.congress.gov/bill/116th-congress/house-bill/133/actions ; AIM Act description http://ahrinet.org/App_Content/ahri/files/Resources/AHRI_AIM_Act-one_pager.pdf .	Noted.	Durwood Zaelke	Institute for Governance & Sustainable Development	United States of America
80869	57	3	57	4	The success of the Kigali Amendment is dependent on national implementation, which typically follows ratification but can proceed ratification as in the case of the US with the recent passage of the Consolidated Appropriations Act that was signed into law on 27 December 2020, mandating the phasedown of HFCs consistent with the Kigali Amendment schedule. The HFC phase-down provisions are included in Section 103, known as the American Innovation and Manufacturing Act of 2020, which provides federal authority to phase down HFC production and consumption in line with the Kigali Amendment to the Montreal Protocol. The law mandates a reduction in the climate impacts of HFCs produced and consumed in the USA by 85% over the next 15 years, and provides EPA with the authority to regulate HFCs even faster in key sectors. CITATIONS: Passage into law: https://www.congress.gov/bill/116th-congress/house-bill/133/actions ; AIM Act description http://ahrinet.org/App_Content/ahri/files/Resources/AHRI_AIM_Act-one_pager.pdf .	Noted.	Gabrielle Dreyfus	Institute for Governance & Sustainable Development	United States of America
22635	57	6	57	7	The Montreal Protocol has 198 Parties (and not 196). To date (10th Feb. 2021), 113 Parties ratified the Kigali amendment.	Accepted.	Government of France	Ministère de la Transition écologique et solidaire	France
50115	57	8	57	18	Similarly, regional agreements to address forest fires can have benefits to mitigate climate change. The ten member States of the Association of Southeast Asian Nations (ASEAN) have adopted various cooperative mechanism and instruments to prevent recurrence of some of the worst haze events in the region in 1997-1998, 2003, 2013 and 2015 (Nurhidayah et al 2015). These include the 2002 ASEAN Agreement on Transboundary Haze Pollution (AATHP) which focusses on national prevention, regional monitoring mechanisms, mitigation and strengthened firefighting capability, as well as the 2006 ASEAN Peatland Management Strategy which guides management of peatlands. Although the AATHP does not specifically refer to climate change, its focus on preventive, monitoring, and mitigation efforts to tackle land and forest fires and to combat transboundary haze expect to contribute to reducing GHG emissions. As such, the AATHP forms an integral part of the regional response to climate change (Koh & Bhullar, 2015 OR Le, 2020). Such regional responses to deforestation-led haze have implications on local initiatives and global directives (Ishani Mukherjee in Brinkmann, 2015) - Policy Design for Sustainability at Multiple Scales: The Case of Transboundary Haze Pollution in Southeast Asia by Ishani Mukherjee in The Palgrave Handbook of Sustainability: Case Studies and Practical Solutions (Edited by Robert Brinkmann) - Nurhidayah, L., S. Alam, and Z. Lipman. 2015. The Influence of International Law upon ASEAN Approaches in Addressing Transboundary Haze Pollution in Southeast Asia. Contemporary Southeast Asia: A Journal of International and Strategic Affairs 37 (2): 183–210. - Le, Thai-He, 2020: Drivers of Greenhouse Gas Emissions in Southeast and East Asia. Energy Sustainability and Development in ASEAN and East Asia, P. Han, F. Targhizadeh-Hesary and Fukunari Kimura, Eds, Routledge, 58 to 80. - Koh, K.-L., Bhullar, L., 2015: ASEAN: The Singapore Declaration on Climate Change, Energy and the Environment, 2007 and Beyond. Regional Environmental Law: Transregional Comparative Lessons in Pursuit of Sustainable Development, W. Scholtz and J. Veschuuren, Eds, Edward Elgar Publishing, 282 to 310. https://doi.org/10.4337/9781781951781.00017	Rejected. Out of the scope of this section.	Government of Singapore	Ministry of Sustainability and the Environment (MSE)	Singapore

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
86273	57	8	57	18	SO2 has also been reduced to limit transboundary pollution which lead to a warmin. Maybe the sentence is a bit naive, there are co-benefits but also side effects wich can not be ignored.	Noted. It will be added that when discussing the co-benefits with Multilateral Environmental Agreements related to transboundary air pollution, attention should be paid to the uncertainty of radiative forcing of the Short Lived Climate Forcers and the update of relevant scientific knowledge.	Sophie Szopa	LSCE	France
86275	57	8	57	18	New assessment of BC role (see WG1 Chapter 6, in particular section 6.4.2) on surface temperature confirms a need of downplaying the role of BC as a lever to mitigate both climate change and air pollution.	Noted. It will be added that when discussing the co-benefits with Multilateral Environmental Agreements related to transboundary air pollution, attention should be paid to the uncertainty of radiative forcing of the Short Lived Climate Forcers and the update of relevant scientific knowledge.	Sophie Szopa	LSCE	France
86277	57	8	57	18	NOx lead to warming through it effect on CH4 lifetime (see WG1 Chapter 6, in particular section 6.4.2) so finally, the key compound acting both on pollution and climate significantly is the CH4.	Noted. It will be added that when discussing the co-benefits with Multilateral Environmental Agreements related to transboundary air pollution, attention should be paid to the uncertainty of radiative forcing of the Short Lived Climate Forcers and the update of relevant scientific knowledge.	Sophie Szopa	LSCE	France
58465	57	13	57	15	Prefer language here that more accurately characterizes the status of black carbon in the 2012 amendments to the Gothenburg Protocol. This could be achieved by replacing "to include black carbon" with the phrase "to encourage Parties to seek reductions in black carbon as a component of their overall reductions in particulate matter emissions".	Rejected. Not referenced.	Government of United States of America	U.S. Department of State	United States of America
58467	57	16	57	18	Recommend that this sentence be deleted. This is a potentially misleading characterization of the amended Gothenburg Protocol, which has only been in force since 7 October 2020. The Protocol is currently under review within the CLRTAP, and any subsequent policy recommendation about its efficacy will be taken into account by CLRTAP following this review process, in any required revisions to the Protocol.	Rejected. Not referenced.	Government of United States of America	U.S. Department of State	United States of America
65617	57	32	57	35	Should integrate and recognize SROCC, partialalry other conventions like CCAMLR, ATS and international bodies such as the Arctic Council and SCAR which operate like the CDB.	Rejected. Not supported by references or argument.	Mônica M. C. Muelbert	UNIFESP	Brazil
70779	57	32	57	43	In this paragraph, you may want to add UNCCD (UN Convention to Combat Desertification).	Rejected. Not supported by references.	Philippe Tulkens	European Union (EU) - DG Research & Innovation	Belgium
14629	57	35	57	35	I think it's more than "theoretical" - perhaps "in principle"? Or just delete "At a theoretical level".	Rejected. Not supported by references or argument.	Joanna Depledge	Centre for Environment, Energy and Natural Resource Governance (CEENRG), University of Cambridge	United Kingdom (of Great Britain and Northern Ireland)
48687	57	40		43	suggest adding at end of sentence 'and concerns about whether they meet equity and justice considerations' (Schroeder and McDermott 2014) [ref Schroeder, H. and C. McDermott. 2014. Beyond carbon: enabling justice and equity in REDD+ across levels of governance. Ecology and Society 19(1): 31-3	Accepted.	Lorraine Elliott	The Australian National University	Australia
1493	58	12	58	12	Add Kongsager et al. 2016 and Kongsager 2018 to the cited references •Kongsager, R., Locatelli, B. & Chazarin, F. (2016). Addressing climate change mitigation and adaptation together: a global assessment of agriculture and forestry projects. Journal: Environmental Management 57 (2), pp 271-282. http://dx.doi.org/10.1007/s00267-015-0605-y • Kongsager, R. (2018). Linking Climate Change Adaptation and Mitigation: A Review with Evidence from the Land-Use Sectors. Journal: Land (7)4, 158. https://doi.org/10.3390/land7040159	Accepted. References added.	RICO KONGSAGER	University College Copenhagen	Denmark
52809	58	21	58	22	"Distinct from project or programmatic level activities, however, international cooperation for adaptation operates to provide finance and technical assistance (Bouwer and Aerts 2006)." Do project and programmatic activities preclude financial and technical assistance?	Accepted. Reworded.	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia
52811	58	22	58	22	What does "it" refer to exactly? What specifically provisions for transboundary actions? Formal agreements underpinning international cooperation? Something else?	Accepted. After transboundary actions added "(formal and informal)".	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia
81099	58	33	58	43	I hadnt originally intended to prioritise looking at rest of the chapter but section 14.3.3 alerted me to concerns about inappropriate (and ill-informed) comparison between Paris and the Kyoto Protocol, which also drew me to observe this section. Again I cannot see merit in comparing a Treaty whose primary purpose was to deliver te UNFCCC commitment on industrialised country 'leadership on emission reductions, to compare their adaptation contributions. And again the text gives me doubts. It would be interesting to compare the annual revenues generated by the adaptation levy on the Kyoto Protocol mechanisms during the first Commitment Period with those so far under Paris? Please do so.	Rejected. No literature found.	Michael Grubb	UCL - Institute of Sustainable Resources	United Kingdom (of Great Britain and Northern Ireland)
14631	58	36	58	36	...but the CDM was a clear attempt to bring together mitigation and adaptation, with mitigation projects resulting in contributions to a new adaptation fund.	Accepted. Added: "It should be noted that the share of the proceeds under Paris Agreement Article 6 directly draws on the precedence of the CDM, whose Kyoto Protocol Article 12 introduced this exact language."	Joanna Depledge	Centre for Environment, Energy and Natural Resource Governance (CEENRG), University of Cambridge	United Kingdom (of Great Britain and Northern Ireland)
14633	58	42	58	42	It should be noted that the share of the proceeds under PA Article 6 directly draws on the precedence of the CDM, whose KP Article 12 introduced this exact language.	Accepted. See the previous response.	Joanna Depledge	Centre for Environment, Energy and Natural Resource Governance (CEENRG), University of Cambridge	United Kingdom (of Great Britain and Northern Ireland)
52853	58	44	58	45	The limits to adaptation and the loss and damage resulting when exceeding these limits should be rmentioned in SPM	Rejected.	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
1767	58	21	58	24	Transboundary co-operation and conflict mitigation are obligatory for joint river basin management, regional water and food security and climate resilience. Review this article. Arfanuzzaman, M. Upstream Downstream Divergence and Hydro-socioeconomic Distress in South Asia, World Food Policy, doi: 10.1002/wfp2.12022, John Wiley & Sons	Accepted. Reference included.	Md Arfan Uzzaman	FAO	Bangladesh
14635	59	14	59	16	Comments such as "some have noted" and direct quotes require a citation. Perhaps this is Dehm (2020)?	Accepted. "Some have argued..." substituted by "Dehm (2020) argues..."	Joanna Depledge	Centre for Environment, Energy and Natural Resource Governance (CEENRG), University of Cambridge	United Kingdom (of Great Britain and Northern Ireland)
14637	59	18	59	18	Such declarations were also made for acceptance of the KP - so SIS have made them under all the three climate treaties, which is significant.	Accepted. Kyoto Protocol added.	Joanna Depledge	Centre for Environment, Energy and Natural Resource Governance (CEENRG), University of Cambridge	United Kingdom (of Great Britain and Northern Ireland)
12649	59	24	59	25	could also cite re: frames of loss and damage Allan, J. I., & Hadden, J. (2017). Exploring the framing power of NGOs in global climate politics. Environmental Politics, 26(4), 600-620.	Accepted. Allan & Hadden quoted.	Jennifer Allan	Cardiff University	United Kingdom (of Great Britain and Northern Ireland)
457	59	26	59	27	On the various conceptions of loss and damage and funding for it, I would suggest to add other references, to (1) Florentina Simlinger and Benoit Mayer, 'Legal responses to climate change induced loss and damage', in Reinhard Mechler, Laurens M. Bouwer, Thomas Schinko, Swenja Surminski and JoAnne Linnerooth-Bayer (eds), Loss and Damage from Climate Change: Concepts, Methods and Policy Options (Springer 2019) 179-203; and (2) Benoit Mayer, 'Whose 'loss and damage'? Promoting the Agency of Beneficiary states' (2014) 4(3-4) Climate Law 267-300.	Accepted. References included: Mayer (2014), Simlinger and Mayer (2019).	Benoit Mayer	The Chinese University of Hong Kong	China
455	59	10	59	13	I fully agree on the relevance of "general international law" but I would suggest to call it by its name: "customary international law". I have difficulty to believe that there is not a single reference to "customary" international law in this chapter, despite the importance it plays both in litigation and in political claims by many countries. Another reference could be added here (if this is not too late): Benoit Mayer, 'Climate change reparations and the law and practice of state responsibility', (2017) 7(1) Asian Journal of International Law 185-216.	Accepted. Changed.	Benoit Mayer	The Chinese University of Hong Kong	China
52855	60	6	60	8	Mitigation actions could slow down poverty reduction efforts in developing countries, this is very critical and need to be addressed in SPM in the context of sustainable development in order to ensure no one left behind in our climate action	Rejected. This should be in the SPM but as input of Ch. 17.	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia
10857	60	12	60	14	Yet, I could not find in Dzebo et al (2019) any suggestion of negative impact of mitigation measure on gender equality: Dzebo et al simply point out, when commenting SDG 5, that women are underrepresented in climate change negotiation and decision making, same as in most negotiation and decision making occasion... The most striking fact however is that, while target 5.6 in SDG 5 reads : "Ensure universal access to sexual and reproductive health and reproductive right", which opens the road to a most efficient way to both adapt to and mitigate global warming, Dzebo et al fail to point out this very strong connection between mitigation and SDGs.	Accepted. Reworded.	Philippe Waldteufel	CNRS	France
14639	60	28	60	42	I would suggest this great and really relevant recent ref: Patrick Toussaint & Adrian Martínez Blanco (2020) A human rights-based approach to loss and damage under the climate change regime, Climate Policy, 20:6, 743-757, DOI: 10.1080/14693062.2019.1630354	Accepted. Reference included.	Joanna Depledge	Centre for Environment, Energy and Natural Resource Governance (CEENRG), University of Cambridge	United Kingdom (of Great Britain and Northern Ireland)
86065	60	28	60	29	Suggest adding new sentence after the first sentence as follows in bold: "The inclusion of energy (and access to energy) in that context is an even more recent area of UN and institutional practice (Bruce and Viñuales, 2021)" Reference: Stuart Bruce & Jorge Vinales, 'SDG 7 and International Law', in Ellen Hay and Jonas Ebbesson (eds), Cambridge Handbook on the Sustainable Development Goals and International Law (CUP, forthcoming 2021), section 3.2.	Accepted. Reference included.	Stuart Bruce	KPMG; International Chamber of Commerce Energy and Environment Committee Co-Chair; IUCN Energy Transition Project Co-Chair	United Kingdom (of Great Britain and Northern Ireland)
4143	60	35			should say: 'and in some cases displacing people as land becomes uninhabitable (right to self-determination).'	Accepted. "Self-harm" substituted by "self-determination".	Jane McAdam	University of New South Wales	Australia
52813	60	40	60	42	Can the literature on dispute settlement and conflict resolution support arguments elsewhere in the report, beyond human rights and attribution of cost?	Noted, we do look briefly in 14.3 and in Chapter 13 at climate litigation, Anything else is beyond the scope of our work.	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia
459	60	44	60	47	The judgment does not refer much to the UNFCCC, and it is not clear what is meant by "adopted a human rights-based approach". The Court applies the European Convention on Human Rights which it interpreted in the light of customary international law. It did not rely on the UNFCCC to make its decision. The judgment applies to 2020, not to "end-2020" (it imposes a level of emission for the entire year!). I would suggest to rephrase this sentence as follows: "In the landmark Urgenda climate case the Dutch Supreme Court interpreted the European Convention on Human Rights in light of customary international law and ordered the state to reduce greenhouse gas emissions by 25% by 2020 compared to 1990.	Accepted. Text changed.	Benoit Mayer	The Chinese University of Hong Kong	China
461	60	48	60	48	The picture is not complete here is the Report does not acknowledge the limitations of these cases. I would suggest to add: "These cases face multiples questions of standing as well as substantive difficulties, for instance with regard to the mostly territorial scope of state obligations on the protection of human rights." A reference could then be added to: Alan Boyle, "Climate Change, the Paris Agreement and Human Rights" (2018) 67(4) International and Comparative Law Quarterly 759-777.	Accepted. Text added.	Benoit Mayer	The Chinese University of Hong Kong	China

Comment Id	From Page	From Line To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country	
46349	60	29	60	29	Please add: Wieding/Stubenrauch, in Sustainability 2020, Human Rights and Precautionary Principle: Limits to Geoengineering, SRM, and IPCC Scenarios, DOI: https://doi.org/10.3390/su12218858 . This is a new paper that analyses in depth human right arguments as well as technical questions on SRM and CDR. The combination of legal and technical expertise is quite unique.	Accepted. Wieding et al. (2020) quoted.	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany
52857	61	1	61	2	Not only climate change impacts affect human rights, but also the mitigation response. Needs to highlight it in the context of response measures	Rejected. No literature found on this topic.	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia
27943	61	2	61	2	After "LIU 2017)", add "including the right to development".	Accepted. Included.	Eleni Kaditi	Organization of the Petroleum Exporting Countries, OPEC	Austria
46351	61	8	61	8	Please add: "An international guidance on assessing embedded carbon and an international verification practice would help to overcome the restrictive WTO jurisprudence on PPM" (e.g. Holzer 2014).	Taken into account. The suggested sentence does not apply to all types of trade measures, and hence would not fit well here. However, a general point on international dialogue and guidance is now included in the discussion on border carbon adjustments.	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany
46353	61	8	61	8	Please add further literature in favour of a carbon input based differentiation of products: Hillman (2013), Changing Climate for Carbon Taxes, https://www.gmfus.org/publications/changing-climate-carbon-taxes-whos-afraid-wto ; Holzer 2014, p. 97 f; Charles Benoit (2011) 42 (2), in Georgetown Journal of International Law, COMMENT: Hillman was an Appellate Body Judge. Her voice is important.	Accepted. Sources are now included, though at a different (and more appropriate) place.	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany
52859	61	25	61	36	questions raised concerning the consistency of trade-related mitigation measures with trade agreement under WTO. This very important for policymakers to be aware of, so should be highlighted in the SPM	Taken into account. The SPM includes a sentence on the role of trade agreements, but due the limited space, there is no statement on the need for WTO consistency.	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia
46355	61	39	61	39	Please add: "in some extreme cases". COMMENT: The cited authors come to the conclusion that under normal circumstances free allocation will not be an actionable subsidy under ASCM. The emphasis in this sentence might be misleading. Moreover in other chapters (13.6) of this WG III draft free allocation is characterized as a success. Please check consistency and avoid to be policy prescriptive.	Taken into account. The wording of "extreme" cases is not followed, as the cited authors write "there is substantial scope to treat free allowances as subsidies that are objectionable under WTO subsidy rules." However, the sentence has been worded to make it clear that this is not a blanket statement applicable to all types of free allocation everywhere.	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany
46357	61	41	61	41	Please add the new literature of Ismer at e.g. Ismer/Haussner et al. 2016, Inclusion of Consumption, https://www.diw.de/documents/publikationen/73/diw_01.c.534388.de/dp1579.pdf . COMMENT: This consumption based levy is adjustable at the borders in a WTO consistent manner. A consumption based internal level can be applied to imports in a non discriminating manner.	Accepted. There is now a clear mention of consumption charges and its possible WTO compatibility, including a reference to the literature on this.	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany
46359	61	42	61		Please add: "New literature suggests that a combination of free allocation of allowances and border adjustment based on consumption based pricing is the optimal compromise for a WTO consistent measure to address Carbon Leakage and strengthen incentives for decarbonisation (Ismer/Haussner et al. 2016, Inclusion of Consumption, https://www.diw.de/documents/publikationen/73/diw_01.c.534388.de/dp1579.pdf ; Ismer et al., 2020, Border Carbon Adjustments and Alternative Measures for the EU ETS: An Evaluation, https://www.diw.de/de/diw_01.c.743700.de/publikationen/diskussionspapiere/2020_1855/border_carbon_adjustments_and_alternative_measures_for_the_eu_ets_an_evaluation.html ; Brzeziński et al. 2020, Climate Contribution and its role in European industrial decarbonisation; https://climatestrategies.org/wp-content/uploads/2020/12/CFMP-Climate-Contribution-Policy-Brief.pdf .	Taken into account. In line with the response to the previous comment. Phrasing such as "optimal compromise" is however omitted, as it is too general and too policy prescriptive (whereas the authors' work mainly regarded the EU ETS). Two of the sources suggested here are now referred to.	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany
46361	61	47	61	47	Please add: "exclude a price put on exports". COMMENT: without this clarification it could be misunderstood. Some approaches (Mehling) cannot address the leakage of exports, exports are excluded from the adjustment effect. Other approaches (consumption based levy, e.g. Ismer et al.) are full border adjustments and rebates on exports are WTO consistent, here exports are included in the adjustment effect but pricing on export is "excluded".	Taken into account in the discussion of border carbon adjustments. The suggestion made in the FOD, however, is not that a BCA cannot address export leakage - it is simply that studies suggest that including exports in a BCA could lead to WTO inconsistency.	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany
86067	61		61		The discussion on investment agreements, which can have very significant real world impacts on the development and diffusion of technologies and investments supportive of a low carbon transition is very brief, underplaying the influence of this branch of international economic law. Suggested adding some further content from: Jorge Viñuales, 'International Investment Agreements and Sustainable Development: Safeguarding Policy Space and Mobilising Investment for a Green Economy' (UN Environment/ PAGE, 2018)	Taken into account. Given space constraints, the discussion had to be limited, but a little more context is provided, including a reference to the suggested source .	Stuart Bruce	KPMG; International Chamber of Commerce Energy and Environment Committee Co-Chair; IUCN Energy Transition Project Co-Chair	United Kingdom (of Great Britain and Northern Ireland)
70787	61	3	63	33	In this subsection, while the title mentions regional economic communities it mainly describes FTA and partnerships. There are various regional (economic) communities such as League of Arab States, Asia-Pacific Economic Cooperation (APEC), Association of Southeast Asian Nations (ASEAN), Union of South American Nations, African Union, etc. If available, the effects or linkages of above-mentioned regional (economic) communities with mitigation through trade and investment would be beneficial to the readers.	Noted. We have done our best to include all relevant findings on regional economic communities such as these.	sim	European Union (EU) - DG Research & Innovation	Belgium
66199	62	24	62	25	It is suggested to add a reference to (Chepeliev and van der Mensbrugge. 2020. Global fossil-fuel subsidy reform and Paris Agreement. Energy Economics, Volume 85, January 2020, 104598, https://doi.org/10.1016/j.eneco.2019.104598) to support the point of GHG emissions reduction from fossil fuel subsidies reform.	Accepted.	Maksym Chepeliev	Purdue University	United States of America
48689	62	28			suggesting adding sentence "The removal of fossil fuel subsidies also raises concerns about distributive impacts, particularly for low-income households (Piggot et al 2019) [ref Georgia Piggot, Michael Boyland, Adrian Down, Andreea Raluca Torre, 2019, Realizing a just and equitable transition away from fossil fuels, Washington DC: Stockholm Environment Institute	Rejected. Though this is a relevant point, the point of this sentence is to simply show that fossil fuel subsidy reform may 1) is relevant for climate mitigation; and 2) is relevant from the perspective of trade agreements.	Lorraine Elliott	The Australian National University	Australia

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
63387	62	40	62	48	The paragraph could be misleading about the CPTPP. While the CPTPP does not include specifically the word 'climate change' in the Environment chapter, it does incorporate provisions promoting cooperation among CPTPP Parties on matters related to transitioning to low emission economies (article 20.15), such as cooperation on clean and renewable energy sources, low-emissions technologies, deforestation and emissions monitoring.	Accepted. The relevant sentences have been reworded.	The paragraph could be misleading about the CPTPP. While the CPTPP does not include specifically the word 'climate change' in the Environment chapter, it does incorporate provisions promoting cooperation among CPTPP Parties on matters related to transitioning to low emission economies (article 20.15), such as cooperation on clean and renewable energy sources, low-emissions technologies, deforestation and emissions monitoring.	Environment and Climate Change Canada	Canada
86713	63	36			The year 2019 marks a turning point for South-South and triangular cooperation with the conclusion of the second High-level United Nations Conference on South-South Cooperation, which took place in Buenos Aires, Argentina. The BAPA+40 Outcome document (UN, 2019*) highlighted that South-South cooperation has made outstanding contributions to alleviating global inequality, promoting sustainable development and climate actions, promoting gender equality and enriching multilateral mechanisms. Furthermore, triangular cooperation was explicitly recognized in the BAPA +40 Outcome reflecting its increasingly relevant role in the implementation of the SDGs. *UN, 2019: Buenos Aires outcome document of the second High-level United Nations Conference on South-South Cooperation, A/RES/73/291	Accepted, included.	Government of Argentina	Ministry of Environment and Sustainable development of Argentina	Argentina
27945	63	9	63	9	After "2019)", add "while distributional and equity impacts of such measures needs to be assessed".	Taken into account. Some more context on these options is provided, indicating that their effectiveness and effects (including environmental and distributional effects) remain to be assessed in detail.	Eleni Kaditi	Organization of the Petroleum Exporting Countries, OPEC	Austria
20013	63	31		29	in the meantime the Energy Charter Treaty is openly treated as an impediment to put an end to fossil fuel combustion and EU discusses openly not to "modernize" but to abandon the Treaty. Also chapters in trade agreements that foresee investor-state disputes settlements are widely recognized to be of no help to the climate process. this is also mentioned in Page 69, Line 11-18. You miss the trade-related literature on production specialisation into weak environmental standards and on negative climate effects of trade facilitation without taking climate and environmental aspects into account. The said le	Rejected. The ECT is discussed in Section 14.5.2.2. The role of trade as such as a driver of emissions is discussed elsewhere in AR6. This section focuses purely on the role of trade and investment agreements.	Manuela Dr. Troschke	Scientists for Future Germany	Germany
86715	64	10			In Paragraph 27, the Outcome Document of the BAPA+40 (UN, 2019*) calls upon the United Nations Development System to assist developing countries, upon request, in building the human and institutional capacity needed to formulate and implement national development policies, strategies and programmes for South-South and triangular cooperation, including the sharing of good practices and experiences from the South, and to encourage the transfer of technologies on mutually agreed terms for the benefit of developing countries to address poverty eradication and sustainable development. *UN, 2019: Buenos Aires outcome document of the second High-level United Nations Conference on South-South Cooperation, A/RES/73/291.	Accepted. Included	Government of Argentina	Ministry of Environment and Sustainable development of Argentina	Argentina
70789	64	10	64	12	When financing a large hydro project is phased out due to environment impacts caused by a large hydro, a case study of a Chinese funded and Chinese built large hydro in Cabodia does not look a good example. Could you replace it with other example?	Partially accepted. We keep the example and include additional examples.	Philippe Tulkens	European Union (EU) - DG Research & Innovation	Belgium
52815	64	25	64	25	A wealth of studies question whether South-South relations, especially with respect to FDI (such as BRI), are "value neutral." Noting this literature is in order.	Accepted. References included: Mawdsley (2019), De Bruyn (2020), Fulquet & Pelfini (2015)	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia
70791	64	31	64	39	I do not see much added value from the example of the Belt and Road Initiative, considering its political debate and sensitivity. In particular, the BRI is mainly infrastructure investment which has no big implications of climate technology development and transfer for mitigation.	Rejected. In the opinion of many authors BRI is contributing to build green infrastructure in partner economies.	Philippe Tulkens	European Union (EU) - DG Research & Innovation	Belgium
10859	64	31	64	39	Inasmuch as China is a very atypical example of "South" nation, it does not seem appropriate to quote the BRI as a "classic" example of SSC. Now it is agreed that, following a pure BAU pathway, GHG emissions from the partners of China in BRI will increase strongly. What remains to be seen is whether the BRI will act to reverse this trend. In this respect the Jun and Zadek (2019) study establish broad recommendations for a low carbon BRI, which is nice, but it does not tell whether these recommendations are followed. From what one hears and reads in the newspaper in western Europe, this is not the case, as China is said to scatter coal plants along the road. Therefore, I stress that references stating facts about the implementation of BRI are required to support the "green BRI" vision proposed by this passage of the report	Accepted. Word "classic" removed. Remark included: "It is early to ascertain the greening of BRI notwithstanding the slowing down of implementation due to COVID-19."	Philippe Waldteufel	CNRS	France

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
86849	64	10			In Paragraph 27, the Outcome Document of the BAPA+40 (UN, 2019*) calls upon the United Nations Development System to assist developing countries, upon request, in building the human and institutional capacity needed to formulate and implement national development policies, strategies and programmes for South-South and triangular cooperation, including the sharing of good practices and experiences from the South, and to encourage the transfer of technologies on mutually agreed terms for the benefit of developing countries to address poverty eradication and sustainable development. *UN, 2019: Buenos Aires outcome document of the second High-level United Nations Conference on South-South Cooperation, A/RES/73/291	Repeated comment	Government of Argentina	Ministry of Environment and Sustainable development of Argentina	Argentina
27947	65	10	65	10	After "in the future", add "while it is complementary to North-South cooperation".	Accepted. Text included.	Eleni Kaditi	Organization of the Petroleum Exporting Countries, OPEC	Austria
48555	65	22	67	32	The report should also include more experiences from global South, one of the most advanced alternative proposal is the Bolivian Joint Mechanism for Mitigation and adaptation for Sustainable and Integral Forest Management, as an alternative approach to carbon markets in the forest sector.	Noted, but no reference provided. Not accommodated.	Fany Ramos Quispe	Environmental Engineers Association of La Paz	Bolivia
27949	65	24	65	24	After "been adopted", add "to enhance its role for carbon sequestration and sink and".	Rejected. The sentence already says NET emissions, which implies sequestration / sink.	Eleni Kaditi	Organization of the Petroleum Exporting Countries, OPEC	Austria
48691	65	28			remove 'merely'	Agreed. We removed.	Lorraine Elliott	The Australian National University	Australia
22637	65	31	65	34	In this sub-section, initiatives on REDD+ are presented with a lack of coherence. They seem (as presented) uncorrelated with the normative system defined under UNFCCC. Whereas, norms under UNFCCC and pilot project and program on REDD+ have been constructed in co-evolution. Moreover UNFCCC norms remain at the center of the system and organize it.	Noted.	Government of France	Ministère de la Transition écologique et solidaire	France
48693	65	31			query use of term 'admittedly ineffective'	Noted. Adopted. The term is deleted.	Lorraine Elliott	The Australian National University	Australia
8745	65	33	65	63	The FCPF is older: I was launched 2007 in Bali. (Check: the history of the FCPF on the Facility's webpage).	Noted. Adopted. Text is adjusted.	Charlotte Streck	University of Potsdam	Germany
29577	65	39	65	39	It says "The programme supports national REDD+ efforts", which programme are you referring to? probably UN-REDD, but this should be explicitly stated.	Adopted. It's indeed UNREDD+. Added to the sentence.	Government of Norway	Norwegian Environment Agency	Norway
29579	65	40	65	44	Please include text in this paragraph referring to the main objectives of FCPF, namely, preparing countries for results-based payments and future carbon markets while securing local communities' benefits. See https://www.forestcarbonpartnership.org/about-fcpf-0	Adopted. Text added.	Government of Norway	Norwegian Environment Agency	Norway
51805	65	41	65	44	Can "minimal" be defined? The emission reductions reported by Brazil alone in the Lima Info Hub for REDD+ are larger than the emission reductions achieved through the Kyoto Protocol. Is that "minimal"? Also, are there differences for subnational and national REDD+ initiatives?	Noted. It is changed to "limited". Also added newer information by Maguire et al., 2021, Green Growth Spurt: State of Forest Carbon Finance 2021. Ecosystem Marketplace, Washington DC.	Florin Vladu	UNFCCC Secretariat	Germany
29581	65	41	65	44	Lines 41-44 refers to project-based REDD+ in the voluntary carbon markets as opposed to jurisdictional which is the focus of FCPF, as outlined in the paragraphs below on page 65 and 66. As it stands, it looks like the FCPF approach is project based and not jurisdictional. Please modify the text to clarify.	Adopted. Text adjusted.	Government of Norway	Norwegian Environment Agency	Norway
48695	65	45			delete 'mere' (what is 'mere' about PES?)	Adopted.	Lorraine Elliott	The Australian National University	Australia
51807	65	47	66	2	It's difficult to consider this as a failure, given the requirements such a "global carbon market system" would need to fulfill to integrate REDD+ with environmental integrity. Can this be rephrased more neutrally? Is it even needed?	Adopted	Florin Vladu	UNFCCC Secretariat	Germany
29583	65	47	66	6	For balance with the paras below on page 66, it should be stated how many countries have joined the FCPF Readiness Fund, that all members of the FCPF Carbon Fund has finished their readiness phase and the number that has signed contracts for trading their emissions, see https://www.forestcarbonpartnership.org/carbon-fund-dashboard	Rejected	Government of Norway	Norwegian Environment Agency	Norway
70793	65	14			If literatures are available, I would like to suggest to include the financial sector in this subsection 14.5.2. Unlike conventional sectors such as forestry, transport, energy, etc., its emissions reduction role would not be the GHG reduction emitted from the financial sector. Rather, the financial can contribute sector to emissions reductions in other sectors by driving climate-friendly investments and through due diligence and other financing criteria for climate-friendliness. The divestment movement is briefly introduced in the first paragraph of page 73, Ch.14.	Accepted. Text included.	Philippe Tulkens	European Union (EU) - DG Research & Innovation	Belgium
29585	66	1	1	6	Please also mention that the Green Climate Fund has done results-based payments within REDD+. Eight countries have so far received together USD 496, 740, 062 https://www.greenclimate.fund/sites/default/files/document/gcf-b28-inf08-add04.pdf	Adopted. Text added.	Government of Norway	Norwegian Environment Agency	Norway
29587	66	1	2	66	New developments in REDD+ finance should also be mentioned here. For example, Architecture for REDD+ Transactions and EMERGENT. See: https://www.artredd.org/trees/ Three jurisdictions in Brazil (Amapa, Maranhão and Tocantins) and two countries, Costa Rica and Guyana, have already submitted concept notes to ART to receive results-based payments. ICAO/CORSIA and the possibility of having REDD+ in article 6 of the Paris Agreement will also open more finance sources for REDD+. See: https://www.edf.org/media/forest-credits-approved-airlines-compliance-icao-carbon-market and https://climatefocus.com/publications/options-enhancing-redd-collaboration-context-article-6-paris-agreement	Adopted. Text added and adjusted.	Government of Norway	Norwegian Environment Agency	Norway
8747	66	2	66	22	A reference for the lack of public resources: Climate Focus. (2017). Progress on the New York Declaration on Forests: Finance for Forests - Goals 8 and 9 Assessment Report. Prepared by Climate Focus in cooperation with the New York Declaration on Forest Assessment Partners with support from the Climate and Land Use Alliance.	Noted. Reference is added.	Charlotte Streck	University of Potsdam	Germany

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
29589	66	4	5	66	It should also be mentioned here that Germany supports REDD+ through "REDD+ early movers". See: https://www.kfw-entwicklungsbank.de/International-financing/KfW-Development-Bank/Topics/Climate/REDD/ In addition, Central African Forest Initiative (CAFI), a collaborative partnership between the European Union, Germany, Norway, France and the United Kingdom, supports six Central African countries in fighting deforestation.	Noted. Text added.	Government of Norway	Norwegian Environment Agency	Norway
70795	66	16	66	28	The author may want to think about moving this paragraph to the subsection 14.5.1.1 which deals with other environmental agreements. UNCCD of course is linked with forestry sector but it has a broader scope whereas subsection 14.5.1.1 can fully accommodate UNCCD.	Rejected. We think it fits better here.	Philippe Tulkens	European Union (EU) - DG Research & Innovation	Belgium
51809	66	29	66	38	Can something be added on how the NYDF goals are being tracked?	Noted. Text added, including new reference NYDF 2020 that confirms that the initiative did not reach its zero deforestation.	Florin Vladu	UNFCCC Secretariat	Germany
8749	66	46	66	68	The NYDF formulates ten forest goals. It depends in its implementation on multiple actors and a wide range of action. I do not think than an attribution to reduced deforestation in Brazil can be made – and I do not think that we make such statements in the referenced paper (Lambin et al). But it is without doubts that the goals of the NYDF are not being met. Check forestdeclaration.org for annual assessments which look at each goal and include annual in-debt reports on individual goals.	Noted. Reference from NYDF is added.	Charlotte Streck	University of Potsdam	Germany
29591	67	1	67	3	On commodity chains from tropical forests, the text should include the more successful results from Indonesia. For example, on palm oil. Cocoa have also been more successful. See: https://www.wri.org/blog/2019/07/indonesia-reducing-deforestation-problem-areas-remain https://chainreactionresearch.com/the-chain-detected-deforestation-within-oil-palm-concessions-has-decreased-so-far-in-2020/ and https://www.climatefocus.com/publications/supporting-smallholder-farmers-sustainable-cocoa-sector	Adopted. All three references added.	Government of Norway	Norwegian Environment Agency	Norway
29817	67	1	67	3	Even with a setback under the current administration in Brazil, one should look at the deforestation rate over a more extended time. Also, the study from Curtis has analysed the deforestation rate from 2001 to 2015, and it is not directly relevant to Brazil's current deforestation under the current administration. Therefore, please consider rewriting to add some refinement to this part.	Adopted. Text adjusted	Government of Norway	Norwegian Environment Agency	Norway
65619	67	4	67	23	CDB	Not understood	Mônica M. C. Muelbert	UNIFESP	Brazil
46363	67	6	67	8	To ensure that these discussions are up-to-date, please check your discussions in this section also against the recently published findings of the 5th edition of the Global Land Outlook (GLO-5) that provides information on progress towards the Aichi Targets; it is currently not cited. Source: Citation: Secretariat of the Convention on Biological Diversity (2020) Global Biodiversity Outlook 5. Montreal. https://www.cbd.int/gbo/gbo5/publication/gbo-5-en.pdf Kindly note that CBD's Aichi biodiversity targets ended in 2020. It may be useful to indicate that the CBD is preparing a 'post-2020 global biodiversity framework' which seems to show continuity in elaborating interlinkages between 'climate change and biodiversity'.	Noted. Adopted.	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany
29593	67	23	67	25	Please consider including other relevant mechanisms such as outlined in the two recent reports on biodiversity finance: https://www.paulsoninstitute.org/key-initiatives/financing-nature-report/ and https://www.gov.uk/government/publications/final-report-the-economics-of-biodiversity-the-dasgupta-review	Reject. This may be more appropriate for chapter 7.	Government of Norway	Norwegian Environment Agency	Norway
47343	67	26	67	32	we can add a new idea in this section about "Create a new or a unified platform for trading voluntary carbon credits and create or developed one standard for calculating, accrediting and documenting all voluntary credits under the UN or IPCC with a compiles with the Paris agreement to take more control of the carbon market and facilitating procedures for verifying and issuing carbon credits and for the compliance carbon credits market".	Reject. We had a long discussion in the IPCC about being very careful about market, and this is a bit too prescriptive	Khaled Mohamed Madkour	Ain Shams University, Cairo, Egypt	Egypt
51811	67	30	67	31	As chapter 7 clearly shows, "a quarter" is a very theoretical technical possibility, which in practice will be almost impossible to achieve.	Noted	Florin Vladu	UNFCCC Secretariat	Germany
52861	67	31	67	32	The AFULO sector continues to be a large source of emissions that is not close to being offset by existing restoration initiatives. Include in the discussion	Noted.	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia
46365	67	8	67	8	Kindly replace "UNCBD" with "CBD". Please correct this throughout the chapter/the report.	Noted.	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany
52827	67	33	69	33	Would recent sub-global organizations focusing on transborder electricity trade and grid management be relevant here?	Noted. Yes, they are relevant. We cite them already late in the section.	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia
52817	67	35	67	38	Do the breakdown of these major actors (e.g. IOs, NGOs, multinational corporations) give us any insights? Clarify.	Noted. We do this to some extent later in the section.	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia
52819	67	36	67	36	"with authors in one case identifying" instead of "with authors identifying in one case"	Accepted.	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia
65621	67	39	67	42	Although a long sentence, suggestion to rewrite as "Global energy governance has encompassed five broad goals (Van de Graaf and Colgan 2016) – security of energy supply and demand, economic development, international security, environmental sustainability, and domestic good governance – and as only one of these provides an entry point for climate mitigation, effort in this direction has often been lost."	Accepted.	Mônica M. C. Muelbert	UNIFESP	Brazil
52821	68	1	68	1	"governance efforts" instead of "governance effort"	Accepted.	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
52823	68	3	68	3	"for the creation" instead of "for creation"	Accepted.	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia
52825	68	4	68	4	"importing countries' instead of importing countries"	Accepted.	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia
27951	68	6	68	6	After "OPEC" replace the rest of the sentence with "to balance the market and ensure sufficient investment in the oil industry".	Rejected. That's not what this reference says.	Eleni Kaditi	Organization of the Petroleum Exporting Countries, OPEC	Austria
78535	68	10	68	10	What about other agencies: WNA, WANO, OECD NEA, GEN IV international forum, SNETP, ...	Noted. There are far too many to describe.	Tomaž Žagar	Faculty for Energy Technology, University of Maribor	Slovenia
78537	68	11	68	35	Some recent intergovernmental initiatives to promote nuclear as clean low carbon should also be mentioned. For example IFNEC (www.ifnec.org), NICE future (https://www.nice-future.org/) within CEM (Clean Energy Ministerial)	Noted. There isn't space to describe them, but we do note the IEA.	Tomaž Žagar	Faculty for Energy Technology, University of Maribor	Slovenia
5567	68	20	68	22	I regret that you mentioned these rumors about IEA motivations. IEA has never promoted the use of fossil fuels, but has mentioned the limits and the problems which are tied to development of renewable (solar and wind). That position was criticized by ultra promoters of renewables and to shock the opinion had this argument : IEA is in favour of fossils. Stupid. And IPCC should not repeat these absurd ideas.	Rejected. The literature is clear that an original purpose of the IEA was protecting fossil fuel access. As we note in the following paragraph, this mission has changed.	Michel SIMON	Retraité/ Pdt d'association	France
86069	68	35	68	35	Suggest adding new sentence at end: "The progressive realisation of those three goals, as reflected in SDG 7, has been patchy and inadequate given their pre-eminent role in mitigating emissions while deriving multiple co-benefits for poverty alleviation, education enhancement, health and employment, among others. The role of international law in facilitating the progressive realisation of the goals and targets in SDG 7 has not been ably assisted by international law". Reference: Stuart Bruce & Jorge Vinales, 'SDG 7 and International Law', in Ellen Hay and Jonas Ebbesson (eds), Cambridge Handbook on the Sustainable Development Goals and International Law (CUP, forthcoming 2021), sections 2 and 3.	Noted, but we don't have space.	Stuart Bruce	KPMG; International Chamber of Commerce Energy and Environment Committee Co-Chair; IUCN Energy Transition Project Co-Chair	United Kingdom (of Great Britain and Northern Ireland)
72883	69	34	71	9	This paragraph should mention the important non-CO2 impacts of aviation, often not included in the present country Contributions	Noted. Amended to show focus is on carbon emissions.	Antoine BONDUELLE	EE-Consultant	France
72885	69	34	71	9	On aviation, the state of play (lines 14-30) is well described. The CORSIA scheme is also well described in the next paragraphs but in a nearly "neutral" fashion, as if it were sufficient to stimulate research on next generation technologies for planes or airline systems. Please strengthen this part, for example with a concluding sentence mentioning that all this is "inadequate".	Noted. Evaluation of adequacy/effectiveness needs to be based on the literature. As noted in the section, this suggests the need for strengthened measures as being likely. Policies to stimulate technology innovation in international aviation are evaluated in the sectoral chapter on transport.	Antoine BONDUELLE	EE-Consultant	France
22639	69	34	69	34	This paragraph is less precise than the previous one (on Energy agreements) for policy, which is very clear on the issue of old agreements supporting oil trade. This chapter on transport lacks (i) more on possible mitigation options on the non-CO2 impacts of aviation or the difficulty of them in policy and verification (ii) the incoherence of the price range aimed by CORSIA on one side, and the cost of carbon needed for accelerated development of sustainable alternatives to kerosene on the other side [the huge and chaotic nature of offsets and the ambiguity of agreements is well described, but this lack of money and incentive for the radical change needed is a separate issue] (iii) the lack of coherence of proposals or projections on biofuels, both on the size of production needed and on the SDGs involved, should be also mentioned.	Noted. Some of this information is beyond the scope of this chapter which focuses on international cooperation rather than policies and actions for mitigation in the transportation sector. However, additional references have been included on the non-CO2 impacts of aviation and the CORSIA scheme.	Government of France	Ministère de la Transition écologique et solidaire	France
76193	69	34	71	34	I suggest stronger coordination with WGIII Ch10 here. That chapter also addresses the role of shipping and aviation vs the Paris Agreement. The section here in Ch14 uses different references from the literature on the same points (e.g., emissions) and the WGIII report would benefit from closer coordination here. I also miss a reference to the paper by Lee et al 2020 here. (You may also consider adding a reference to the section of aviation in WGI Ch6).	Noted. Coordination undertaken with chapter 10 and section reviewed in light of that.	Jan Fuglestedt	CICERO	Norway
76195	69	34	71	9	One issue that could be worth attention here is the following: Aviation has a dominating long term effect on climate via CO2 emission. This is robust and well established knowledge. At the same time, it has several non-CO2 effects, which are, at present, 66% of the total radiative forcing from aviation, but with large uncertainties and low confidence level (Lee et al., 2021). Among these, the effect on contrail cirrus is dominating. The uncertainties of the non-CO2 effects dominate those of the total effect of aviation. This causes a challenge for policymaking; i.e., focus on the certain CO2 effect or expand the scope to take the potentially large non-CO2 effects into account. These perspectives can be combined in the design of mitigation strategies. I think this chapter could reflect on this. And I suggest consulting the LA covering aviation in Ch10.	Consultations with ch 10 undertaken and reference to Lee et al paper included	Jan Fuglestedt	CICERO	Norway
14641	69	35	69	46	It is worth noting that emissions from shipping and aviation have always been excluded from national "inventory emission totals" under the UNFCCC regime, in line with UNFCCC reporting guidelines based on IPCC methodological guidelines (latest version 2006), because of the reasons that you give. They should, however, be reported separately, and there is no reason to exclude them from national "policies" or from NDCs (as indeed is stated later in this section).	Noted. These points are already addressed in this section of the chapter.	Joanna Depledge	Centre for Environment, Energy and Natural Resource Governance (CEENRG), University of Cambridge	United Kingdom (of Great Britain and Northern Ireland)
85401	69	35	69	35	The transportation sector has been a particular focus of cooperative efforts on climate mitigation that extend beyond the sphere of the UN climate regime, such as UNFCCC, International Civil Aviation Organisation (ICAO) and the International Maritime Organisation (IMO). A number of these cooperative efforts involve transnational public-private partnerships, such as the European-based Transport Decarbonisation Alliance, which brings together countries, regions, cities and companies working towards the goal of a 'net-zero emission mobility system before 2050' (Transportation Decarbonisation Alliance 2019). Other efforts are centred in international institutions, such as the International Civil Aviation Organisation (ICAO) and the International Maritime Organisation (IMO).	This comment simply extracts text from the chapter. No response required.	Neil Dickson	ICAO	Canada

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
82917	69	42	69	47	I think this deserves more space (in cooperation with Chapter 10). Aviation and shipping will be a much bigger part of the global inventory by 2050. And aviation is growing. All the other sectoral stuff is inside the UNFCCC framework while these are out. Elevate above the sectoral level?	Noted. Greater coordination with chapter 10 initiated and detail added in to this section based on previous cross-chapter box.	Jim Skea	Imperial College London	United Kingdom (of Great Britain and Northern Ireland)
85403	69	42	69	42	The first edit is to provide concise wording. The underlined text contains a statement contradictory to the one in Chapter 1, Page 35, Line 16. Please consider aligning. Regulations introduced by the ICAO and IMO have addressed emissions from international shipping and aviation. Emissions from these parts of the transportation sector are generally excluded from national emissions reduction policies and NDCs because the 'international' location of emissions release makes allocation to individual nations difficult (Bows-Larkin 2015; Lyle 2018; Hoch et al. 2019). Aviation emissions currently account for 2-2.5% of global CO2 emissions (Grote et al. 2014; Larsson et al. 2019), with total shipping emissions contributing 2.6% global CO2 emissions (Olmer et al. 2017). Notably, however, the contribution of CO2 emissions is estimated to represent only 36-51% of the total aviation-related radiative forcing of climate (Terrenoire et al. 2019).	Accepted. Text aligned with chapter 1.	Neil Dickson	ICAO	Canada
27953	69	11	69	13	Delete "Despite improvements in the international governance of energy, it still appears that a great deal of this is still concerned with promoting further development of fossil fuels. One aspect of this is the development of international legal norms."	Rejected. The science suggests that indeed a great deal is concerned with promoting fossil fuel development.	Eleni Kaditi	Organization of the Petroleum Exporting Countries, OPEC	Austria
52863	69	11	69	12	Promoting further development in fossil fuel should not be a concern if this development is to enhance the clean technologies for fossil fuel which we need for climate action	Noted. We do not say that it is a concern, as that would be policy prescriptive. We do however make note of the fact, because if it isn't coupled to other technologies like CCS, then it would be a problem for mitigation.	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia
20015	69	11		17	this is again on Energy Charter Treaty and Investor-State Dispute Settlements but this time mentions the fact that this legislation might be - and in fact is - used to "block national legislation"	I don't understand the comment.	Manuela Dr. Troschke	Scientists for Future Germany	Germany
66023	69	14	69	14	2015 International energy charter is a political declaration. The text to refer to should be the 1994 Energy Charter Treaty	Accepted	Yamina Saheb	OpenExp	France
27955	69	16	69	18	Delete "Numerous scholars have pointed to ISDS being able to be used by fossil-fuel companies to block national legislation aimed at phasing out the use of their assets".	Rejected. I don't see a justification for removing the text. It is not inaccurate.	Eleni Kaditi	Organization of the Petroleum Exporting Countries, OPEC	Austria
52865	69	17	69	18	Phasing out the use of fossil fuel assets is a biased direction, and national legislation should focus more on the emissions rather than the source	Rejected. We don't say that countries should phase out fossil fuels, as doing so would be policy prescriptive. But it is relevant that many scholars investigate this issue.	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia
9231	69	18	69	22	It is recommended to add the content of renewable energy investment growth in China's "One Belt One Road" project after this paragraph: "However, study (Greenpeace, 2019) also shows that Chinese investment in renewable energies soars under Belt & Road Initiative. The largest single recipient of Belt & Road related investment was Pakistan, where equity investments from China accounted for 36.8% of the country's new wind capacity from 2014 to 2018." The supporting literature is: Chinese equity investments in energy reshape South and Southeast Asia-Greenpeace analysis. Greenpeace International. https://www.greenpeace.org/international/press-release/23446/chinese-equity-investments-in-energy-reshape-south-and-southeast-asia-greenpeace-analysis (accessed Jan 31, 2021).	Noted. We have mentioned the finance for renewable energy.	Yongxiang Zhang	National Climate Center	China
48557	69	31	69	33	There is a great potential to increase the use of renewables, by increasing the production of lithium batteries. However the use of Lithium must be sustainable and its production have strong potential to be developed under non-market mechanisms.	Noted. This would be wrong place in the report to go into this detail on lithium.	Fany Ramos Quispe	Environmental Engineers Association of La Paz	Bolivia
27957	69	32	69	33	Delete "including legal norms designed to protect the interests of owners of fossil assets".	Rejected. We don't see a scientific rationale for removing this text.	Eleni Kaditi	Organization of the Petroleum Exporting Countries, OPEC	Austria
51601	70	1	70	2	"Notably, however, the contribution of CO2 emissions is estimated to represent only 36-51% of the total aviation-related radiative forcing of climate (Terrenoire et al. 2019)." This statement is inconsistent with the one in Chapter 10 (p. 61 lines 10-11) that says CO2 is about 34% of aviation's total forcing (Lee et al., 2020).	Accepted. Reference included.	eric lombard	Stay Grounded	France
75135	70	1	70	2	Should also cite Lee et al. 2021 (https://doi.org/10.1016/j.atmosenv.2020.117834), where it is estimated that aviation has contributed 3.5% to the total anthropogenic warming (measured by effective radiative forcing) to date.	Accepted. Reference included.	Marianne Tronstad Lund	CICERO Center for International Climate Research	Norway
76197	70	11	70	13	this paper may be relevant here: "Climate Penalty for Shifting Shipping to the Arctic" https://pubs.acs.org/doi/10.1021/es502379d	Rejected. Pre-AR5 literature	Jan Fuglestedt	CICERO	Norway
58469	70	14	70	14	Delete "(developed country)" parenthetical after "Annex I". Annex I in the Convention and Kyoto are not defined as "developed country" and these should not be equated.	Accepted.	Government of United States of America	U.S. Department of State	United States of America
85405	70	14	70	14	Proposed change: please refer to the work of ICAO and A40-19 to make clear the large body of work being carried out under the remit of ICAO in addressing the impact of climate change and ICAO. We suggest the deletion of: "Limited progress was made by these organisations on emissions controls in the ensuing decades (Liu 2012), but" and "The Paris Agreement neither explicitly addresses emissions from international aviation and shipping, nor repeats the Kyoto Protocol's provision requiring parties to work through ICAO/IMO to address these emissions (Hoch et al. 2019). This leaves unclear the status of the Kyoto Protocol's article 2.2 directive after 2020 (Dobson 2020; Martinez Romera 2016), potentially opening up scope for more attention to aviation and shipping emissions under the Paris Agreement (Doelle and Chircop 2019)."	Suggested deletions rejected. These statements are supported by the literature cited and no alternative sources identified.	Neil Dickson	ICAO	Canada
58471	70	21	70	24	Recommend deleting this sentence: "This leaves unclear the status of the Kyoto Protocol's Article 2.2 directive after 2020 (Dobson, 2020; Martinez Romera, 2016), potentially opening up scope for more attention to aviation and shipping emissions under the Paris Agreement (Doelle and Chircop, 2019)." It's speculative and not within the IPCC's expertise.	Rejected. This statement is not speculative - it is based on the literature cited.	Government of United States of America	U.S. Department of State	United States of America

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
463	70	24	70	26	This sentence is misleading. Parties are required to report emissions from international shipping - they just are not required to include these emissions as part of the total emissions. I am not familiar with the reference cited, but I suppose that what Doelle and Chircop say is that nothing prevents Parties from including international shipping within the scope of the mitigation objective of their NDCs.	Noted. Amendment made	Benoit Mayer	The Chinese University of Hong Kong	China
63393	70	24	70	26	We would note that while it is technically correct that a Party could include a separate pledge relating to international aviation/shipping emissions in its NDC, the Paris rulebook does require Parties to report on these emissions as a memo item and not to include them in their national totals (18/CMA.1, para. 55)	Accepted. Reference to Paris Rulebook included.	Government of Canada	Environment and Climate Change Canada	Canada
58473	70	27	70	30	Delete this sentence: "Given provision for a five-yearly global stocktake under the Paris Agreement to monitor progress in emissions reduction (see Section 14.3.2.5), there is likely to be increased pressure on parties who are also IMO or ICAO member states to act in the case of inadequate progress in these international institutions on transportation emissions (Doelle and Chircop, 2019)." The IPCC should not be speculating on what "pressure" will be put on parties in the context of the GST.	Accepted. Sentence deleted.	Government of United States of America	U.S. Department of State	United States of America
85407	70	31	70	31	ICAO Member States have adopted a 'basket' of mitigation measures for the aviation sector consisting of technical and operational measures, measures on sustainable alternative fuels and a market-based measure, known as the Carbon Offset and Reduction Scheme for International Aviation (CORSIA) introduced in 2016 (ICAO 2016). CORSIA is intended to be the complementary international measure for meeting the ICAO's aspirational goal of 'carbon neutral growth from 2020' (ICAO 2016), if the goal cannot be achieved by aviation in-sector CO2 mitigation measures. CORSIA will commence in 2021 with a voluntary phase, becoming mandatory from 2027 onwards for states whose share in the total international revenue tonnes per kilometre (RTK) is above a certain threshold (Hoch et al. 2019). Under CORSIA, overall aviation emissions are not capped but rather compensated through use of 'offset units' from emissions reduction projects in other industries (Erling 2018). However, it is unclear whether the goal of carbon neutrality and further CO2 emissions reduction in the sector will be possible solely through the use of such offsets without additional constraints on demand (Lyle 2018). Likely non 42 participation in CORSIA by countries such as China, as well as Brazil, India and Russia, could significantly undermine its capacity to deliver substantial emissions reductions by limiting coverage of the scheme to less than 50% of international aviation CO2 emissions in the period 2021-2035 (Climate Action Tracker 2020a; Hoch et al. 2019). In addition, a wider range of offsets can be used in CORSIA than are contemplated under the Paris Agreement Article 6 mechanism and ICAO does not apply quality standards to offsets, which may raise questions over their integrity (Hoch et al. 2019). Further limitations on the scheme's effectiveness are likely as a result of the ICAO Council's decision setting 2019 as the baseline year for at least the first three years of CORSIA, despite significant reductions (45-60%) in aviation CO2 emissions in 2020 compared with 2019 (Climate Action Tracker 2020a). Other measures adopted by ICAO include an aircraft CO2 emissions standard that applies to new aircraft type designs from 2020, and to aircraft type designs already in production as of 2023 (Smith and Ahmad 2018). Overall, CORSIA and applicable regional measures, such as the EU ETS, are estimated to reduce aviation carbon emissions by only 0.8% per year from 2017-2030 (noting, however, that if non 7 CO2 emissions are included in the analysis, then emissions will increase) (Larsson et al. 2019). Accordingly, pathways consistent with the temperature goal of the Paris Agreement are likely to require more stringent international measures for the aviation sector (Larsson et al. 2019).	This comment just extracts text from the chapter and does not require a response.	Neil Dickson	ICAO	Canada
58475	70	32	70	32	Given ICAO's recognition that CORSIA is a "gap filler", it is helpful for this top-line text to also introduce other measures that are comparably critical over the long term in respect of the sector's emissions sources. Suggest providing examples, as in this edit: "... operational measures, such as a CO2e emissions standard for new aircraft adopted in 2016, measures on sustainable alternative fuels and a market-based measure, known as ..."	Accepted	Government of United States of America	U.S. Department of State	United States of America
58477	70	33	70	33	The drafting is ambiguous as to how CORSIA was agreed, and its legal basis, while an outsized proportion of this text is focused on criticism of the scheme. Factual information about the CORSIA's establishment is important for facilitating understanding of this system and its text foundations. For this, suggest the following: "... the Carbon Offset and Reduction Scheme for International Aviation (CORSIA), which the triennial ICAO Assembly of 193 Member States resolved to establish in 2016 ..."	Accepted	Government of United States of America	U.S. Department of State	United States of America
58479	70	35	70	35	The authors should be clear about ICAO Member States' progress toward CORSIA's implementation, for which important actions were taken prior to 2021. Suggest this information: "... aspirational goal of 'carbon neutral growth from 2020' (ICAO, 2016). In line with the 2016 ICAO Assembly Resolution that established CORSIA, in mid-2018, the ICAO's 36-member state governing Council adopted a series of Standards and Recommended Practices (SARPs), now contained in Annex 16, Volume IV of the Chicago Convention (1944), as a common basis for CORSIA's implementation and enforcement by each state and its aeroplane operators. From 1 January 2019, the CORSIA SARPs require states and their operators to undertake an annual process of monitoring, verification, and reporting of emissions from all international flights, including to establish CORSIA's emissions baseline. Based on this emissions data, CORSIA's carbon offsetting obligations commence in 2021."" Source: CORSIA SARPs: https://www.icao.int/environmental-protection/CORSIA/Pages/SARPs-Annex-16-Volume-IV.aspx	Accepted	Government of United States of America	U.S. Department of State	United States of America
58481	70	36	70	36	It is important to facilitate readers' understanding of the system design, including the design and functioning of CORSIA compliance cycles. Include: "... with 3-year compliance cycles, including a pilot phase in 2021-2023. States have the option to participate in the pilot phase and the subsequent voluntary 3-year cycle in 2024-2026; CORSIA becomes mandatory from 2027 onwards for states whose share in the total ..."	Accepted	Government of United States of America	U.S. Department of State	United States of America

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
465	70	37	70	39	This section fails to recognize that aviation is responsible not only for CO2 emissions, but also for the emissions of other gases, including precursors, and soot, and the making of contrails, which cause more radiative forcing than aviation's CO2 emissions. This sentence in particular is misleading when suggesting that CORSIA would offset "overall emissions", when in fact it would only offset CO2 emissions. See for instance D.S. Lee et al, 'The contribution of global aviation to anthropogenic climate forcing for 2000 and 2018' (2021) 244 Atmospheric Environment 117834 on the non-CO2 climate impacts of aviation.	Accepted. Reference to "overall emissions" changed to CO2 emissions and reference to Lee et al (2021) paper included.	Benoit Mayer	The Chinese University of Hong Kong	China
58483	70	38	70	38	Overall emissions are not compensated, but rather inform a formula for distributing obligations to offset the emissions that exceed the CORSIA baseline (in line with goal of carbon neutral growth). Suggested edit: "... CORSIA, overall aviation emissions are not capped; rather, emissions that exceed the CORSIA baseline are compensated through use of 'offset units' ..."	Accepted	Government of United States of America	U.S. Department of State	United States of America
51603	70	39	70	40	"the goal of carbon neutrality" should be replaced by "the goal of carbon neutral growth"	Accepted	eric lombard	Stay Grounded	France
58485	70	40	70	45	There is little doubt that the goal of carbon neutral growth can be achieved through CORSIA's use of offsets and sustainable aviation fuels. A valid question here could be whether the CORSIA, in combination with other measures, will sufficiently incentivize in-sector mitigation. Further, the speculation regarding these states' participation is not only subjective but factually incorrect, as the states mentioned here have already begun to implement CORSIA's MRV requirements and continue to consider opting in to the voluntary phase, which the SARPs provide for on an annual basis. Beyond 2026, CORSIA is mandatory for all states. Given this needed correction, it is unclear whether the analysis cited in lines 44-45 remains (or ever was) a relevant, accurate source. Suggest this formulation: "... further CO2 emissions reduction in the sector will be sufficiently incentivized solely through the use of such offsets in combination with ICAO's array of manufacturing standards, programs, and state action plans, without additional measures being taken, for example, constraints on demand (Lyle, 2018). Non-engagement in CORSIA's voluntary offsetting requirements by countries such as China, as well as Brazil, India, and Russia, could significantly undermine its capacity to fully deliver on the sectoral goal by limiting coverage of the scheme to less than 50% of international aviation CO2emissions in the period 2021-2026 ..."	Accepted	Government of United States of America	U.S. Department of State	United States of America
58487	70	41	70	42	Suggested edit: "... if countries such as China, Brazil, India, and Russia do not participate ..."	Accepted. Sentence already modified in response to another comment.	Government of United States of America	U.S. Department of State	United States of America
63389	70	44	70	44	According to ICAO statistics, the current participation in CORSIA is estimated at 76.82% of aviation activity, even excluding China, Russia, India and Brazil.	Noted. However, the percentage relates not to the coverage of aviation activity but to the coverage of international aviation CO2 emissions.	Government of Canada	Environment and Climate Change Canada	Canada
63395	70	45	70	47	We would note that this statement is inaccurate. The CORSIA has adopted Emissions Unit Criteria (EUC) regarding the quality of carbon offsets and applies these criteria to offset programmes, following an assessment by the ICAO Technical Advisory Body. Currently, the range of eligible units is significant narrower than many of the options proposed in the Article 6 text.	Noted that the Emissions Unit Criteria have been adopted but the March 2021 determination on Eligible Emissions Units still allows for a wide coverage of offsets. Sentence amended to make this clearer.	Government of Canada	Environment and Climate Change Canada	Canada
58489	70	45	70	48	The discussion on offsets and standards seems inappropriate. Suggest deletion.	Rejected. No reason given for this view. Sentence amended in response to more specific comment above.	Government of United States of America	U.S. Department of State	United States of America
63391	70	46	70	47	ICAO does apply quality standards to offsets. A set of eligibility criteria were established, and each program must undergo a review by the Technical Advisory Board to ensure they meet the criteria and have their eligibility approved by Council. A number of applicant programs have been refused for not having met the criteria. https://www.icao.int/environmental-protection/CORSIA/Pages/CORSIA-Emissions-Units.aspx	Accepted. Amendment made.	Government of Canada	Environment and Climate Change Canada	Canada
52867	70	46	70	47	ICAO does not apply quality standards to offset, which may raise questions over their integrity	Noted	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia
58491	70	46	70	47	ICAO does in fact apply a single, common quality standard to assess CORSIA eligible offsets. It is called the CORSIA Emissions Units Eligibility Criteria, which are applied to assess both offset certification programme-level arrangements and the quality of offsets/projects themselves and are cross-referenced in the CORSIA SARPs -- further supported by Guidelines for Criteria Interpretation, and formal Procedures for a 19-member expert Technical Advisory Body to apply this standard to evaluate and recommend offset program eligibility to the ICAO Council. Suggest deleting the following: "... than are contemplated under the Paris Agreement Article 6 mechanism and ICAO does not apply quality standards to offsets, which may raise questions over their integrity (Hoch et al., 2019). Further ..." Sources: Technical Advisory Body (TAB): https://www.icao.int/environmental-protection/CORSIA/Pages/TAB.aspx TAB Procedures: https://www.icao.int/environmental-protection/CORSIA/Documents/TAB/TAB%202021/TAB_Procedures_January_2021_final.pdf CORSIA Emissions Units Eligibility Criteria and Guidelines: https://www.icao.int/environmental-protection/CORSIA/Documents/TAB/TAB%202021/Programme_Application_Form_Appendix_A_Supplementary_Information_2020.docx	Accepted. Text amended.	Government of United States of America	U.S. Department of State	United States of America
58493	70	48	70	48	This section uses highly ambiguous, (mis-)leading language (e.g., "further limitations", "likely as a result of") based on a report that contains erroneous assumptions about CORSIA's methodology for calculating offsetting obligations and the technical rationale and textual basis for this Council decision, and about the nature of the Council's decision itself. Suggest deletion of: "... standards to offsets, which may raise questions over their integrity (Hoch et al., 2019). Further limitations on the scheme's effectiveness are likely as a result of the ICAO Council's decision setting."	Accepted.	Government of United States of America	U.S. Department of State	United States of America

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
58495	71	1	71	2	This section uses highly ambiguous, (mis-)leading language (e.g., "further limitations", "likely as a result of") based on a report that contains erroneous assumptions about CORSIA's methodology for calculating offsetting obligations and the technical rationale and textual basis for this Council decision, and about the nature of the Council's decision itself. Suggest deletion and revision so the text reads as follows: "In June 2020, the Council decided to define 2019 emissions levels, rather than an average of 2019 and 2020 emissions, as the baseline year for at least the first 3 years of CORSIA, in light of significant reductions in international consumer air travel in 2020 compared with 2019 due to the COVID-19 pandemic. Other ..."	Accepted. Note this comment repeats and expands that above	Government of United States of America	U.S. Department of State	United States of America
52869	71	5	71	6	CORSIA and ETS only 0.8% emission from aviation sector	Noted. Changes have been made to reflect that there are also significant non-CO2 emissions.	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia
58497	71	5	71	5	Unclear what "applicable" means in this context. Suggest deletion given ongoing deliberations regarding the extent of the applicability of such regional measures. The text should read as follows: "... 2018). Overall, CORSIA and regional measures, such as the EU ETS, are estimated to reduce ..."	Accepted	Government of United States of America	U.S. Department of State	United States of America
58499	71	10	71	12	This sentence should be revised for accuracy of the IMO data collection system. Suggest the following formulation: "In 2016, the IMO's Marine Environment Protection Committee (MEPC) approved an amendment to the MARPOL Convention Annex VI for the introduction of a mandatory data collection system for fuel oil consumption of ships."	Accepted	Government of United States of America	U.S. Department of State	United States of America
22657	71	33	71	33	there is a risk that the shipping lines might compensate for the disappearance of heavy fuel oil as fuel by leaving the vessel of a larger size allowing the cost of the tonne transported to be preserved. these 30,000 containers, or even more, require more than 18 m of draft, making 95% of the world's ports out of these ships? very deep water ports will therefore develop and the final ecological cost of the disappearance of heavy fuel oil may therefore be very expensive in terms of ecological footprint.	Noted. Not clear what the suggested amendment is or supporting literature.	Government of France	Ministère de la Transition écologique et solidaire	France
58501	71	35	71	38	This sentence should be revised for accuracy of the IMO Initial Strategy. Suggest the following edits: "Further progress on market-based measures faces difficulty in light of conflicts between the CBDR principle of the climate regime and the traditional non-discrimination and principle of no more favorable treatment, enshrined in MARPOL and other IMO conventions (Zhang, 2016)."	Accepted. Revisions made.	Government of United States of America	U.S. Department of State	United States of America
58503	71	35	71	38	Delete these two sentences in their entirety. The language is very contentious, was negotiated very particularly, and shouldn't be taken out of context or characterized by the IPCC, nor should the IPCC point to a single source to speculate about the motivations of states or the prospects for progress in future negotiations.	Partially accepted. The first sentence has been modified in light of the previous comment of the government of the US. The remaining sentence contains no speculation about motivations of states or the prospects for progress in future negotiations but points to gaps identified in the literature.	Government of United States of America	U.S. Department of State	United States of America
52871	71	36	71	37	Conflict between CBDR principle and IMO non-discrimination approach	Noted. Not clear what the comment is calling for as this conflict is identified in the text already.	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia
70797	71	36	71	38	The CBDR principle is presented as CBDRRRC in page 21 line 11-12. Unifying terminology would be better to enhance consistency through the chapter.	Accepted.	Philippe Tulkens	European Union (EU) - DG Research & Innovation	Belgium
63397	71	39	71	40	In 2020, the IMO's Marine Environment Protection Committee approved a mandatory goal-based technical and operational measure to reduce carbon intensity of international shipping, expected to be adopted in June 2021.	Noted. A reference to this development has been included and we will monitor for adoption	Government of Canada	Environment and Climate Change Canada	Canada
48559	71	41	73	43	A great achievement of the decision of the Paris Agreement, regarding the participation of social movements, is the establishment of the Local Communities and Indigenous Peoples Platform, which was demanded by these highly vulnerable groups, and that has started working in 2019 in Katowice.	Noted. Reference included	Fany Ramos Quispe	Environmental Engineers Association of La Paz	Bolivia
18519	71	44	73	43	This section discusses the roles of NGOs, social movements and recent trends that advocate for 'climate justice'. Are there any examples of the opposing argument to this? E.g. anti-environmental campaigns; the impact anti-environmental policy can have on achieving sustainability goals; influence of world leaders on societal movements?	There is certainly some evidence of this e.g. actions taken against environmental defenders and SLAPP suits against environmental advocacy organisations but it is not clear how this limits the overall effectiveness of this form of transnational cooperation in contributing to climate mitigation. On this point have included references to some recent literature.	Government of United Kingdom (of Great Britain and Northern Ireland)	Department for Business, Energy & Industrial Strategy	United Kingdom (of Great Britain and Northern Ireland)
48697	71	44			section 14.5.3 to include commentary on how NGOs also help to frame rule-systems of climate governance and are important for in capacity building and knowledge sharing (eg ref Michaelowa and Michealowa, already cited elsewhere in this chapter), or clarity that this section refers only to advocacy, and that the role of NGOs as sites of agency and authority in climate governance is discussed elsewhere in the chapter eg section 14.5.4	Noted. Reference to Michaelowa article included though findings limited to knowledge-sharing role when part of TCG initiatives.	Lorraine Elliott	The Australian National University	Australia
48721	71	45	73	43	As noticed, the literature of 14.5.3 Civil society and social movement is a bit fewer than others and has not been comprehensively evaluated in the literature. Here I recommend a book as the new literature for the coming review which may be considered. Binbin Wang. China's Transition on Climate Change Communication and Governance: From Zero to Hero. Springer.2021.01.	Additional suggested reference considered but book appears very focused on China rather than looking more broadly at the role of civil society	Binbin Wang	Institute of Climate Change and Sustainable Development at Tsinghua University	China
52831	71	45	72	11	definitions included here for civil society and social movements are problematic in two major ways. First, the approach adopted here is Western-centric (considerable literature exists on how civil societies form where the demarcation between the state and the civil is not that clear). Second, the boundaries between civil society and social movements are not necessarily that clear. As is, the discussion misrepresents our current understanding of the two concepts.	Noted. The definitions are drawn from the relevant literature and reflect a general understanding of civil society as independent of government/the state. No references are given to the asserted 'considerable literature' putting forward alternative definitions. The definition of civil society is qualified by the use of the term 'generally denotes'	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
7541	71	45	73	43	This section raises important context around social movements and climate policy, including a focus on the growing movements of Extinction Rebellion and Fridays for Future. My concern with this section is that while Indigenous and Global South climate movements are mentioned on page 72 there is very little detail of these and thus the focus emphasizes movements predominately originating in Western countries (such as XR and Fridays for Future). I would suggest that a more substantive mention of the importance and role of Indigenous movements and Global South movements be incorporated. This could include climate movements based in the Global South/Indigenous territories as well as their role in transnational negotiations through networks such as Indigenous Peoples Platform. Furthermore there is a growing and important presence of youth Indigenous movements such as Te Ara Whatu from Aotearoa New Zealand. Sources that may be of use here include: Bargh, M. (2019). A Tika Transition. In D. Hall (Ed.), A Careful Revolution: Towards a low-emissions future (pp. 36–51). Bridget Williams Books; Chatterton, Paul, Featherstone, D., & Routledge, P. (2013). Articulating Climate Justice in Copenhagen: Antagonism, the Commons, and Solidarity. Antipode, 45(3), 602–620; McNamara, K. E., & Farbotko, C. (2017). Resisting a 'Doomed' Fate: An analysis of the Pacific Climate Warriors. Australian Geographer, 48(1), 17–26; Jenny Ritchie (2020): Movement from the margins to global recognition: climate change activism by young people and in particular indigenous youth, International Studies in Sociology of Education;	Noted. Additional references considered and text added.	Raven Cretney	University of Waikato	New Zealand
12181	72	3	72	3	Suggest amending 'World Wildlife Fund' to 'Worldwide Fund for Nature'.	Accepted. Amendment made	Paul Rouse	Carnegie Climate Governance Initiative (C2G) - The Carnegie Council for Ethics and International Affairs	United Kingdom (of Great Britain and Northern Ireland)
12651	72	12	72	28	Also here on tactics: Hadden (2015) outlines how protest and civil disobedience tactics emerged through "inter-movement spillover" from the global justice movement. Allan (2020) also notes this effect of justice advocates bringing new tools of contention. Allan (2018, 2020) considers how and why labour, gender, and justice movements started to campaign in the UNFCCC from the mid-2000s, while human rights NGOs and health NGOs either did not participate or struggled to mobilize a presence. These new activists brought new issues and concepts (e.g., just transition) or new programmes of work (e.g. gender) to the UNFCCC. Allan, J. I. (2020). The New Climate Activism: NGO Authority and Participation in Climate Change Governance. University of Toronto Press. Allan, J. I. (2018). Seeking entry: discursive hooks and NGOs in global climate politics. Global Policy, 9(4), 560-569. Hadden, J. (2015). Networks in contention. Cambridge University Press. Hadden, J. (2015). Networks in contention. Cambridge University Press.	Noted. Additional post AR-5 references considered and included as appropriate into the text.	Jennifer Allan	Cardiff University	United Kingdom (of Great Britain and Northern Ireland)
7543	72	12	72	28	In this paragraph I suggest it would be worth noting that many climate activism groups during this time period were based around localised campaigns against fossil fuel intensive development, mining or other specific projects. I suggest this is important to briefly recognise due to the multi-scalar nature of climate activism globally, i.e. it can range from locally specific, through to national level campaigns and then to global climate movement focus.	Noted but no specific reference suggested to support this.	Raven Cretney	University of Waikato	New Zealand
63399	72	22	72	22	The Indigenous Rights movement and the peasant rights movements are distinct from one and other. This should be better reflected in the text. Recommend "as well as from the distinct indigenous rights and peasants rights movements"	Accepted.	Government of Canada	Environment and Climate Change Canada	Canada
20021	72	29		49	You do not mention Scientists for Future who also operate transnationally	Noted. The discussion of civil society cannot include every relevant group given space limitations.	Manuela Dr. Troschke	Scientists for Future Germany	Germany
48267	72	31	72	31	This says 2019, but the same events have continued in 2020 and 2021.	Noted. This date was based on the literature source cited but it is recognised these protests have continued so date changed	Susana Hancock	University of Oxford	United States of America
22641	72	36	72	36	("more than 200 countries"): This statement uses the term "countries" instead of "States" and the number represent more than the total number of states in the world. Thus it is not really useful because the number of country is subjective, which makes it impossible to know which proportion represents 200 countries. It would appear more appropriate to use the term "states" and modify the number of those covered, or to use a percentage of countries instead of an absolute number.	Noted but this is the figure and terminology used in the source document which does not provide a breakdown by states.	Government of France	Ministère de la Transition écologique et solidaire	France
48265	72	36	72	36	As above, inconsistent numbers of participants throughout WGIII. Here figure is 10million, but see Ch13Pg31Ln9 or Ch5Pg69Ln34-36 for others.	Noted. Figures checked in other chapters for consistency and amended.	Susana Hancock	University of Oxford	United States of America
77751	73	1	73	17	Some discussion of the role of activism and social movements in generating new international moral norms is relevant here—especially given this is an internationally-focused chapter and the study of the proliferation of global moral norms is an important sub-field within international relations (Finnemore and Sikkink 1998 being the classic in the literature). My work on "anti-fossil fuel norms" was the first to draw on and discuss systematically this literature in the climate context and arguably merits mention here (or elsewhere in this section): Green, Fergus, 'Anti-Fossil Fuel Norms', Climatic Change, 150 (2018), 103–16. Other relevant work on anti-fossil fuel norms includes various papers by Matheiu Blondeel, e.g. Blondeel, Matheiu, Jeff Colgan, and Thijs Van De Graaf, 'What Drives Norm Success? Evidence from Anti-Fossil Fuel Campaigns', Global Environmental Politics, 4 (2019), 63–84; Blondeel, Matheiu, 'Taking Away a "Social Licence": Neo-Gramscian Perspectives on an International Fossil Fuel Divestment Norm', Global Transitions, 1 (2019), 200–209.	Noted. Issues relevant to anti-fossil fuel norms are considered, as appropriate, in other sections of the chapter.	Fergus Green	Utrecht University	Netherlands
52873	73	3	73	10	Campaign of fossil fuel divestment and efforts to shift away from fossil fuel led by civil societies are baised direction from non-satate actors and not aligned with formal negotiations within Paris Agreement that centered on finding the balance between emissions by sources and removal by sinks	Noted but no specific amendment suggested. The text is focusing on the subject matter of transnational social movements not the consistency with the Paris Agreement.	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia
27959	73	9	73	10	Delete "As of November 2020, more than 1,200 institutional investors managing over \$14 trillion of assets around the world have committed to divest some or all of their fossil fuel holdings", considering that the main objective of the Paris Agreement is GHG emission reductions and not discriminating against any source of energy that could enhance energy access with technology and innovation.	Rejected. This is a factual statement about the outcomes of this form of international cooperation.	Eleni Kaditi	Organization of the Petroleum Exporting Countries, OPEC	Austria

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
52875	73	14	73	17	Financial climate risk disclosures need to be emission-based and not to undermine the investments in clean technologies for hydrocarbons	Noted but this is a statement is not relevant to what is said in the text which is drawing on literature to articulate one of the main outcomes of the transnational divestment movement around public understanding of climate risk.	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia
8789	73	29	73	29	Add the Burns (2006) and Doelle (2006) references to Boyle (2019): Burns, W.C.G. (2006) Potential causes of action for climate change damages in international for a: The Law of the Sea Convention. International Journal of Sustainable Development Law and Policy 2, 27-51. https://www.mcgill.ca/mjsdl/files/mjsdl/2_1_4_burns_0.pdf Doelle, M. (2006) Climate change and the use of the dispute settlement regime of the Law of the Sea Convention. Ocean Development and International Law 37, 319-337. https://www.tandfonline.com/doi/abs/10.1080/00908320600800945	Rejected. Focus is on post AR5 literature	Chris Vivian	Retired ex Cefas	United Kingdom (of Great Britain and Northern Ireland)
63401	73	44			Recommend highlighting Global Methane Initiative as an example of public-private partnerships and initiatives. The Global Methane Initiative is an avenue to engage on climate solutions outside the UN system, which makes it more agile and flexible in engaging with governments and private industry.	Accepted. Now included-	Government of Canada	Environment and Climate Change Canada	Canada
63403	73	44			This chapter is missing any reference to the work of the Arctic Council. The Arctic Council does a considerable amount of climate-focused work, especially when it comes to mitigation of short-lived climate pollutants.	Taken into Account. However, Arctic Council activities are primarily covered in other sections.	Government of Canada	Environment and Climate Change Canada	Canada
52835	73	44	77	26	Keck & Sikkink's (1998) discussion of the boomerang effect, i.e. when local civil society actors cannot communicate their governments, they reach out to their counterparts in other countries, who put pressure on their own countries, who, in turn, put pressure to the country in question could contribute to the debate here. Some pundits suggest such boomerang effect takes place among pension and sovereign wealth funds in investing in green tech and divesting from dirty energy.	Taken into account. However, this topic is covered in other sections.	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia
12653	73	44	73	44	This section is missing a discussion of the efforts of the Secretariat to "orchestrate" non-state actions. The Marrakech Partnership for Global Climate Action is a major piece of the regime in place since 2014. There are a wide range of literatures considering how this orchestration was a key part of the drive for the Paris Agreement, and the nature of the contributions from businesses, cities and others. Hale, T. (2016). "All hands on deck": The Paris agreement and nonstate climate action. Global Environmental Politics, 16(3), 12-22. Bäckstrand, K., Kuyper, J. W., Linnér, B. O., & Löwbrand, E. (2017). Non-state actors in global climate governance: from Copenhagen to Paris and beyond.	Taken into account. However, this topic is primarily covered in section 14.5.5.	Jennifer Allan	Cardiff University	United Kingdom (of Great Britain and Northern Ireland)
82919	73	44	73	44	A reference to the Oil and Gas Climate Initiative might be relevant here 12 of the biggest globals including China, Brazil India, Aramco.	Taken into account. We will further check this.	Jim Skea	Imperial College London	United Kingdom (of Great Britain and Northern Ireland)
31329	73	44	77	26	Thank you very much for the efforts to combine the perspective from transnational business with PPP initiatives. The carbon influence of transnational business goes beyond the PPP initiatives, I think. May I suggest to have a broader discussion on multinational enterprises (MNEs) and climate mitigation? In fact, in the academic community of international business there are growing interests and literature on how MNEs can contribute to sustainable development, including climate protection. Let me recommend two special issues. (1) Journal of International Business Policy SI on The Sustainable Development Goals: What role for multinational enterprises? https://link.springer.com/journal/42214/volumes-and-issues/4-1 (2) Journal of International Management SI on MNEs and Sustainable Business in Emerging Markets https://www.journals.elsevier.com/journal-of-international-management/call-for-papers/mnes-and-sustainable-business-in-emerging-markets Thank you a lot!	Accepted. But only the first special issue mentioned here. We could not find a direct link to climate change in the second one.	Maoliang Bu	Nanjing University	China
86717	74	8			The Outcome Document of the BAPA+40 (UN, 2019*) recognizes that the shortage of resources continues to hinder the expansion of South-South and triangular cooperation and underscored the need to further mobilize resources from all sources — public, private, domestic and international. It also recognizes the value of including multi-stakeholder approaches to South-South and triangular cooperation led by Member States whereby governments create enabling environments that mobilize collective action by a growing number of diverse actors in South-South and triangular cooperation. *UN, 2019: Buenos Aires outcome document of the second High-level United Nations Conference on South-South Cooperation, A/RES/73/291.	Taken into account. However, we think this fits better in section 14.5.1.4.	Government of Argentina	Ministry of Environment and Sustainable development of Argentina	Argentina
52833	74	12	74	12	(established 2004) should be moved to the previous sentence	Accepted. Done.	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia
73931	74	36			The work 'Goulder et al. 2019' cannot be found in the References (There is a work conducted by them in 2018 ONLY in the References).	Accepted.Changed.	Raehyun KIM	National Institute of Forest Science	Republic of Korea
86851	74	8			The Outcome Document of the BAPA+40 (UN, 2019*) recognizes that the shortage of resources continues to hinder the expansion of South-South and triangular cooperation and underscored the need to further mobilize resources from all sources — public, private, domestic and international. It also recognizes the value of including multi-stakeholder approaches to South-South and triangular cooperation led by Member States whereby governments create enabling environments that mobilize collective action by a growing number of diverse actors in South-South and triangular cooperation. *UN, 2019: Buenos Aires outcome document of the second High-level United Nations Conference on South-South Cooperation, A/RES/73/291	Noted. We were unsure how to incorporate this into the scientific literature on this topic, and so did not.	Government of Argentina	Ministry of Environment and Sustainable development of Argentina	Argentina

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
72349	75	15	75	23	Please replace "Compact of Mayors" with the "Global Covenant of Mayors", which includes the former Compact of Mayors, and is supported by ICLEI, C40, UCLG, the Climate Alliance and other European cities networks. You could cite here: Albana Kona, Paolo Bertoldi, Fabio Monforti-Ferrario, Silvia Rivas, Jean François Dallemand, Covenant of mayors signatories leading the way towards 1.5 degree global warming pathway, Sustainable Cities and Society, Volume 41, 2018, Pages 568-575, https://doi.org/10.1016/j.scs.2018.05.017 .	Accepted. Changed and cited.	bertoldi paolo	European Commission	Italy
52837	75	34	75	34	"these authorities" instead of "These authorities"	Accepted. Done.	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia
52877	75	34	75	34	missing a dot before (These authorities ...)	Accepted. Done	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia
52879	76	3	76	6	Circular economy and the business investment for carbon capture were mentioned, should also include circular carbon economy concept	Accepted. Done	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia
72351	76	24	75	46	Here you could cite the following article supporting your statement: Paolo Bertoldi, Albana Kona, Silvia Rivas, Jean François Dallemand, Towards a global comprehensive and transparent framework for cities and local governments enabling an effective contribution to the Paris climate agreement, Current Opinion in Environmental Sustainability, Volume 30, 2018, Pages 67-74, https://doi.org/10.1016/j.cosust.2018.03.009	Rejected here. Belongs in section 14.5.5.	bertoldi paolo	European Commission	Italy
52881	76	28	76	29	It is important to the issues of TCFD for shifting away from fossil fuel, and undermining clean technologies which may mislead investors	Noted.	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia
52839	76	35	76	35	"recent vintage, an" instead of "recent vintage an"	Accepted. Changed	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia
12655	77	6	77	26	There is a literature that assesses the contributions of non-state actors. The UNFCCC also publishes a Yearbook of Global Climate Action that outlines how many (or rather, few) of the actions pledged are progressing or have successfully achieved their goals (https://unfccc.int/climate-action/marrakech-partnership/reporting-and-tracking). Chan, S., Falkner, R., Goldberg, M., & Van Asselt, H. (2018). Effective and geographically balanced? An output-based assessment of non-state climate actions. <i>Climate Policy</i> , 18(1), 24-35. Chan, S., Brandt, C., & Bauer, S. (2016). Aligning transnational climate action with international climate governance: The road from Paris. <i>Review of European, Comparative & International Environmental Law</i> , 25(2), 238-247. Roger, C., Hale, T., & Andonova, L. (2017). The comparative politics of transnational climate governance. <i>International Interactions</i> , 43(1), 1-25. Chan, S., Boran, I., van Asselt, H., Jacobuta, G., Niles, N., Rietig, K., ... & Wambugu, G. (2019). Promises and risks of nonstate action in climate and sustainability governance. <i>Wiley Interdisciplinary Reviews: Climate Change</i> , 10(3), e572.	Accepted. Included.	Jennifer Allan	Cardiff University	United Kingdom (of Great Britain and Northern Ireland)
52841	77	18	77	18	What is PPT?	Accepted. Changed to PPP.	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia
58505	77	18	77	18	"PPT" is an undefined acronym. What is this?	Accepted. Changed to PPP.	Government of United States of America	U.S. Department of State	United States of America
52843	77	27	77	27	The following reference can be used to enhance the text. Van der Heiden, Nico. Urban foreign policy and domestic dilemmas: insights from Swiss and EU city-regions. ECPR Press, 2010.	Noted. We don't think it really adds much, so we are not including it.	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia
43527	77	33	77	38	Is that possible cities who already success reducing their GHG emissions then share their best practices to the other cities in this world? The method to implement best practices in the other cities can be put in the paper.	Noted. We already make this point at the end of the paragraph	INTAN SUPRABA	Universitas Gadjah Mada	Indonesia
58507	77	42	77	42	Is ICLEI an acronym for an organization?	Noted. It used to be, when the organization was the International Council for Local environmental Initiatives. But then they dropped that, and now are just ICLEI, Local Governments for Sustainability.	Government of United States of America	U.S. Department of State	United States of America
22643	77	45	77	46	It may be useful to make one or two sentences about functions and ways of action of these networks : exchange of informations, taking direct commitment, influence international negotiations using more informal way, etc...	Accepted. We have made a note of this.	Government of France	Ministère de la Transition écologique et solidaire	France
72353	77		77		Here it is suggested to cite the following articles: Paolo Bertoldi, Albana Kona, Silvia Rivas, Jean François Dallemand, Towards a global comprehensive and transparent framework for cities and local governments enabling an effective contribution to the Paris climate agreement, Current Opinion in Environmental Sustainability, Volume 30, 2018, Pages 67-74, https://doi.org/10.1016/j.cosust.2018.03.009 and Albana Kona, Paolo Bertoldi, Fabio Monforti-Ferrario, Silvia Rivas, Jean François Dallemand, Covenant of mayors signatories leading the way towards 1.5 degree global warming pathway, Sustainable Cities and Society, Volume 41, 2018, Pages 568-575, https://doi.org/10.1016/j.scs.2018.05.017 . (https://www.sciencedirect.com/science/article/pii/S2210670717314762)	Partly accepted. I had a hard time figuring out what the first reference contributed. The second reference was clearer, and has been included.	bertoldi paolo	European Commission	Italy
14647	78	30	78	32	(1) The strongest critique of the PA is not just that the NDCs are not ambitious enough, but that there is no legally binding obligation to actually implement their contents. Implementation is key, not just ambition. (2) for line 41, I would add "...to increase the ambition and secure the implementation of..."	Accepted	Joanna Depledge	Centre for Environment, Energy and Natural Resource Governance (CEENRG), University of Cambridge	United Kingdom (of Great Britain and Northern Ireland)

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
72355	78	3	78	22	There is evidence in literatures that cities report their emission reductions in a transparent manner and that their aggregated GHG emission reductions are additional to state actors. See, among other articles: Valentina Palermo, Paolo Bertoldi, Malvina Apostolou, Albana Kona, Silvia Rivas, Data on mitigation policies at local level within the Covenant of Mayors' monitoring emission inventories, Data in Brief, Volume 32, 2020, 106217, https://doi.org/10.1016/j.dib.2020.106217 , (https://www.sciencedirect.com/science/article/pii/S2352340920311112) or Bertoldi, P., Rivas Calvete, S., Kona, A., Hernandez Gonzalez, Y., Marinho Ferreira Barbosa, P., Palermo, V., Baldi, M., Lo Vullo, E. and Muntean, M., Covenant of Mayors: 2019 Assessment, EUR 30088 EN, Publications Office of the European Union, Luxembourg, 2020, ISBN 978-92-76-10722-4, doi:10.2760/775755, JRC118927 available at https://ec.europa.eu/jrc/en/publication/eur-scientific-and-technical-research-reports/covenant-mayors-2019-assessment	rejected. I couldn't figure out how these references added additional information.	bertoldi paolo	europa commission	Italy
14643	78	3	78	23	These are important new contributions to the debate on the impact of NSAs on achieving climate goals: (1) Takeshi Kuramochi, Mark Roelfsema, Angel Hsu, Swithin Lui, Amy Weinfurter, Sander Chan, Thomas Hale, Andrew Clapper, Andres Chang & Niklas Höhne (2020) Beyond national climate action: the impact of region, city, and business commitments on global greenhouse gas emissions, Climate Policy, 20:3, 275-291, DOI: 10.1080/14693062.2020.1740150; (2) Thomas N. Hale, Sander Chan, Angel Hsu, Andrew Clapper, Cynthia Elliott, Pedro Faria, Takeshi Kuramochi, Shannon McDaniel, Milimer Morgado, Mark Roelfsema, Mayra Santaella, Neelam Singh, Ian Tout, Chris Weber, Amy Weinfurter & Oscar Widerberg (2021) Sub- and non-state climate action: a framework to assess progress, implementation and impact, Climate Policy, 21:3, 406-420, DOI: 10.1080/14693062.2020.1828796	Partly accepted. The first of these references was quite useful, and we included it, while the second less so.	Joanna Depledge	Centre for Environment, Energy and Natural Resource Governance (CEENRG), University of Cambridge	United Kingdom (of Great Britain and Northern Ireland)
86719	78	22			The Outcome Document of the BAPA+40 (UN, 2019*) urges the United Nations system to continue its support to regional and subregional organizations for the continued promotion of transparent, sustainable and accountable development practices, and to enable more partnerships, with a view to promoting and scaling up best practices to benefit developing countries. In paragraph 31 the Outcome document, also urges the United Nations system to continue its support to regional and subregional organizations for the continued promotion of transparent, sustainable and accountable development practices, and to enable more partnerships, with a view to promoting and scaling up best practices to benefit developing countries. *UN, 2019: Buenos Aires outcome document of the second High-level United Nations Conference on South-South Cooperation, A/RES/73/291.	Noted, but it isn't quite relevant here.	Government of Argentina	Ministry of Environment and Sustainable development of Argentina	Argentina
7671	78		78		The synthesis section in page 78 would benefit form a reference to the importance of stepping up international peer pressure and accountability of NDCs (for instance, inserted between lines 30 and 34). Such references are included in the main text, including in pages 25 (line 25) and 35 (line 15). Other than procedural obligations, the main weakness of the NDCs is their weak accountability (page 26, lines 19 and 31), and their long review period, every five years (page 35, lines 9 through 20).	Accepted. We now include language highlighting the importance of NDCs being implemented.	Pablo Moreno	International Monetary Fund	United States of America
10861	78	25	78	40	All this is certainly true. Are missing suggestions about which better deal could have concluded than the Paris agreement, keeping in mind the numberless obstacles. Perhaps such suggestions are not to be found in the literature! Back in 2015, concluding the agreement was widely recognized as a considerable achievement.	Accepted. We do have text suggesting that Paris fits the political realities of our time, which is the point you wish to be made.	Philippe Waldteufel	CNRS	France
19519	78	28	78	40	What is the substantive basis of the "views" and whose views are referred to here - what is put forward in the scientific literature or said by different actors. A firm assessment of how well the PA will work would seem to require a longer period to see than what has been available to assess in the literature by the WGIII literature cut-off dates. Just to say state different arguents would seem to be a thin basis to make such statements, if the overall conclusion is that "we don't know".	Accepted. We highlight that these are views are to be found in the scientific literature.	Markku Rummukainen	Lund University	Sweden
19831	79	16	79	16	Replace "there is" by "the empirical". Reason: The empirical literature assessed in section 14.5. is finding low effectiveness.	Accepted	Axel Michaelowa	University of Zurich	Switzerland
22645	79	28	79	30	In this chapter, it seems that the promising existing cooperation on buildings remains unknown of the authors. The Global Alliance for Buildings and Construction, hosted by UNEP, is currently gathering 30 national governments and more than a hundred organisations. It aims at raising awareness, enhancing financial capacities, providing support to national and local authorities. Created in 2015 at COP 21, the GlobalABC is developing regional and national roadmaps for decarbonising the buildings sector. It is also, among other activities, issuing each year a Global Status Report. Therefore, we would suggest the following modifications: 14.6.2 Existing wording: The one sector lacking current international cooperative action is buildings, although many of the concerns relevant for buildings may be embedded in the energy sector with respect to their operation, and the industrial sector with respect to their materials. Proposed wording: "Despite the existing initiatives (note), the buildings sector is still lacking sufficient international cooperative action. Although many of the concerns relevant for buildings may be embedded in the energy sector with respect to their operation and the industrial sector with respect to their materials, there is an important need to reinforce the specific networks to address the sector as a whole. Note: such as Global Alliance for Buildings and Construction (Global ABC.org)	Accepted. We have altered the text to reflect the existence of this initiative.	Government of France	Ministère de la Transition écologique et solidaire	France
72357	79	34	79	34	There is good evidence of international cooperation to enhance mitigation activities in buildings, in particular in collaborative activities to improve energy efficiency in residential appliances, lighting, air-conditioners, see Section 9.9.7.1	Accepted. We have updated the text with respect to buildings.	bertoldi paolo	europa commission	Italy

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
51605	79	34	79	34	In Table 14.5 transport : "especially as emissions from international aviation and shipping continue to grow, often unaccounted for in NDCs." "often" should be taken out. Emissions from international aviation and shipping are not accounted for in NDCs.	Accepted.	eric lombard	Stay Grounded	France
51813	79	34	80	1	What does "Inclusion of support for REDD+ in Paris Agreement mechanisms" mean for key strenghts of AFOLU in the table? The negotiations under Article 6 are not yet completed, and views on whether it should include REDD+ remain diverse. Suggest to delete, as this is wrong.	Accepted. We have changed this to bilateral support.	Florin Vladu	UNFCCC Secretariat	Germany
27961	79		79		Delete "Need for enhanced financial support to place renewable energy on an equal footing with fossil fuel energy in developing countries; investor-state dispute settlement mechanisms designed to protect the interests of fossil fuel companies from national policies; ensuring just transition; and, addressing stranded assets", as this is not a policy neutral statement.	Accepted. We have rewritten to low-carbon and high-carbon, avoiding the policy prescriptiveness with respect to renewables and fossil fuels.	Eleni Kaditi	Organization of the Petroleum Exporting Countries, OPEC	Austria
52883	79		79		protecting the interest of fossil fuel or addressing should not be weakness for mitigation efforts in energy sector	Noted. We have rewritten to be about high carbon energy sources rather than fossil fuels.	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia
11171	80	1	80	1	The final row lumps CDR and SRM together. They should be broken apart in the table and analyzed separately -- as they are in the main text on pages 49, 53 - 55 -- because SRM and CDR are at different levels of development and state/stakeholder interest and present very different problem structures and risk/benefit analyses. Cf. IPCC, Special Report: Global Warming of 1.5C at 550 (explaining that CDR and SRM are analyzed separately within report rather than grouped together under the name "geoengineering"); see also AR6WGIII Draft at 49 (noting the same).	Rejected. We lump them together -- which we acknowledge is imperfect, because they both fall within the "cross-sectoral category.	Charles Corbett	University of California, Los Angeles School of Law	United States of America
75671	80	2	82		The overall assessment of international cooperation against the 5 criteria set in section 14.2.3 and summarized in table 14.3 provides a good overview to compare the different agreements within each other and to highlight 'key' characteristics of such agreements. However, the analysis lacks details behind the results; if space is the issue an annex could be attached to the analysis. Also, I would suggest including the following: i)UNFCCC - under institutional strength - to include the fact that due to the reporting needs national climate change offices, focal point, etc. had to be created/assigned for which capacity building to staff had to be provided. ii)Kyoto Protocol - under transformative potential- to include the fact that due to the CDM renewable technologies' implementation increased as it is the case for wind technology. Clear country examples of this are China and India (for stats refer to: cdm.unfccc.int). Also, the contribution to sustainable development must be demonstrated and endorsed by host countries for each of the more than 10,000 CDM activities registered. For the demonstration of sustainable development host countries developed metrics and different ways to assess such contribution. Hence, understanding of sustainable development at host country, investor, certifiers levels was imperative back in 2008.	Accepted in part. We have included the additional strength of the UNFCCC. With respect to the CDM, the statements you suggest are contests (as we report in 14.3.3), and so we do not include them.	Karla Solis	Peru	Germany
19833	80	6	80	9	Replace "Second, there ... offsetting" by "Second, the international market mechanisms under Article 6 allow an upscaling from projects and programs to policy-based and sectoral generation of emissions credits. Moreover, the sectoral agreement CORSIA also makes use of such credits" Reason: Article 6 is not "more limited" as the current text would suggest. It is much wider than the Kyoto Mechanisms.	Accepted. Thank you for the text suggestion, which we have largely used.	Axel Michaelowa	University of Zurich	Switzerland
52845	80	15	82	1	The fifth column can be called "economic effectiveness" in table 14.6. The preceding discussion features lots of details on this concept as they relate to UNFCC, Montreal Protocol and other cooperation schemes, for which the cells of economic effectiveness is blank.	Rejected. We have shown very little in the way of market mechanisms in these agreements.	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia
14649	80	15	80	15	The entry on distributive outcomes for the UNFCCC should be headlined by "leadership role for industrialised countries listed in Annex I, including stronger commitments on emission reductions and reporting" (There weren't "stabilisation targets" as such, and the leadership role extends beyond emission reduction).	Accepted. Thanks.	Joanna Depledge	Centre for Environment, Energy and Natural Resource Governance (CEENRG), University of Cambridge	United Kingdom (of Great Britain and Northern Ireland)
14653	80	15	81	1	The scope of "transformative potential" requires more explanation and precision. In this table, it seems to overlap/duplicate with "distributive outcomes", although not consistently. Is transformative potential the same as provision of finance and technology transfer, as implied by some of the entries? I suspect it is different, but this needs more work to be clear, as revealed through the concrete examples in this paper. This comment is relevant to section 14.2.3 and table 14.3, where I also encourage deeper thought about what constitutes transformative potential. In this previous section/table, there is the implication that transformative potential implies a "signalling function", but this is not included in this table 14.6.	Accepted. We have gone back to section 14.2.3 and updated.	Joanna Depledge	Centre for Environment, Energy and Natural Resource Governance (CEENRG), University of Cambridge	United Kingdom (of Great Britain and Northern Ireland)
14659	80	15	82	1	Overall, table 14.6 could be really useful, but the brevity of its material renders it superficial and incomplete. I would suggest spreading it out over two "landscape" pages, allowing for the addition of more information and improved readability.	Noted. We will have to negotiate with the TSU about how this table is oriented. We are including some additional material in response to review comments.	Joanna Depledge	Centre for Environment, Energy and Natural Resource Governance (CEENRG), University of Cambridge	United Kingdom (of Great Britain and Northern Ireland)
7683	80	15	81		Omission: table 14.6 would benefit from a reference to the IMF in the section of "multilateral and regional economic agreements and institutions" (see comment on page 57).	Accepted. We have included this.	Pablo Moreno	International Monetary Fund	United States of America
12777	80	20	81	2	(Change) In the second row and the third column, I hope that "Financial mechanism, provisions for technology transfer, and capacity building" can be changed to "Financial Mechanism; Technology Mechanism; provisions for capacity building".	Accepted. We have changed this.	Chaewoon Oh	Green Technology Center	Republic of Korea
16657	80	20	81	2	(Change) In the second row and the third column, I hope that "Financial mechanism, provisions for technology transfer, and capacity building" can be changed to "Financial Mechanism; Technology Mechanism; provisions for capacity building".	Accepted. We have changed this.	Government of Republic of Korea	Korea Meteorological Administration (KMA)	Republic of Korea
8269	80		82		Figure 14.6 is not easy to read, please consider adding a grid.	Noted. This will all be formatted in the end.	Frida Zahlander	DanChurchAid	Denmark

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
22647	80		80		table 14.5, 1st row of the page, 3rd column: AFOLU "need for increased global finance": not only for restoration projects : also for REDD+.	Accepted. We have added this.	Government of France	Ministère de la Transition écologique et solidaire	France
22649	80		80		table 14.5, row "buildings", 2rd column : Suggestion to replace "None identified" with "Initiatives promoting regional and national roadmaps and decarbonisation strategies (Global ABC, PEEB) "	Accepted. We have changed this.	Government of France	Ministère de la Transition écologique et solidaire	France
22651	80		80		table 14.5, row "buildings", 3rd column : We suggest to replace "Limited evidence of international cooperation to enhance mitigation activities in buildings." by "Need to reinforce international cooperation to enhance mitigation activities in buildings."	Accepted. We have changed the text,	Government of France	Ministère de la Transition écologique et solidaire	France
85409	80		80		Table 14.5 Effects of international cooperation on sectoral mitigation efforts: Need to raise the level of ambition in sectoral agreements, such as by ICAO and IMO, consistent with the Paris Agreement and complete decarbonisation, especially as emissions from international aviation and shipping continue to grow, often unaccounted for in NDCs.	Rejected. We think this is clear from the context. We want to avoid calling out particular organizations.	Neil Dickson	ICAO	Canada
69399	80		82		Table 14.6 seems overly ambitious and I would recommend cutting it. It seems like there is a struggle going on to finish filling out all of the cells. It could be condensed into a listing of the relevant agreements, and their main achievements. What is each known for? Again this gets back to previous comments – an agreement is not a success if it does not achieve its stated goals, no matter what other co-benefits may have been created, intentionally or not.	Rejected. Most of the comments seem to support the basic inclusion and structure of Table 14.6.	Tyler Felgenhauer	Duke University	United States of America
14651	81	1	81	1	For consistency with the other agreements, the entry on transformative potential for the KP should include funding for adaptation through the CDM, including creation of the Adaptation Fund.	Rejected. We don't see the adaptation fund as enhancing the potential for transformative mitigation. It does however help those countries most affected by climate impacts, and hence plays a role with respect to equity.	Joanna Depledge	Centre for Environment, Energy and Natural Resource Governance (CEENRG), University of Cambridge	United Kingdom (of Great Britain and Northern Ireland)
14655	81	1	81	1	The Kigali Amendment - addressing a potential conflict between the two regimes, and therefore enhancing climate mitigation - could usefully be added here. Perhaps this category of other multilateral agreements should be disaggregated further - the SDGs and MP are sufficiently significant, that they should probably have their own entries.	Rejected. I don't think we have the material in the main text to support this.	Joanna Depledge	Centre for Environment, Energy and Natural Resource Governance (CEENRG), University of Cambridge	United Kingdom (of Great Britain and Northern Ireland)
12775	81	16	81	17	(Change) In the third row and the third column, I hope that "Mechanisms for capacity building and technology transfer" can be changed to "Mechanisms for technology development & transfer and capacity building".	Accepted. We have changed the text.	Chaewoon Oh	Green Technology Center	Republic of Korea
16655	81	16	81	17	(Change) In the third row and the third column, I hope that "Mechanisms for capacity building and technology transfer" can be changed to "Mechanisms for technology development & transfer and capacity building".	Accepted. We have changed the text.	Government of Republic of Korea	Korea Meteorological Administration (KMA)	Republic of Korea
19835	81		81		Reword "Voluntary cooperation" as follows: "Voluntary cooperation, including market mechanisms"	Rejected. This is implicit.	Axel Michaelowa	University of Zurich	Switzerland
27963	81		81		In column under distributive outcome, after "concessional financing agreement", add "and possible negative impacts on distribution implications and equity due to trade policies".	Rejected. We don't show any evidence for this.	Eleni Kaditi	Organization of the Petroleum Exporting Countries, OPEC	Austria
14657	82	1	82	1	If ICAO is included under sectoral agreements and institutions, which is fine, then I am missing an entry under environmental effectiveness. And what about IMO?	Accepted. We have added the transport sector to environmental effectiveness.	Joanna Depledge	Centre for Environment, Energy and Natural Resource Governance (CEENRG), University of Cambridge	United Kingdom (of Great Britain and Northern Ireland)
52847	82	3	82	5	Times series, CSTS and other forms of empirical approaches may hold immense value with the data we have right now. The challenge, most researchers would argue, is about research design and the spatiotemporal domain we choose. As a reminder, punctuated equilibrium models, matching, and synthetic counterfactuals (cited a couple of times in this report as well) do rely on basic time-series assumptions.	Noted. We have changed the text to say that time-series analysis are challenging for the reasons listed, rather than categorically of little value.	Government of Saudi Arabia	Sustainability Advisor to the Minister Ministry of Petroleum and Mineral Resources	Saudi Arabia
14661	82	3	83	8	I agree with what you say about the difficulty of assessing the effectiveness of international agreements and institutions, given the many variables involved. However, this seems to expose a glaring missed opportunity in terms of assessment of the Kyoto Protocol's effectiveness. The Kyoto Protocol is an international climate agreement that has, to all intents and purposes, now run its course and expired, and whose effectiveness could therefore now be assessed ex post, while recognising that such an assessment will always be incomplete and imperfect. Why don't we do this, and try to learn lessons, both good and bad? There is literature out there to draw on.	Accepted. We now cover this in 14.3.3.1, and also note it here.	Joanna Depledge	Centre for Environment, Energy and Natural Resource Governance (CEENRG), University of Cambridge	United Kingdom (of Great Britain and Northern Ireland)
8445	82	5	82	5	the exact meaning of "which include different criteria for assessment" needs to be clarified	Accepted. We have reworded this for clarity.	Sandrine MALJEAN-DUBOIS	CNRS/ Aix-Marseille University	France
3823	82	11	82	12	Here again I would refer to the existence of analogies within other international regimes from which lessons can be drawn for the PA. This is a considerably under-explored area of research that may help to fill gaps in the current knowledge until more empirical evidence on the PA's effectiveness is available. For example see: Raiser et al., forthcoming, "Beyond Pledge and Review: learning from analogies to the Paris Agreement's review mechanisms" - the paper studies the performance of analogous review mechanisms in the trade, finance, human rights and labour regimes, drawing lessons for the Paris Agreement	Accepted. We have noted the issue of analogous treaties.	Raiser Kilian	Hertie School	Germany
48305	82	11	82	11	New to what?	New in terms of now existing, and not along ago they didn't.	Susana Hancock	University of Oxford	United States of America
48307	82	11	82	12	Might not be the place for it here, but we need some discussion about what the new design is a shift in hope from the failures of the previous efforts.	It isn't really the place for it here. We do describe the arguments for why Paris was adopted under section 14.3.	Susana Hancock	University of Oxford	United States of America
69401	82	22	82	31	Suggest cutting this para.	Noted. We understand that it doesn't say a lot. At the same time, we have included it -- and keep it -- in order to dampen expectations that research can provide hard evidence on the effectiveness of international cooperation.	Tyler Felgenhauer	Duke University	United States of America
58509	82	30	82	31	"no matter how much data is accumulated" should be "no matter how much data are accumulated" (data are plural)	Accepted. Thanks.TP 24.08.2021	Government of United States of America	U.S. Department of State	United States of America

Comment Id	From Page	From Line To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country	
9387	83	11	83	27	What is the aim and focus of this FAQ? Despite all the details provided in this long question, it still seems to assume that many readers think international cooperation is not needed in the face of a global problem. Is this really the case? Is the question trying to hint at the changes in the framework for international cooperation? If you would like to highlight the importance of international cooperation, my suggestion would be to simply ask: Why is international cooperation important to strengthen countries' nationally determined emissions reductions under the Paris Agreement?	Thank you. The text reflects the shift in architecture. We have rephrased the questions	Maïke Nicolai	Helmholtz Centre Geesthacht	Germany
14663	83	15	83	16	The distinction is not that these were "multilaterally negotiated" but that they were "legally binding emission reduction targets based on common metrics for a limited group of industrialised nations", compared to non-legally binding NDCs from all countries etc...	Merci, we adjusted the phrasing	Joanna Depledge	Centre for Environment, Energy and Natural Resource Governance (CEENRG), University of Cambridge	United Kingdom (of Great Britain and Northern Ireland)
27965	83	25	83	25	After "South-South", add "and triangular" cooperation.	The term "multilateral" includes trilateral and multi-node cooperation.	Eleni Kaditi	Organization of the Petroleum Exporting Countries, OPEC	Austria
14665	83	30	83	37	(1) It wasn't a stabilisation target. It was for Annex I countries to return their emissions to 1990 levels by 2000. (2) Line 37 - add "to increase the ambition "and ensure the implementation" of their NDCs..."	Correct. Text rephrased	Joanna Depledge	Centre for Environment, Energy and Natural Resource Governance (CEENRG), University of Cambridge	United Kingdom (of Great Britain and Northern Ireland)
19837	83	31	83	31	Reword: "Neither ... will" as follows: "The Kyoto Protocol has led to an emission reduction from business as usual. International market mechanisms have led to the implementation of thousands of mitigation projects around the world and generation of billions of emission credits." Reason: We do not know yet whether we will see the transformational policy changes the long term targets of the Paris Agreement require. But we know what happened in the past...	Accepted. We have reworded the text in this direction.	Axel Michaelowa	University of Zurich	Switzerland
14667	83	44	83	45	This comment mirrors my feedback on p.4 of chapter 14, and also p.122 of the Technical Summary, which includes the same information: Cooperation has made a difference not just in the AFOLU sector and not just for non-CO2 gases. SPM B2 finds that "a growing number of countries have entered a period of sustained GHG emission reductions in the absence of economic crisis", a point further elaborated in B2.4. Another important metric is the spread of climate legislation, targets and strategies, as documented in chapter 13. B5 finds that "there has been a substantial growth in climate policy and corresponding institutional arrangements at national and sub-national level". Chapter 13 provides evidence that this is linked to "international negotiation events" (KP entry into force, run-up to CPN, PA adoption). These provide important evidence of emerging environmental effectiveness of the climate regime.	While well observed points, this chapter deals with "international cooperation" - not whether policies in general are effective.	Joanna Depledge	Centre for Environment, Energy and Natural Resource Governance (CEENRG), University of Cambridge	United Kingdom (of Great Britain and Northern Ireland)
48309	83	46	84	1	Can these be quantified? It would be useful to have numbers here.	Section 14.5.2.1 provides numerical evidence	Susana Hancock	University of Oxford	United States of America
46467	83	28	83	38	FAQ 14.2: the text does not answer the question posed, but rather states "it remains to be seen". Delete this FAQ or rephrase the question in order for the text to be meaningful?	Accepted. We have substantially revised this text.	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany
9389	83	28	83	28	In which area? With respect to what? Please make this question more precise.	Accepted. We have substantially revised this text.	Maïke Nicolai	Helmholtz Centre Geesthacht	Germany
46367	83	32	83	36	This sentence should be transferred to the subsequent FAQ 14.3. Its content relates to current gaps in international cooperation rather than to the question whether international cooperation is working. This FAQ evaluates the Kyoto Protocol and the Paris Agreement against their ability and likelihood to cause transformational policy changes.	Accepted. We have changed the text accordingly.	Government of Germany	Federal Ministry for the Environment, Nature Conservation and Nuclear Safety International Climate Policy	Germany
19839	84	6	84	6	Insert "through international carbon market mechanisms and public climate finance" after "voluntary cooperation"	Accepted	Axel Michaelowa	University of Zurich	Switzerland
27967	84	8	84	8	After "international cooperation", add "to enhanced support for provision of means of implementation, namely finance, technology transfer and capacity building for".	rejected; we deal with the larger theme of the chapter and crisp phrasing is advisable in an FAQ section.	Eleni Kaditi	Organization of the Petroleum Exporting Countries, OPEC	Austria
22653	84	8	84	8	A need of international cooperation in these issues does not equate with a role for international cooperation.	The phrasing "finalising the rules... may play an important role" uses subjunctive, carefully crafted language	Government of France	Ministère de la Transition écologique et solidaire	France
84851	93	21	93	21	This statement may be true, but misleading when looking at all NDCs in aggregation. Indeed, the UNEP Gap report shows that current policies are less ambitious than current NDCs, both unconditional and conditional. This paragraph uses undocumented examples that convey the false idea that implementation is expected to overshoot commitments.	Wer couldn't find what the reviewer is referring to, as page 93 is in the references section.	Yann Robiou du Pont	Climate Analytics	France
72977	94	33	94	34	Reference to be included after line 33: J. Edmonds, D. Forrister, L. Clarke, S. de Clara, C. Munnings, IETA, University of Maryland and CPLC, September 2019, "The Economic Potential of Article 6 of the Paris Agreement and Implementation Challenges", Washington, D.C. License: Creative Commons Attribution CC BY 3.0 IGO	Rejected. The citation has not been used in text and therefore cannot be included in the bibliography.	Jean-Yves CANEILL	ERCST	France
4145	108	25			should say McAdam (not Mcadam)	Accepted. The typo has been corrected.	Jane McAdam	University of New South Wales	Australia
85611	112	1	113	45	First author name is missing. There are many other references missing the first author.	Rejected. The reference style follows IPCC style guides.	San Win	Environmental Conservation Department, Ministry of Natural Resources and Environmental Conservation	Myanmar
8447	113	34	113	34	(submitted, under Rev... => need to close the parenthesis	Accepted	Sandrine MALJEAN-DUBOIS	CNRS/ Aix-Marseille University	France
22655	127	6	127	11	Same publication cited twice	Accepted. Typo will be corrected.	Government of France	Ministère de la Transition écologique et solidaire	France
75537	129	8	129	9	In the section 14.1.2.3 IPCC Special Reports on 1.5°C, Land and Oceans, it would be worthwhile to note that the special report on oceans and cryosphere resulted in the first official dialogue on ocean and climate change as well as Blue COP in Madrid, which aimed to facilitate the international cooperation to strengthen mitigation and adaptation action in this context. This achievement should be highlighted in this section by citing the UNFCCC's decision 1/CP.25 paragraph 31.	Accepted. Thanks.	Mai FUJII	Sasakawa Peace Foundation, Ocean Policy Research Institute	Japan

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
58511					Prefer the terminology "technology development and transfer" rather than just "technology transfer". This section particularly has a bias in favor of developing countries and should not suggest that transfer of technologies should occur in a manner that isn't voluntary and on mutually agreed terms.	The term "technology development and transfer" is used as the heading to the section. Comment noted.	Government of United States of America	U.S. Department of State	United States of America
86081					The entire chapter seems to give very little to no attention to more optimistic perspectives, such as Carattini, Levin, Tavoni (REEP 2019), Figueres (Nature 2020), Sakamoto and Karp (WP 2019), Carattini and Loeschel (WP 2020).	Noted. We are a little puzzled, because in our framing section, and in the section on climate clubs, we presented scientific work that provides the basis for a great deal of optimism. The transition framing, for example, suggests a set of indicators for measuring progress that are far more positive than what is revealed from global emissions. The specific papers you suggest are interesting, although three of them are more editorial in nature, which is why we have not devoted space to them. The fourth (Sakamoto and Karp) is interesting, but did not fit into the set of issues that we have devoted space to. We simply can't reference every paper that is out there.	Carattini Stefano	Georgia State University	United States of America
86083					Rather limited coverage of global carbon pricing (e.g. Weitzman JAERE 2014; Nordhaus AER 2015; Stiglitz et al. 2019; Carattini, Kallbekken, Orlov Nature 2019; IMF 2019). That also implies that ideas such as a system of harmonized carbon taxes or international carbon dividends (see Carattini, Kallbekken, Orlov Nature 2019) are not really covered by the report.	Noted. We do devote space to considering the evolution of international cooperation on carbon markets. We have responded to specific suggestions on improving those sections. As much of theory of whether a global carbon pricing scheme would be desirable was covered in past assessment reports, we have skirted the issue.	Carattini Stefano	Georgia State University	United States of America
50393					Many developing countries are faced with barriers such as access to adequate information, financial and technological resources and climate change knowledge to participate better in global movement against climate change. Unfortunately, few examinations have been done in this matter, and it would be worthwhile to allocate a particular section to study and examine the barriers of developing countries in climate change mitigation and adaptation: what are the problems? Are these barriers common or special? What are the solutions?	Noted. This goes beyond the cope of this chapter, fitting better into the institutional issues covered in chapter 13.	Government of Iran	Islamic Republic of Iran Meteorological Organization (IRIMO)	Iran
58513					Be consistent in writing "carbon dioxide removal". The words carbon or dioxide need not be capitalized.	Accepted. We will pay attention to this.	Government of United States of America	U.S. Department of State	United States of America
58515					International cooperation (military and otherwise) on humanitarian assistance and disaster relief operations in response to disasters linked to climate change may be of note to include here, if relevant.	Noted. We think it is more relevant for WG2, as disasters are a common manifestation of climate impacts.	Government of United States of America	U.S. Department of State	United States of America
48605					Encourage clarity on terminology - this chapter refers variously to cooperation, collaboration, coordination - how are these terms used; do they function at different scales or are they defined by specific kinds of actions? For example, Keohane defines cooperation as occurring when 'actors adjust their behaviour to the actual or anticipated preferences of others, through a process of policy coordination' (After Hegemony, 1984, pp.51-2); others, such as Moravcsik, understand cooperation across a range of behaviours including inter-state bargaining, compliance with institutional norms. Throughout the chapter cooperation is used in conjunction with legal and diplomatic outcomes, collective ambition, rule-making, regulatory practices and outcomes, financial models and practices, and implementation strategies; perhaps include a figure outlining typologies of cooperation	Noted. Going into depth on terminology is a task for the Glossary, rather than here, and there have been extensive discussions of what to include in the glossary, given length limitations. We have done our best throughout the chapter to use terms that fit the context (e.g. collaboration means actors working together). We have paid attention to this issue in our revisions.	Lorraine Elliott	The Australian National University	Australia
81085					Re my SPM comment, KP "building institutional capacity ... and voluntary cooperation" is very strange. The KP was associated with major legislative developments and emission reductions in most countries that took on legally binding commitments, as well as a surge of international investment associated with the CDM. Why not say so? And to say the Paris Agreement "has shifted .. towards encouraging and supporting rising levels of ambition.." can be read in many ways, is it implying that KP didn't? why not just state the basic fact that the Paris Agreement represented a shift to "broad but shallow", in terms of the lack of specific national outcome commitments?	Accepted. We are going into more detail about the success of Kyoto.	Michael Grubb	UCL - Institute of Sustainable Resources	United Kingdom (of Great Britain and Northern Ireland)
81087					The chapter does not seem to have a clear and consistent theoretical foundation in terms of the functions of an international regime, though it makes reference to several elements of these. It refers to various criteria including "transformative potential" but does not define or utilise that consistently. It seems to have been quite selective in relation to my (very limited) FOD review comments, and still think the work of Xinyuan Dai at Illinois is insightful in terms of the role of international agreements in relation to domestic actors, but remains uncited.	Noted. The issue of international drivers for national climate policy is one that -- after discussions-- finds a home in Chapter 13. We have tried to be more consistent about transformative potential, but as you know it is hard. We do outline the functions of a regime, but also differentiate these according to analytic frameworks.	Michael Grubb	UCL - Institute of Sustainable Resources	United Kingdom (of Great Britain and Northern Ireland)
84995					One other observation - this chapter has relatively few authors or contributing authors compared to many other chapters. Even at this stage, no harm in considering some CAs to fill out areas of analysis.?	Noted. We have taken on a couple additional CAs.	Michael Grubb	UCL - Institute of Sustainable Resources	United Kingdom (of Great Britain and Northern Ireland)
87025					Sharing some international co-operation agreements that are relevant to Chapter 15 Investment and Finance incase there are helpful to also cross reference to Chapter 14 - UN Addis Ababa Action Agenda on Financing for Development https://www.un.org/esa/ffd/wp-content/uploads/2015/08/AAAA_Outcome.pdf article - UN Roadmap for Financing the 2030 Agenda for Sustainable Development https://www.un.org/sustainabledevelopment/wp-content/uploads/2019/07/UN-SG-Roadmap-Financing-the-SDGs-July-2019.pdf - UN SDGs Samoa Pathway https://www.un.org/ga/search/view_doc.asp?symbol=A/RES/69/15&Lang=E - UN Sendai Framework for Disaster Risk Reduction under United Nations Office for Disaster Risk Reduction https://www.un.org/odrr.org/implementation-sandai-framework/what-sandai-framework - Paris Agreement https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement	Noted. We go into depth on some of these.	Nokuthula Dube	Africa Energy and Finance	United Kingdom (of Great Britain and Northern Ireland)

Comment Id	From Page	From Line	To Page	To Line	Comment	Response	Reviewer Name	Reviewer Affiliation	Reviewer Country
43487					Many developing countries are faced with barriers such as access to adequate information, financial and technological resources and climate change knowledge to participate better in global movement against climate change. Unfortunately, few examinations have been done in this matter, and it would be worthwhile to allocate a particular section to study and examine the barriers of developing countries in climate change mitigation and adaptation: what are the problems? Are these barriers common or special? What are the solutions?	Noted. We think this is an incredibly important issue. Its home, however, is not here, but rather in chapters 4 and 13.	sadegh zeyeyan	Head of national center for forecasting and weather hazards management of Islamic Republic of Iran Meteorological Organization (IRIMO)	Iran
69395					<p>Overall, there could be better clarification throughout the chapter of a key question. Is the Paris Agreement: A) a multi-objective challenge, or B) instead an optimization problem with a single objective function subject to several constraints? P. 4 line 18 we have "objectives" (plural) while on p. 21 line 10 we have "The Paris Agreement's objective" (singular), referring to the temperature target objective. In Box 14.1 we have three goals laid out (temperature, adaptation, and finance). (For context, the Paris Agreement website with the UNFCCC lists three key "elements" of the agreement: temperature goal, reviewing commitments, and providing finance). Reading the PA directly, it could be up for debate -- but perhaps Ch. 14 could serve to clarify.</p> <p>It is likely too late to change the structure of this all, but it may have been more clear -- when presenting an evaluation of the Paris Agreement -- to lay it out as follows. 1) The PA has a goal of limiting GMT to 1.5 or at most 2.0. 2) To achieve this goal we are subject to the constraints of doing this in an equitable way, that promotes transformation, is economically effective, and that builds institutions. 3) In order to achieve this goal, subject to those constraints, the PA will have mechanisms that require regular, updated, and strengthening mitigation commitments (NDCs), and financing for this and adaptation.</p> <p>The framing of the PA is important for its overall evaluation and more specifically the evaluation as to whether or not it is succeeding. Public perception of the PA seems to be that it is "B," i.e., a single objective (temperature) challenges subject to constraints. The chapter does a fine job in laying out its evaluation rubric (environmental outcomes, transformational potential, distributive outcomes, economic performance, and institutional strength). But aren't environmental outcomes the only ones that really matter, or at the very least first among equals in this list? I am trying to imagine in 50 years how historians will evaluate the success of the PA, and it will likely be on whether or not 1.5 / 2.0 were surpassed or not. Historians view the League of Nations as a failure primarily because it did not prevent WWII. It is not seen as a success because it may have also achieved other beneficial outcomes that are now forgotten.</p>	Noted. Indeed it is too late change the structure. We tend not to think about international agreements as addressing constrained optimization problems, and have not described the Paris Agreement in these terms. You will see a great deal of diversity out there in terms of saying what the most important objectives of international cooperation are: there is pushback when it is framed purely in terms of a temperature target.	Tyler Felgenhauer	Duke University	United States of America