

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
3	0	0	0	0	I am not sure whether capital letters are required in english after a colon (:). If so, please check throughout the text for this.	done
4	0	0	0	0	The AAR2 is a marvelous assessment that will be a source of Information to many over the coming years, and I would like to thank and congratulate the coordinators and all the authors. However, I would like to make some critical remarks as well. I have not been able to read all the text, so my comments will certainly not apply to all, but possibly to more parts than I read. To my understanding the AAR2 addresses itself not primarily to the scientific community, but to decision makers and interested public. In view of that it is a) difficult to read and b) sometimes falls short of the information they are looking for. ad a) It seems to me that the english wording is often not wrong, but clumsy, possibly because it was translated from german - at least in the minds of the authors. ad b) In a truly scientific way, trends and dependancies are explained, but what readers will also be looking for is absolute or relative values - at least ranges of values of the change. And with due note regarding uncertainties, science can supply these. "it is going to get hotter, wetter, dryer, stormier or whatever" is fine - but climate change becomes real when there are figures to go along. Maybe some can be added (not just in the first chapter!) I also have the Impression - especially in some of the last chapters - that international developments and literature is well reflected, but Austrian developments are merely touched upon. I noticed this especially regarding developments in civil society (and academia, for that matter). I am sorry to see that one of the weaknesses of the AAR 2014 is repeated here. Maybe we need a special report on these issues?	Thank you! Language has been improved with deepl Pro. Impacts of climate change on ecosystem services have been quantified as good as possible. Mitigation potentials have been quantified in absolute values in table 2.3. Austrian specific literature was used wherever possible.

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

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5	0	0	0	0	The report is well done and summarizes excellent information about the current Austrian situation. One can clearly see that a lot of efforts and work has been put into this document, thanks to all the authors and congratulations for putting this important piece of work together. There are some issues I would like to share as food for thought: 1. Ecosystems in Austria are the result of a long-lasting management history and this history has shaped the landscape and thus strongly affects the impact of changing climate. This can either mitigate effects or making systems more vulnerable. Management was and still is a key driver and the separation of management versus climate effects is challenging. It would be important to address this in the related biophysical chapters. 2.The observed changes in climate – well outlined in Chapter 1 – will lead to changes in daily precipitation and temperature (Tmin and Tmax). This is important because “plants do not grow along average values”, the daily (or seasonal) weather pattern are essential. Furthermore bio-physical changes often follow “tipping points”. A lot of the Chapter 2 impact discussions are the result of this and it is suggested to better outline such conceptual principles.	Thank you for the comment. Lock ins are discussed extensively in chapter 2.4. Long term historic developments have been mentioned (eg. Gingrich et al., 2016, 2022). Effects of precipitation and reference to chapter 1 are mentioned, but tipping points are yet poorly documented in the context of ecosystem services.

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

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6	0	0	0	0	Please make sure that you do not mix concepts and terminology, especially AFOLU and Agriculture/LULUCF. If within the realm of "AFOLU" (Agriculture, Forestry, and Other Land Use), there is no LUC ("land-use change") separately addressed (it is incorporated in "AFOLU"), and if "sectors" (plural) are mentioned, then Agriculture is to be differentiated from LULUCF and not only from "Forestry". Such sloppy use of terminology makes it hard to understand what exactly is referred to (especially when "emissions" are compared) and makes informed readers question whether the authors fully comprehend what they are writing about. I will highlight examples in the text, but am not sure I found every single problematic sentence and this problem might also exist in other chapters.	Thanks for this remark. During revision, we took care to distinguish "AFOLU" emissions (terminology according to the IPCC national inventory guidance) and the Agriculture/LULUCF terminology as these sectors are still requested separately by UNFCCC for national GHG inventories. For example in Fig 2.2

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

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8	0	0	0	0	Throughout the report biodiversity is mentioned many times, mostly as either co-benefit or conflicting objective related to mitigation. However a clear definition of biodiversity is never given. Indeed it seems different authors implicitly use different - and sometime conflicting - definitions. The unfortunate consequence is a complete lack of metrics for biodiversity in the report. (Despite such metrics being readily available in the literature and international policy documents.) While we have clear metrics for mitigation or GHG emissions, where the only notable complication concerns consumption based accounting, no method for comparing scenarios in the biodiversity dimension is used or provided. This is a serious weakness: Discussions and tradeoffs between conflicting objectives cannot be based on facts and come across as personal opinions.	Thank you for this very valuable comment. The definition has been added to the glossary. Chapter 1 describes in detail climate change impacts on biodiversity (mainly dealing with species diversity), whereas the focus of chap. 2 is on ecosystem services and not biodiversity.

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

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9	0	0	0	0	Please apply the concept of uncertainty in a larger context and apply the safety principle and the precautionary principle drawing on worst case scenarios The important concept of uncertainty was quite prominently covered in AAR14, according assertions were clear such as: The safety principle, the precautionary principle and the polluter pays principle. The safety principle requires that, in case of doubt, THE UPPER LIMIT (the „WORST CASE SCENARIO“) of possible negative environmental impacts should be assumed. Scientific evidence of negative consequences of climate change beyond all doubt is therefore not required to implement climate protection measures; a plausible suspicion is sufficient. Doubts about the anthropogenic influence on the climate should therefore not be accepted as a justification for „business as usual“. For climate science, this means that it must in any case present the full range of possible impacts, including rather unlikely but possible „best case“ and „worst case“ scenarios, in order to enable society to make informed decisions. This, assuming always an 1) upper limit and 2) a worst case scenario, does not seem to be adequately taken into account in many places in AAR2 which are to numerous to list them here. However, the most prominent according fields are: 1. surface temperature rise (Austria, globally) and according directly temperature related consequences such as the length and height of heat waves 2. significantly endangered food safety (regarding Austria's self- sufficiency) in particular the worst case of massively reduced yields up to local or even nationwide total crop failures 3. overcrowded emergency facilities during heat waves reaching capacity limits of different kinds, in particular in hospitals 4. wood fires of larger size Most of the above risks were discussed among doctors and scientists in November 2023 in Vienna during an event hosted by the Viennese medical chamber called „Medizin in der Klimakrise“, most relevant video: Wiener Ärztekammer (Nov. 2023). /Medizin in der Klimakrise, Teil 9/. url: https://www.youtube.com/watch?v=T56gS7s26mA&t	Agreed. In general, better considering the precautionary principle as guiding decisions and valuations needs to be implemented. However, we have an example in chapter 2 (chapter box 2.2) where the precautionary principle (avoiding calamities in forests) requires to apply conservative forest management avoiding the mitigation options necessary. Likewise, similar examples could be drawn from other sectors (avoiding change, as change always comes with risks that will become effective locally, while mitigation is visible only globally). So statement has to be used with some care.

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

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10	0	0	0	0	Please include a comparison of the incremental changes of AAR2 with regard to the AAR14 from 2014 (if possible as sort of synopsis) The precursor of the current AAR2 report, the AAR14 report from 2014, is currently hardly mentioned. It was the first big assessment with 1000+ pages. Readers of the current report should be able to find, now some 10 years later, some sort of reference comparing findings, projections and recommendations of AAR2 to the according ones of AAR14. Actually, AAR14 should be, besides relevant IPCC assessment and special reports, the most important reference within the huge reference list. Many assertions in AAR2, probably the majority of them, refer to issues already covered in AAR14. Rather than presenting them anew with other words the more interesting questions are How did the projections of AAR14 perform compared to observed reality? In particular this translates to the following questions: 1. In most cases projections in AAR14 have not been provided as numerically measurable but rather as qualitative projections such as 'will rise', 'will strongly be effected', 'will significantly be reduced' etc. If there there have been any numeric bandwidths regarding future development in the AAR14, of course they are as well interesting, e. g. climate parameters. 2. Where has the meanwhile observed development AAR14 -> AAR2 shown to be significantly worse than the worst case projections of AAR14? 3. Where has the meanwhile observed development AAR14 -> AAR2 turned out to be significantly better than the worst case projections of AAR14? Further questions relating to AAR14 are: 1. What was the fate of the most important measures recommended in AAR14? Have they been somehow been implemented or ignored totally? 2. Which new aspects, concepts, ideas and approaches have been included in AAR2 which were not covered AAR14? Such a new key concept seems to be, e. g., „degrowth“ in chapter 6 of the current report. Degrowth was mentioned in AAR14 but hardly discussed there. „Degrowth“ is one of the most important aspects in the entire AAR2 report but unfortunately somewhat hidden in chapter 6. 3. Finally, reflecting the above list: Which mistakes have been made in AAR14, in content but also in style, and where has it been tried to avoid them now in AAR2 (lessons learned)? Here the according citation is relevant: „Once published, projections should not be forgotten but should be rigorously compared with evolving observations.“ (R.A. Pielke Jr. (2008). /Climate predictions and observations/. In: /Nature Geoscience/ 1, S. 206)	This is a great idea, but clearly beyond the terms of AAR2. Like IPCC reports, the AAR not necessarily directly builds on the previous assessment. The structure has been completely revised. To live up the idea, a Special Report could be developed after finalizing AAR2.

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

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11	0	0	0	0	Please mitigate/leave out euphemistic descriptions of future/present positive effects of global warming Even though these statements are true they have the potential to create an attitude of underestimating the total risk of the mid- to longterm climate change impact. Examples are: 1. Positive effects of CO₂ -fertilization on plant growth 2. Citation: In limited situations, climate change will improve ecosystem productivity by increasing temperatures, extending cropping seasons. 3. Citation: Warmer temperatures, however, improve conditions for e.g., bathing activities or summer tourism	The statements in section 2.2 have been removed or revised.

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

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12	0	0	0	0	Please include a risk assessment of the possibility of a /systemic collapse/ The topic of a systemic collapse is currently avoided/missing although the according mechanisms have been made clear at least by 1972 (Donella Meadows, Jörgen Randers und Dennis Meadows (2016). /Grenzen Des Wachstums — Das 30-Jahre-Update/. 5. Aufl. Hirzel). What had been seen even by the authors as lying far way in the distance at that time has now become a more imminent and even obvious risk. Before making the risk assessment the notion of 'systemic collapse' should be defined as adequately as possible for the analysis. The topic is that important that it merits an according subsection/box or the like. One example underpinning that the importance of the analysis of a collapse has found large attention within the scientific sector is the following declaration about the threat of societal collapse (mainly triggered by climate change), signed by six hundred and seventy-four scholars, all with a doctoral degree, from 53 countries, including many professors and also a former minister (Dr Yves Cochet) among others from 2020. Since then, this initiative of scholars produced four open letters to either the general public or participants in key international summits, the last dating from 2023. these scientists believe that "Only if policymakers begin to discuss this threat of societal collapse might communities and nations begin to prepare and so reduce its likelihood, speed, severity, harm to the most vulnerable, and to nature." Each signatory, with doctoral degree, endorsed a public warning on societal disruption and collapse due to environmental change. They cover more than 20 major academic disciplines, including ecology and climatology, thereby conclusively demonstrating that preparations for societal collapse are being taken seriously by experts from around the world. The announcement of the final list of signatories concludes a 3-year initiative to promote awareness of the scientific basis for exploring how to reduce the damage from societal disruption, breakdown, and collapse, due to environmental change. The range of signatories demonstrates clearly that any scientists or commentators who claim that warnings and preparations for societal collapse are unscientifically fringe beliefs are either grossly misinformed or deliberately misleading. Editors, journalists, 'factcheckers' and 'online safety groups' who ignore or disparage such views when covering the topics of climate change, biodiversity loss, and energy futures, can now be challenged by readers, colleagues, funders and advertisers. Therefore, digital platforms should desist from any further 'visibility filtering' or 'de-amplifying' of analyses of collapse risk, as they have done in the past. (Source: https://jembendell.com/2024/07/03/no-more-warnings-needed-an-intransigent-managerial-class-must-be-sidestepped/, accessed on 2024-07-26) If nothing can be said about the collapse risk include the issue in a prominent place in the list of „Research Gaps“.	Presumably needs to go into the Risk cross-cut, or chapter 8

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

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13	0	0	0	0	Target years 2040, 2050 and 2070: These years are psychologically too far off. The target years 2040, 2050 and 2070 are far off in the future. Even though projections have to be made it should be prominently added that the uncertainties are very high with regard to projections along such long periods. This increases confidence into science rather than compromising it. In particular in 2023 the broad public has seen and felt that most of the climate models and scientists were not capable to predict the sharp rise in global surface and sea surface temperature. Citations in the report: 1. Strong climate change has a high potential to negatively affect carbon stocks and halt sequestration, in particular after 2070 (medium evidence, high agreement). [2.3.3, 2.3.4, 2.4] page: , rows: 2. The long-term nature of spatial planning creates particular urgency, given Austria's climate neutrality goal for 2040. page: , rows: 3. The overall final energy demand for heating will decrease in the different scenarios by 10-50 % until 2040/2050, despite the population growth and therefor increasing heated area	Explanations about uncertainties related to C sinks and stocks in Forests have been clarified further in Chapter box 2.2. The results for 2040 an 2070 were likely refering mostly to the numbers in 2.3.4. which have been deleted. The mitigation potentials in the new table in the beginning of 2.3. either reflect averages over long periods of time (for forest-wood measures) and/or are bandwidth of several studies. Uncertainties are mentioned in the caveats in the table. 1. Sentence has been removed 2. the Climate neutrality goal is not a projection but a political objective.

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

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14	0	0	0	0	Please take into account that quite some scientists spread the word that the „Paris goal“ of 1.5 °C has already been missed and very likely also 2 °C will be surpassed! There seems to be a lot of uncertainty regarding how the most recent dramatic development of the global surface temperature (inkl. at least the entire year of 2023) relates to the Paris/Glasgow goal (and other thresholds) of 1.5 °C . While the majority of scientists (=consensus) seems to be of the opinion and many declare it publicly that neither the 1.5 °C target will be met and most likely nor will the 2 °C be met, some scientists up to the end of 2023 publicly still clinged to the possibility that the 1.5 °C target may still be met. It should be clarified that this opinion can only be maintained when looking at the mean temperature based on a calculation period (averaging interval) which is large enough to level out the most recent rapid rise in temperature. Since the current calculation period is a concept that was developed decades ago during a rather stable climate the according limits of applicability and risks of applying it in case of an accelerating temperature rise should me made transparent. This is in particular true for the case of decisions makers who seek all possibilities to downplay the dramatic development of the tempetarure rise. Citations from the report: 1. fundamental aims of the assessment report with the goal of keeping global warming well below 2 degrees page: , rows: 2. Regardless of the political commitment, the achievability of the goals by current measures is doubted page: , rows: 3. Rapid reductions restrict warming to well-below 2 degreeC So this passage should be adapted as well: For all emission scenarios considered by the IPCC, global surface temperature will continue to rise until at least mid-century (high confidence) (IPCC, 2021a). Global warming of 1.5 °C and 2 °C will be exceeded during the 21st century unless deep reductions in CO2 and other greenhouse gas emissions occur in the coming decades (IPCC, 2021a).	In Ch.2, we provide evidence as seen in the scientific literature. It is probably task for Ch. 1 to work out which sceanrios are reasonable (e.g., if a 2° scenario is still reasonable).

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

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15	0	0	0	0	Please allow for a widened the spectrum of admitted sources and references In line with the practice of the IPCC reports only peer-reviewed scientific papers are admitted as references. This ensures a highly sound scientific basis but on the other hand strongly limits how reality can be grasped, Other types of references should be admitted given the current exceptional circumstances that 1. the climate catastrophe is advancing at an extremely fast pace 2. it often takes too long until a paper is published 3. some sensitive topics are not well accepted or bluntly avoided in scientific papers. The most important example is the sensitive issue of systemic collapse, because it still is rather a taboo in the scientific ambience (proof lacking due to self-reference, see the according comment) Suggestion how to include non peer-reviewed references without compromising the scientific standard: As with the IPCC classification of certainty (high agreement, robust evidence etc.) additional sources may be tagged with according remarks or even explicit warnings on potential biases, e. g.: „paper not peer-reviewed“, „newspaper article“, etc.. rather than too precautiously excluding them from eligible references. This is even more justified as the entire AAR2 is subject to an external review process safeguarding against biases. During this review additional cautious remarks might be added by the reviewers. Examples of such additional references that can bring along important added value are 1. books, including popular science books of scientists or similar quality, e.g. from investigative journalists as long as a minimum standard is met (foremost spedification of references) 2. conference proceedings (even if not peer-reviewed) 3. articles in newspapers authored by scientists 4. video/audio recordings/transcripts of public talks of scientists 5. at a national level papers issued by research institutions, a concrete example are the „discussion papers“ from the Austrian University of Life Sciences (Boku): https://boku.ac.at/wiso/infer/publikationen/diskussionspapiere 6. publications of scientists on blogs, websites etc., for instance of former prof. Jem Bendell (prof. at the University of Cumbria up to the end of 2023). 7. statistics issued by large corporations such as insurances, banks etc.	For the AAR2, not only peer-reviewed sources have been used but also accessible grey literature has been added.

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

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16	0	0	0	0	Please include the rather new notion of /ecocide/ and its potential driving potential in policies/transformation paths The notion of „ecocide“ and according legal sanctions are currently not mentioned in the report although there are relevant according discussions at a national but foremost at a European level. On the issue it says the following in Ernest Aigner u. a. (2023). /APCC Special Report: Strukturen für ein klimafreundliches Leben/. Hrsg. von Christoph Görg, Verena Madner, Andreas Muhar Andreas Novy, Alfred Posch und Karl W. Steininger Ernest Aigner. Springer Spektrum. isbn: 978-3-662-66496-4: For some time now, the legal policy debate has been discussing under the keyword „ecocide“ whether behavior that is harmful to the environment or the climate can be understood and sanctioned as an (international) crime, depending on its severity (Greene, 2019; Gray, 1996). A draft to introduce ecocide as a criminal offense at the international level was already presented in 2010 (Gauger et al., 2013; Higgins et al., 2013). This draft defines „ecocide“ as actions or omissions that, among other things, cause climate damage or the loss of entire ecosystems. In 2021, international law experts presented a new draft in which ecocide is defined more generally. It describes ecocide as unlawful and willful actions or omissions that were carried out in the knowledge that serious, large-scale or long-lasting environmental damage could occur. Damage that affects entire animal or plant species or ecosystems, or even a large number of people, is by definition considered large-scale“(Stop Ecocide Foundation & Independent Expert Panel for the Legal Definition of Ecocide, 2021). Even then, the act or omission causing it must be unlawful or willful, so that, for example, not all species or biodiversity loss would be covered by the (future) crime of ecocide. The European Parliament has repeatedly called on the EU and MS to support the recognition of ecocide as an international crime in the Rome Statute (P9(2021)0014, 2021; European Parliament, 2022). At the national level, for example, the criminal offence of ecocide was recently added to French environmental law (LOI no 20211104 du 22 août 2021 portant lutte contre le dérèglement climatique et renforcement de la résilience face à ses effets, 2021). In 2021, the Commission proposed revising the Environmental Criminal Law Directive, under which certain acts would now constitute a criminal offence. These acts include, among others, the discharge of substances into the air, soil and water if it causes significant damage to animals and plants, or harmful behaviour that leads to significant damage in a Natura 2000 protected area (COM(2021) 851 final, 2021).	This may fit better for chapter 6

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

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17	0	0	0	0	If possible: Please try to establish a critical review of potential biases among the authors/steering committee Several of the IPCC reports – at least up to AR4 – have been strongly criticized in the scientific community suffering from a bias regarding a too weak risk assessment. One of the papers that summarizes the relevant critical points bears the title 'Climate change prediction: Erring on the side of least drama?' (Keynyn Brysse, Naomi Oreskes, Jessica O'Reilly und Michael Oppenheimer (2012). /Climate change prediction: Erring on the side of least drama?/. In: /Global Environ. Change/), coauthored by Prof. Naomi Oreskes. Also Stefan Rahmstorf himself, being one of the authors, publicly declared (key note in Vienna in 2024) that he did not agree with the picture given in the final version of the related report.) A key assertion from the abstract of the paper reads as: We suggest, therefore, that scientists are biased not toward alarmism but rather the reverse: toward cautious estimates, where we define caution as erring on the side of less rather than more alarming predictions. In an older paper from 2007 (J. E. Hansen (2007). /Scientific reticence and sea level rise/. In: /Environ. Res. Lett./) one of the world's leading climatologists describes: Another relevant discussion is that of 'behavioral discounting' (Hariri et al 2006), also called 'delay discounting' (Axtell and McRae 2006). Concern about the danger of 'crying wolf' is more immediate than concern about the danger of 'fiddling while Rome burns'. It is argued in the referenced discussions that there is a preference for immediate over delayed rewards, which may contribute to irrational reticence even among rational scientists. Furthermore he stresses: I suggest that 'scientific reticence', in some cases, hinders communication with the public about dangers of global warming. If I am right, it is important that policy-makers recognize the potential influence of this phenomenon. Such a critical review of authors is definitely difficult to be done in a self-evaluation and probably ultimately can be done efficiently only by external reviewers. The main focus of the critical review should be with regard to the above citation, i. e., if the AAR2 report has a bias 'toward cautious estimates' thereby 'erring on the side of less rather than (providing) more alarming predictions'. This relates strongly to the comment on the risk of a systemic collapse which I added in a separate comment.	This is a really interesting perspective and certainly worthwhile specific consideration. As generally applicable to the whole report, a general section (a few paragraphs) or cross-chapter box dealing with it seems useful (to be organized by co-chairs?)

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

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18	0	0	0	0	Please include a risk assessment of the possibility of a / ystemic collapse/ The topic of a systemic collapse is currently avoided/missing although the according mechanisms have been made clear at least by 1972 (Donella Meadows, Jörgen Randers und Dennis Meadows (2016). /Grenzen Des Wachstums — Das 30-Jahre-Update/. 5. Aufl. Hirzel). What had been seen at that time by the authors as lying far way in the distance today has become a more imminent and even obvious risk. Before approaching the according risk assessment the notion of 'systemic collapse' should be defined as adequately as possible for the analysis. The topic is that important that it merits an according subsection, box or the like. One example underpinning that the importance of the analysis of a collapse has found large attention within the scientific sector is the following declaration about the threat of societal collapse (mainly triggered by climate change), signed by six hundred and seventy-four scholars, all with a doctoral degree, from 53 countries, including many professors and also a former minister (Dr Yves Cochet) among others from 2020. Since then, this initiative of scholars produced four open letters to either the general public or participants in key international summits, the last dating from 2023. These scientists believe that: ---- „Only if policymakers begin to discuss this threat of societal collapse might communities and nations begin to prepare and so reduce its likelihood, speed, severity, harm to the most vulnerable, and to nature.“ -- E ach signatory, with doctoral degree, endorsed a public warning on societal disruption and collapse due to environmental change. They cover more than 20 major academic disciplines, including ecology and climatology, thereby conclusively demonstrating that preparations for societal collapse are being taken seriously by experts from around the world. The announcement of the final list of signatories concludes a 3-year initiative to promote awareness of the scientific basis for exploring how to reduce the damage from societal disruption, breakdown, and collapse, due to environmental change. The range of signatories demonstrates clearly that any scientists or commentators who claim that warnings and preparations for societal collapse are unscientifically fringe beliefs are either grossly- misinformed or deliberately misleading. Editors, journalists, 'factcheckers' and 'online safety groups' who ignore or disparage such views when covering the topics of climate change, biodiversity loss, and energy futures, can now be challenged by readers, colleagues, funders and advertisers. Therefore, digital platforms should desist from any further 'visibility filtering' or 'de-amplifying' of analyses of collapse risk, as they have done in the past. (Source: https://jembendell.com/2024/07/03/no-more-warnings-needed-an-intransigent-managerial-class-must-be-sidestepped/, accessed on 2024-07-26) If nothing can be said about the collapse risk please include the issue in a prominent place in the list of „Research Gaps“. See also the following most recent papers (more older ones do exist): 1. Lisa Scordato und Magnus Gulbrandsen (2024). /Resilience perspectives in sustainability transitions research: A systematic literature review/. In: /Environmental Innovation and Societal Transitions/ 52. url: https://doi.org/10.1016/j.eist.2024.100887.eist.2024.100887%E2%80%9C> 2. Daniel Steel, Giulia Belotti a Ross Mittiga und Kian Mintz-Woo (2024). /A Dynamic Collapse Concept for Climate Change/. In: /Environmental Values/. url: DOI:%2010.1177/09632719241255857 3. Daniel Steel, C. Tyler DesRoches und Kian Mintz-Woo (Okt. 2022). /Climate change and the threat to civilization/. In: /Proceedings of the National Academy of Sciences (PNAS)/ 119.42, S. 907–909. url: pnas.2210525119%E2%80%9C> 4. Danilo Brozović (2023). /Societal collapse: A literature review/. In: /Futures/ 145 5. Joe P. L. Davidson (2023). /Two cheers for collapse? On the uses and abuses of the societal collapse thesis for imagining Anthropocene futures/. In: /Environmental Politics/ 32.6, S. 969–987 6. C.E. Richards, H.L. Gauch und J.M. Allwood (2023). /International risk of food insecurity and mass mortality in a runaway global warming scenario/. In: /Futures/ 150	identical to comment 12

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

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19	0	0	0	0	Please apply the concept of uncertainty in a larger context and apply the safety principle and the precautionary principle drawing on worst case scenarios A very recent and comprehensive (42 pages) overview on the important concept of uncertainty including a review of the frameworks of the past applied to the assessment of environmental change is: Luke D. Bevan (2022). /The ambiguities of uncertainty: A review of uncertainty frameworks relevant to the assessment of environmental change/. In: / Futures/ 137. The important concept of uncertainty was also quite prominently covered in AAR14, according assertions were clearly formulated such as (own translation of the german original): -- The safety principle, the precautionary principle and the polluter pays principle. The safety principle requires that, in case of doubt, THE UPPER LIMIT (the „WORST CASE SCENARIO“) of possible negative environmental impacts should be assumed. -- Scientific evidence of negative consequences of climate change beyond all doubt is therefore not required to implement climate protection measures; a plausible suspicion is sufficient. -- Doubts about the anthropogenic influence on the climate should therefore not be accepted as a justification for „business as usual“. For climate science, this means that it must in any case present the full range of possible impacts, including rather unlikely but possible „best case“ and „worst case“ scenarios, in order to enable society to make informed decisions. Assuming always an 1) upper limit and 2) a worst case scenario for safety reasons, as mentioned in AAR1, does not seem to be adequately taken into account in many places in AAR2 which are too numerous to list them here. However, the most important affected fields are: 1. surface temperature rise (Austria, globally) and according directly temperature related consequences such as the length and height of heat waves 2. significantly endangered FOOD SAFETY (focussing here on Austria's self-sufficiency) in particular of massively reduced yields up to local or even nationwide total crop failure. In less scientifically embellished words: The risk of a FAMINE should 1) be at least mentioned, 2) according boundary conditions should be sketched and the likelihood of such boundary conditions coming true should be estimated (qualitatively). 3. overcrowded emergency facilities during heat waves reaching capacity limits of different kinds, in particular in hospitals 4. wood fires of larger size The key issue in this is not an intellectual exercise on how the concept of uncertainty, known unknowns and unknown unknowns may be applied to climate or other models as it the impression might result from the above citation (Bevan, 2022). They key issue is to show to the public and to the decision makers the extension of the worst case scenario and the implications it has on the life of the population. The above risks with the exception of food safety were discussed among doctors and scientists in November 2023 in Vienna during an event hosted by the Viennese medical chamber called „Medizin in der Klimakrise“, the most relevant among the according video recording series of that day is: Wiener Ärztekammer (Nov. 2023). /Medizin in der Klimakrise, Teil 9/. %E2%80%9Chttps://www.youtube.com/watch?v=T56gS7s26mA&t%E2%80%9C	Identical as comment 9

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
21	0	0	0	0	Please improve the structure of the partly overloaded „key messages“: Dividing them into 1) alarming messages 2) further explanatory key messages E. g. there are more than 20 (!) „key messages“ in chapter 2. This is not „communication-efficient“ in particular with regard to the special target group of decision makers. The notion of „key“ is usually associated with „a few but really relevant“. The overall message would be clearer to grasp if there would be some sort of prioritization/ranking of the key messages already here not only in the summary for decision makers. The easiest prioritization would be to divide the messages in two groups: 1) alarming messages 2) further explanatory messages	The revised set of key messages has been strongly improved in their logical coherence. Also their number has been reduced. Yet, we do believe it is essential to provide factual evidence, for which a distinction into "alarming" and "explanatory" key messages seems not useful.
23	0	0	0	0	thank you for your review request. As previous APCC reports, I find the report to be an innovative and inspiring take on this matter.	Thank you!
24	0		0		Up-date references and bring reference list to a level suitable for publication (add missing information, provide all information for each reference, apply the guidelines)	Done
25	0		0		Up-date figures and table according to the guidelines for submission (See guidelines in the link in the next cell)	Done
26	0		0		please standardize capitalizing in titles	Done
27	0	0	0	0	Please use consistent wording for "climate change" vs "anthropogenic climate change"	n.a.
28	0	0	0	0	consistent structure for CS in KM - e.g. after bold statement	Done
29	0	0	0	0	Please use the term "federal province(s)" throughout the report when referring to Austria's <i>Bundesländer</i>	Done

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
30	1		637		Please note that the ÖKS15 temperature data for all RCP scenarios have a cold bias that cannot be ignored. This bias is inherent in the EURO-CORDEX runs. Based on observations (SPARTACUS), the Austrian annual mean temperature anomaly is already 2°C above 1971-2000, but this temperature increase is not reached until 2068 for RCP4.5 and 2052 for RCP8.5. (RCP2.6 never reaches a 2°C anomaly). Please mention this cold bias explicitly in Chapter 1, 1.2.2. For impact studies relying on ÖKS15, please ensure that GWLs are used and consider the temporal offset with respect to population or infrastructure projections tied to a timescale.	A general sentence mentioning the issue has been added at the beginning of section 2.2., with a link to chapter 1.2.2. References to years removed where these were not necessary.
32	3	0	10	0	Different styles of title case writing are used throughout the document, for capitals, (sub)sections and appendices, as can be perfectly observed in the Table of Contents; should imho be uniform for the whole report; which title case style to be used should be decided, as there is no clear one and only international standard as far as I know (https://en.wikipedia.org/wiki/Title_case).	Writing style has been adapted
118	19	19	19	20	This sentence is unclear and/or misleading. What does "from forest and non-forest" mean? You mean from harvested wood in Austria and imported wood together? This should be made clear here. Otherwise the sentence suggests that all harvested wood in Austria is used for energy purposes.	sentence changed: almost equal to the total amount of wood harvested domestically from forest and as well as from ecosystems with woody vegetation outside forests in Austria.

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
420	109	0	109	0	The chapter uses the provisioning approach, which is great. A cross-review with Chapter 4 and 5 and how they use the same approach would be important as a next step.	The sectoral chapters (2,3 and 4) use their own respective approaches to cover emissions and emission scenarios as well as the need for mitigation and adaptation. Also chapters 3 and 4 include, in their coverage, aspects similar to "provisioning", when they discuss energy services rather than energy consumption. But this is totally different terminology as using the respective sectoral literature and nomenclature. It does not make sense trying to move away from the existing sectoral literature. Instead, overall assessment of costs and potentials harmonizes the seemingly (but only in nomenclature) different data sets. Note that chapter 5 (demand-side transformation) operates completely differently, the reviewer errs in addressing it
421	109	0	213	23	Chapter 2: concerning the forest(ry)-related parts of the text, it seems as if two different authors or groups of authors wrote parts of the text without consulting each other. This should be amended.	Considerable work has been spent to harmonize differing perspectives on forestry and its services
422	109	0	213	23	Chapter 2: Terms from GHG reporting and accounting are often used incorrectly, not as defined by UNFCCC and IPCC. I suggest to have a member of the Austrian GHG Inventory team responsible for Chapter 6 (LULUCF) check the revision of this manuscript for correctness.	See response to Comment Nr. 6

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
423	109	1	213	50	The passages on forestry in Chapter 2 make no or few references to the forestry elements in the Special Report Land use. This is a pity because Chapter 5.1.2.2 assesses the current age structure of Austrian forests and its implications on current C sequestration rate. Moreover, the impact on expected forest disturbances and its implications on the contribution of forests to C sequestration is not addressed. A reduction of the harvesting intensity as (somehow -> no methods given) presented by Roux (forthcoming) is NOT part of the adaptation measures discussed in Chapter 4.2 of the Special Report Land use. It is surprising that the authors of Chapter 2 apparently would have agreed on a different line of argumentation. The readers may wonder what has changed and what new insights have been gained between the finalization of the Special Report Land use and the AAR2. Probably, this issue calls for the attention of the vice chairs.	The SRLU constitutes an important source and is now quoted multiple times, often with specific reference to certain elements of that report
424	111	41	111	47	General remark: How is this topic, and how are the other topics, linked to sections in the first chapter with which there are overlaps? In the case of the hazards, the link to the chapter on risks (p. 68, from line 29) is particularly clear.	Through several discussions with authors of Ch1 and Ch7 we have tried avoid any overlaps but describe only the potential impact of hazards caused by CC on the provision of ecosystem services here.

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
425	111	25			These regional impacts are important. It is suggested to be more specific to better understand why this is important. e.g. the heterogenous landscape in Austria especially the different geological zones strongly derive the water as a key limiting factor for plant growth. Thus, if temperature and precipitation changes, the impact will differ according the regions. Furthermore, vegetation stress profiles follow tipping points and not a continuous decline. This could be better outlined	Thank you! It is now indicated that complex biophysical conditions lead to regionally diverse impacts. Also plant stress profiles are indicated as an important factor influencing climate change impacts on ecosystem services
426	111	5			The message is clear but it is suggested to use a less complex text to make this more readable – editing is needed.	Done accordingly, as one of the changes to the KMs
427	111	13			sink magnitude has been declining starkly. because of? It seems to be important but explain why – editing needed.	KM has been revised accordingly
428	111	20			warmer climate may offer opportunities to plant growth (depending on the limiting factor for growth). The adaptation of tree species is of course strongly affected or limited by the speed how these changes are taking place.	in forestry, challenges are related to the long rotation periods in forest management that limit a quick adaption turnover of tree species needed to take advantage of a different climate. Text has been adjusted accordingly
429	111	2	111	4	The bold part of this key message seems less useful as a key message (too obvious) compared with the rest of the text (lines 4-8), consider omitting the first statement.	Done accordingly, as one of the changes to the KMs
430	111	1	113	30	The key messages seem very long and partly overlapping. Maybe they can be summarized some more (e.g. the effects of climate change on ecosystem services: maybe summarize all of those into one key message?)	See response to Comment Nr. 21

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
431	111	9	111	12	Please use the correct terminology: the sectors in the GHG Inventory are termed "Agriculture" and "Land-Use, Land-Use Change, and Forestry" (see Austrian NIR 2023 for an example). Thus, "agricultural emissions" can not be set against forestry alone. There are several source categories missing in this comparison. So please either differentiate properly or add text how you chose to re-align subcategories from the GHG Inventory (and why).	See response to Comment Nr. 21
432	111	13	111	13	Consider adding a timeframe, like "since year 2000".	statement "since the early 2000s" has been added
433	111	9	111	13	Is it a random choice to present data 2018-2022? - The record in the Annual emission reports goes further back!	As explained in the text (not in the KM, for reasons of space limitation), the period 2018-2022 refers to the most recent available 5-year average. The average has been used as single years show too much variability
434	111	13	111	13	Here the authors report a starkly declining GHG sink for forests and other land uses. Given the huge annual fluctuations (as can be seen in the original Report of Anderl et al. 2023 (but which have been removed here), and due to the high uncertainty of the calculations (i.e. Anderl et al. 2023 reported an uncertainty of 48% or 5100 kt CO ₂), I strongly recommend to tune the decline down to a "potential long-term decline"	We do mention the variability, but also need to point out the clear signal received from 5-year averages
435	111	3	111	3	"other services, e.g., regulating and cultural, ecosystem services " ->check grammar	Comma has been removed

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
436	111	2	111	8	The first Ch2 key message: it seems that the bold text is not the conclusion or main message of this KM. The other way around: the non-bold text doesn't seem to support the bold text (that should be the main message of this KM?). Maybe the last sentence should be put slightly adjusted in bold in front and then the rest should follow, incl. the first sentence (but not in bold)?	Done accordingly, see response to Comment 429
437	111	29	111	29	The first "ecosystem" seems lonely here, should be plural? Or is a subsequent word missing? Or should the comma between "ecosystem" and "and" not be there?	The word "services" has been added. Comma has been deleted
438	111	39	111	39	Which kind of breeding is meant here?	The word "plant" has been added
439	111	3	111	3	It looks like there is a comma too much here, between "cultural" and "ecosystems".	Comma has been removed
440	112	0	112	0	It would be good to reflect on co-benefits beyond health (such as cooling demand with abundant urban green, air pollution, reduction of disruptions, etc.) Also connect (or even move certain parts) to Chapter 5.	During revisions of KMs, this idea has been considered (see response to Comment Nr. 6); however, reference to other chapters on the KM level seemed not useful, we restricted such references from the main text
441	112	49	112	49	" does not provide no climate benefit" please check	Replaced with "negates any"
442	112	5			xxx%?	Quantity now provided as "16%"
443	112	19			What is meant with deep transformations – explain what deep means and which transformation are considered.	revisiting KMs (see response to comment nr. 21) also led to removal of the term "deep transformation"
444	112	9	112	11	Please check definition and revise text: one of the main characteristic of INVASIVE species is that they cannot be controlled by the ecosystems they invade, but that they change these ecosystems. Suggestion: replace "controlling" by "resisting" or "preventing".	key message has been deleted

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
445	112	28	112	35	The paradox situation is: all sectors shall use biomass to reach sectoral emission reduction targets, and the biomass-provisioning sector LULUCF shall reach climate targets by not providing biomass. This comes with a prize, and this is not mentioned here.	Mitigation potentials in the revised set of KMs (following restructuring according to response to Comment Nr. 21) clearly identifies long-lived HWPs as a mitigation potential. Trade-offs are being discussed in the detailed text.
446	112	36	112	43	Please specify what emissions should be reduced in forestry. Emissions as measured in the GHG Inventory are mostly negative, so do you mean "increase (CO2) removals (from the atmosphere)"? Or do you mean process-based emissions in timber processing, HWP manufacturing, transport? Please be aware that according to UNFCCC GHG Inventory Guidelines NET emissions are reported and that if emissions should be reduced the same result could be achieved by increasing removals.	increasd sinks" are now referred to specifically
447	112	19	112	19	Here the text part is missing.	revisiting KMs (see response to comment nr. 21) allowed to provide complete sentences
448	112	26	112	27	I am not convined that adaptive management is a research gap. It is rather a 'quickly involving field' because climate change is a moving target.	Following shortening of KMs (see response to Comment Nr. 21) no reference is given to adaptive management as a research gap. The case is more thoroughly being dealt with in the main text.
449	112	5	112	5	At the end of the line is "XXX %	See response to comment 442

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
450	112	17	112	18	Line 17 states "One Health", which refers to the concept of human, animal and environmental health. In line 18, however, only "human health" is mentioned. Should this consequently also refer to animal health?	we have added a reference to animal health
451	112	16	112	18	What is the difference to the first KM?	in an overall restructuring of KMs (see response to Comment Nr. 21) more clarity of distinction between KMs has been provided, and KMs also have been combined when useful. The link to "health" has been worked out more clearly in the specific KM
452	112	32	112	32	"according" should be "accordingly" ?	deleted
453	112	29	112	32	Are these reductions incl. the effects on i.a. the healthcare(system) or the emission reductions from the agriculture / forestry / landbusiness side only?	information added to the revised KMs
454	112	39	112	39	"or" should be "and" or "and/or" ?	Done
455	112	44	112	46	A similar story was already covered above, 2 KMs earlier, beginning with "Deeper transformations limiting the overall...". Why is this one separat?	KMs have been combined for greater consistency (also following the request of Comment Nr. 21)
456	112	49	112	49	"not" and "no" together means the opposite of what probably is meant. Suggestion: erase "not".	Replaced with "negates any"
457	112	42	112	42	Probably the second i.e. last comma between "farmers" and "or" should be erased in order to improve readability if understanding the sentence correctly...	Done
458	112	20	112	20	First comma, between "system" and "(in order) to", should be erased.	Comma has been removed

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

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459	113	40	113	40	A lot of conflicts will rise through open doors of companies to bring cooler air in but make the noise much more loud for the surroundings; the same case is the installation of split-air.cons: the second in topten.ch is outside 19 dB louder than the first and inside 13 dB	reference to specific measures and their shortcoming has been covered in another (next) KM
460	113	3			Agreed but one should be careful - high carbon stocks do not automatically lead to high biodiversity. The problem here is how biodiversity is defined but this is a different story. Some careful editing is suggested.	reference to biodiversity has been deleted.
461	113	39			Why are members of minorities in Austria more affected by climate change?	see comment 465: "ethnic minorities" has been specified. More details are in full text
462	114	37			The anthropocentric view is well received but it would be good to outline why, because for a long time I would assume that it was different?	the anthropocentric view is central to environmental consideration - especially but not only regarding health issues
463	114	45			... covered in 0...?	Reference has been adjusted to "Chapter 1"
464	113	31	113	32	Please check: CCB 2 refers to CCB 3?	CCB-3 (should have been all along) is now being dealt with together with Chapter 2, also in listing the key messages. Comment is not relevant any longer, but thanks anyway
465	113	38	113	39	Please be more specific: what "minorities" are meant here, that do not have a large overlap with "poor" and/or "demanding jobs"? Comparatively rich scientists like the authors are also a minority in Austria, as are inhabitants of mountain villages, ...	"minorities" refers to ethnic minorities, not to rich scientists. We will add the term "ethnic". We explain "demanding" as "physically demanding"
466	113	16	113	16	Win-win is too vague to be used in the key messages in my opinion. Please state would you refer to.	While the message of interferences between measures has been maintained, more precise formulation has been selected

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
467	113	13	113	13	it are not only saturation effects. The disturbance regime is also relevant.	disturbance and calamities are specifically mentioned, while saturation (difficult to quantify) has been removed from KMs
468	113	3	113	3	"enhancing" should be "enhance" ?	Done
469	113	16	113	25	This KM entails some complex sentences, could be resturctered to improve readability.	Complex sentences have been removed during restructuring (see also response to Comment Nr. 21)
470	114	45	114	45	What is "0"?	see comment 463 - reference to chapter 1 corrected
471	114	45	114	45	Here at least an estimate seems justified. Less than 0.1% of forest area, considering this reference (I am not a coauthor). Sabatini, F.M., Bluhm, H., Kun, Z., Aksenov, D., Atauri, J.A., Buchwald, E., Burrascano, S., Cateau, E., Diku, A., Duarte, I.M., Fernández López, Á.B., Garbarino, M., Grigoriadis, N., Horváth, F., Keren, S., Kitenberga, M., Kiš, A., Kraut, A., Ibisch, P.L., Larrieu, L., Lombardi, F., Matovic, B., Melu, R.N., Meyer, P., Midteng, R., Mikac, S., Mikoláš, M., Mozgeris, G., Panayotov, M., Pisek, R., Nunes, L., Ruete, A., Schickhofer, M., Simovski, B., Stillhard, J., Stojanovic, D., Szwagrzyk, J., Tikkanen, O.-P., Toromani, E., Volosyanchuk, R., Vrška, T., Waldherr, M., Yermokhin, M., Zlatanov, T., Zagidullina, A., Kuemmerle, T., 2021. European primary forest database v2.0. Sci. Data 8, 220. https://doi.org/10.1038/s41597-021-00988-7	This would be good to use, unfortunately (i) refers to forests only, not to alpine grassland, barren land, natural wetlands, ..., which also are "close to pristine cover", and (ii), the FOREST EUROPE report (quotation 10 in the paper cited) speaks of 1.3% of Austrian forests being pristine, while the paper itself estimates in Fig. 4 that for Austria about 1/100 - 1/10 of that value is really pristine (0.013%-0.13%). Detailed data is available as GIS file, much too complex to retrieve here
472	114	4	114	7	This key message is a bit hard to follow (e.g., mitigation measures...regarding sustainable modes of transport). It would probably benefit from more specific examples.	all KMs have been revised to clarify
473	114	13	114	13	The text in brackets (the dominan form of animal life) is unnecessary	deleted accordingly

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
474	114	18	114	18	"Ecosystems also offer fibers and energy resources, contributing to various industries and ensuring our energy needs are met, and they are host to biodiversity ..": Shouldn't biodiversity be mentioned first? Without biodiversity in an ecosystem there wouldn't be any ecosystem services!	An ecosystem remains an ecosystem even with strongly reduced biodiversity. The statement remains correct that ecosystems are hosts to biodiversity (plural-s of hosts added)
475	115	7	115	8	The figure that overviews teh chapter is very helpful. Overall, all chapters could be given such an illustration, If this is not done, at least the overview figure in Chapter 4 could be cross-checked and the style and content consolidated.	Message has been transfered to other chapters
476	115	6	115	8	What is the relationship of the chapter and especially of Fig. 2.1 to the sub chapter about climate related risks (p. 68, line 29 - p. 74, line 35)? There are close connections between both which should be as visible/explicit as possible.	the risk section of chapter 1 is beyond the interpretation of land based adaptation and mitigation measures, and much more general than the specific info provided in chapter 2
477	115	4	115	4	The correct citation for the Special Report Landuse isJandl, Tappeiner, Foldal 2024. It contains no english translation of any part.	corrected accordingly
478	115	4	115	4	The correct citation for the Special Report Landuse is Jandl, Tappeiner, Foldal 2024. It contains no english translation of any part in the Special report Land use.	corrected accordly
479	116	16			Where do the numbers come from – please explain. It is good to see that a consistent unit is used (tC) but it would be good to provide the conversion ratios since in the different sectors use different units. For example, m³ in Forestry and Wood Industry and thus the conversion factor is important.	The Figure has been revised, and text has been added: Wood flows in [m³] have been converted to tC using a crude factor of carbon density [500t dry matter/m³], dry matter biomass flows were converted to carbon fluxes applying a carbon content factor of 50%.

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

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480	116	6	118	6	Please check and revise this section. It is not clear what is considered as an emission and what constitutes biomass flows. For example, a flow of C in annual crops and subsequent release can not be considered an emission if the uptake of C has not been recorded, too. This would violate core principles of GHG reporting and accounting. In addition, "forestry" (net) emissions of -12.3 Mt CO ₂ /yr are not backed by the Austrian GHG Inventory (NIR 2023, Anderl et al. 2023, Table 249), so please specify where the data have been taken from.	The Figure has been revised, and the text revised. A sentence was added: . The latter [energy use of biomass] is associated with corresponding C-emissions to the atmosphere. At the production side, biomass provision is sustained by a flux of carbon from the atmosphere to the land ecosystems. For the quantification and balance of these flows, see below (subchapter 2.1.1.2).
481	117	2	117	3	Make sure that the volumes match those reported in the similar material figure on page 292	Values in the figure page 292 are not precise enough to be compared with this figure.
482	117	26	117	26	low temperature energy should be provided in cities with small or big heat pumps, which are able to cool too. Burning wood should be the exception, guided by power generation (4 times more costly than wind energy, but "on time")	This passage discussed the current practices, hence the comment could not be implemented in this paragraph.
483	117	11	117	26	Could in part or as a whole be replaced by a commented table, since a lot of quantitative information is presented.	As this is a description of the information provided in the Figure 2.2, we refrained from adding a table. But the text was revised for clarity.
484	117	9	117	10	Suggestion: add that this is the reason why emissions are given in [CO ₂ -eq.] to account for these differences.	Sentence has been deleted, to make a clearer differentiation between the C flows and the GHG emissions. (see comment 480)

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

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486	117	3	117	10	This figure contains multiple major failures, ignores Eurostat standards and double counts wood flow parameters in Austria & the EU. Misleading and useless!	The numbers have been thoroughly checked, the statements can also be found in the peer-reviewed CCCA-fact sheet (https://ccca.ac.at/fileadmin/00_DokumenteHauptmenue/02_Klimawissen/FactSheets/41_FS_holzbio_masse_202303.pdf) and are in line, methodologically and by result, with the study by Kalt (2015). The review does not reveal any details for double counting or violation of Eurostat rules, and is not specific about the Eurostat rules.
487	117	1	117	1	Some text segments have too small font size	Revised
488	117	1	117	1	What is the motivation behind the different colors? Consider adding a legend. Please use throughout one digit after the comma. Which is there a circle below livestock products? It is unfortunately not clear, how the GHG emissions in the stars (MtCO₂eq / year) are linked to the vertical bars (MtC/yr). The caption should provide some pointers on that	Figure revised, added to the caption ". Colour coding is used to indicate similarity of components (imports, domestic extraction, processing stages, exports, final consumption, etc.) "

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

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489	117	19	117	19	Citing the report of Kirchmeir is controversial. To my understanding the report was expected to be a part of Mutter Erde (https://www.muttererde.at/ueber-uns/). The finalized report was heavily criticized and reviewed by Umweltbundesamt and BOKU. In my understanding it was not used for broadcasting by ORF due to quality issues. There were doubts whether it gives a balanced presentation. The co-chairs may want to back-check this observation. I as a reviewer are neither judge nor jury to draw conclusions. In the Special Report Landuse the reference was used in an early phase of the discussions to support some claims on sustainable forestry. Confronted with the critique on the report the reference was not used. It is surprising to see it coming back via the side entrance, as if the discussions in the Special Report Land Use would never have happened. Beck-O'Brien refers to a report of WWF Germany, that ultimately supports sustainable forestry. I am not sure whether or not a reference to Austrian forest conditions is made in the report. I did not find any.	The reason for the "controversy" is not given by the reviewer (is it due to a lack of scientific rigor or due to an interest conflict? The critiques by "UBA" and "Boku" are not presented by the reviewer and are not accessible over the internet, so it is impossible to judge their validity. The report is available at the Mutter Erde Website, which we take as indication that it is not withdrawn due to quality reasons. An analysis of the information compiled in Kirchmeir et al. did not reveal relevant scientific flaws, the statement is (https://www.muttererde.at/wp-content/uploads/2021/11/TechnischerBericht_Wald_Kohlenstoff_Klimawandel_E.C.O._211103.pdf, pg 61): "Die Österreichische Forstinventur dokumentiert für die Erhebungsperiode 2016/2018, dass ca. 88 % des Zuwachses durch forstliche Nutzungen entnommen werden (Gschwantner, 2019). Gegenüber der vorangegangenen Inventurperiode 2007–2009 bedeutet das einen Anstieg der Nutzungsintensität um 3 %. Dies zeigt auch das limitierte Steigerungspotenzial auf, insbesondere wenn man bedenkt, dass ein beträchtlicher Teil des Zuwachses auf Zuwächse im Kleinwald und unzugängliche oder schwer bringbare Lagen zurückgeht." The reason why the reference was not used in the SRLU was never disclosed to me when I served as Co-Chair of this report (KHE), and it was never argued that it would be flawed or not relevant. The reason why the LAs of the SRLU ignored this report was never openly discussed, even after requests. Beck-O'Brien is quoted for their statement on risk-corridors: "Zur Ermittlung und Bewertung der nachhaltigen Holzkapazitäten der Wirtschaftswälder setzt die vorliegende Studie einen Risikokorridor ein: Dieser basiert auf den jährlichen Holzentnahmen aus dem Wald. Der Risikokorridor reicht von Holzentnahmen von 50 Prozent (geringes Nachhaltigkeitsrisiko) bis 80 Prozent (hohes Nachhaltigkeitsrisiko) des jährlichen Holzzuwachses (NAI)." Indeed, a reference to Austrian Forests is not made. But, the general nature of these values, their recognizable value as rough proxies, and the geographic and ecological proximity of German and Austrian forests, together with the fact that the statement in the ch2 does not make quantitative assertions, renders this reference plausible.

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

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490	117	19	117	19	Citing the report of Kirchmeir is controversial. To my understanding the report was expected to be part of Mutter Erde (https://www.muttererde.at/ueber-uns/). The finalized report was heavily criticized and reviewed by Umweltbundesamt and BOKU. In my understanding it was not used for broadcasting by ORF. The co-chairs may want to back-check this observation. In the Special Report Land Use the report of Kirchmeir was not used for this reason. Beck-O'Brien refers to a report of WWF Germany, that ultimately supports sustainable forestry. I am not sure whether or not a reference to Austrian forest conditions is made in the report. Forest inventory data for Austria (periodically reported in BFW Praxisinformation, and available at www.waldinventur.at) show that the standing stock of forest biomass is increasing since the 1960s, even though the harvesting rates have increased.	Same as 489. Plus: The statement that stocks are growing despite increasing harvest is not really relevant for the assertion, that the potentials to increase harvest volumes under sustainability criteria is limited.
491	117	15	117	19	There is room for enhancing domestic wood provision under sustainability criteria if some specific measures of forest management are implemented, e.g. Chakraborty et al 2024, Assisted tree migration can preserve the European forest carbon sink under climate change, nature climate change, doi.org/10.1038/s41558-024-02080-5. Moreover, in an upcoming paper by Weiss et al it is shown that increment and harvest levels can be sustainably increased when optimal rotation lengths and immediate reforestation are applied.	The passage was reformulated. The upcoming paper is not yet accessible to the chapter team
492	119	3	119	3	Unit in the last column?	column deleted

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
493	118	14	118	14	"two thirds in the form of soil organic carbon (SOC). " please check with chapter 1 section 1.5 and numbers there - SOC 2.2tC/ha, add cross reference	Done
494	119	1	119	4	It seems that Austrian data about SOC in vineyards have not been considered (e.g. https://doi.org/10.1111/sum.12204).	Done
495	119	1			This is a very interesting table but a bit difficult to understand because there are two columns of Total C stocks and also the meaning of the numbers presented should be explained in the figure caption. Editing is needed.	The headers have been changed
496	119	10	119	16	The last sentence (l. 15 - 16) is incorrect. Please do not misunderstand the combined presentation of AFOLU inventory methodologies in the inventory guidelines (IPCC 2006 GL and 2019 Refinement) as "accounting rules". The _accounting_ is done under the rules of the Paris Agreement and, in the EU, the relevant EU regulations (e.g., the LULUCF-Reg.), and according to UNFCCC rules Agriculture and LULUCF are seperated.	All texts have been checked
497	119	26	119	27	Please check and revise: there is no such thing as "other land-use change", this is a mixture of "AFOLU" and "LULUCF" and does not make any sense in GHG reporting and / or accounting. Especially if contrasted with "agriculture" which would then be considered LUC, too.	revised text
498	119	3	119	3	References are presumably different for biomass carbon and for soil carbon. Please elaborate this. The value for forest soil C deviates from Baumgarten et al. 2021, please check.	References have been added

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
499	119	3	119	3	There are more uptodate numbers on forest biomass. Please look at the FRA 2020 report. https://fra-data.fao.org/assessments/fra/2020/AUT/sections/carbonStock	Has been updated to FAO/FRA 2020
500	119	3	119	3	In caption and text, the authors should note, that deadwood is not included in the forest C stock assessments. This is an important C pool and the reader has to be made aware about it.	Inserted in the footnote
501	120	23			The increment increases from 2.8 to 9.4 (m ³ /ha/year). This is probably also strongly driven by chance in the national forest inventory data collection design and the volume calculation methodology. It is suggested that you just add a sentence mentioning that methodological adaptations have been done, otherwise this increase seems to be a bit superficial. In 1981 the national forest inventory was changed to permanent plot sampling design and this has reduced the random error component and enhanced the reliability of the national forest data.	text added
502	120	31			What was corrected please explain. The volume estimations of the national forest inventory usually use the whole stem including the stump, while the harvesting statistics record only the harvested volume. The difference is approximately 25 to 30 % and depends on the tree species etc. In principle these numbers are not comparable and thus I comparison should be taken with care.	revised accordingly
503	120	5	120	7	again: "other land-use changes" does not make sense. If you took the data from the NIR, what you refer to is "LULUC".	revised text

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
504	120	23	120	23	Please check and revise: if you refer to data from the NIR, then this sentence is wrong because in the GHGI also other pools than living biomass are considered. If you refer to own calculations, please make sure to emphasize this and check for calculation bias due to omitting the other pools.	sentence deleted
505	120	1	120	1	see comment on page 111/9. Here the available data are presented, on page 111 the authors show the last 5 years. -- I miss consistency.	text was added
506	120	23	120	23	The statement is wrong! The net forest sink is NOT calculated as difference between increment and harvest. The forest sink / source IS calculated from the difference in standing stocks of biomass. Thereby, disturbances of the forests are included! The Special Report Land Use has been very specific on that and the Austrian expert Peter Weiss (UBA) was involved and was available for many discussions. How can these topics have been missed?	sentence deleted
507	120	4	120	4	Figure 2.3 A bracket is missing in the description of the y Axes in the figure on the right	Done
508	121	42	121	43	How much "import dependency" does the data of the national energy statistics suggest? This should be made clear here to explain what "higher" means.	Changed to: Austria's dependence on bioenergy imports is higher than indicated by national energy statistics on direct wood energy imports, as part of the wood processing residues used for energy come from imported sources
509	121	26	121	26	"Note that these emissions are much smaller than the AFOLU emissions " please clarify	sentence deleted

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
510	121	12	121	12	"as such spillover effects are often overlooked, and may offset reductions in carbon emissions and biodiversity loss linked to decreasing rates of deforestation" please explain further	We specified "spillovers effects on non-forest ecosystems".
511	121	42			The import dependence... This sentence is very difficult to read and requires English editing.	See 508
512	121	13	121	26	I wonder what the reader should learn from this paragraph. -- Is it that boundary conditions for assessments are relevant for the outcomes? -- This could be stated briefer!	we have checked the paragraph and have shortend it accordingly
513	121	42	121	49	The supply of bionerger in national energy statistics ... I am not sure who ever claimed that bioenergy is a self-sufficient energy source in Austria, and the high contribution of oil and natural gas in the Energy Reports of the Ministry BMK do not suggest such claims. - However, I am not sure whether the statements reflect that 20% of the wood harvest does not reach the timber market because it is retained for use by the owners.	See 508.

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
514	122	7			What is meant with the deforestation risk? From the national forest inventory, we learn that the annual increase in forest area is about 4000 ha/year. How does this fit together?	The sentence referred to deforestation risk embodied in consumption, which includes imports. The embodied deforestation risk is hence entirely linked to imports, because, as the reviewer mentioned, no deforestation is happening in Austria. However, because Austria re-exports a substantial amount of the imported biomass, the precision embodied in consumption remains important, to differentiate from the imports that are re-exported and finally consumed in other countries. We hence specified "the imported 'deforestation risk' embodied in Austria's consumption".
515	122	24			This is interesting and well received but improve the quality of the figure.	The figure will be improved through higher font size and pixels.
516	122	6	122	6	"Roux et al." is cited several times in the text, but missing in the literature. Please add.	The references to Roux et al have been deleted
518	122	24	122	24	"Colored ribbons" this is probably a leftover from editing. The image would look more appealing if legends cover two lines, giving more space to the images.	"Colored Ribbons" has been deleted. The legend will be adjusted or moved.
519	122	7	122	22	I think the authors could make it easier for the reader to make a point. The reference to some 'upcoming' paper is difficult at this stage of the report, where review editors expect final texts, and not texts that could eventually be reviewed once the papers have been published.	removed

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
520	123	9			It is suggested that regional assessment should have a stronger focus or at least include the geological conditions, since they are an important driver for climate change impacts. For example, the limiting factor in limestones is the water holding capacity or hydrology and this drives the timber line or better the water availability. It would good to see a stronger link to the biophysical and geomorphological conditions for plant growth to better understand climate change impacts and its regional differences. This seems to be missing in this report.	Thanks for this suggestion. The biogeographical regions included in the table also account for geological conditions, but of course they do not depict fine-scale variations. Due to the high number of ecosystem services and specific impacts, it is not possible to include this at this place. However, it is included in the individual sections if there was literature addressing regional differences and linkages to biophysical conditions.
521	123	9	123	9	I wonder whether NN revised submitted is ready for review.	The paper is now published. The reference is added.
522	124	21	124	24	Cross-references to the sub-chapters on precipitation (page 22, from line 42on) and grass lands (1.6.3) might make sense.	inserted cross reference "- as described in Chapter 1.2.2" in the first sentence of the second paragraph
523	124	31	125	4	All meteorological/climate phenomena mentioned in this paragraph – from elevated temperatures to droughts - have been extensively covered in chapter 1. It would be good if the connections were explicit/visible.	I inserted the cross referenc by rewording the first sentence of paragraph 4 into "Besides general yield trends, specific climate change phenomena as described in Chapter 1.2.2, with medium evidence, and medium agreement climate change will moreover increase the uncertainty of crop yields."
524	124	4	124	6	Why are the SDGs are suddenly mentioned here? Why not in the other sub-chapters of chapters 2 on the pages above?	The SDGs are listed all along the chapter, also in the pages above this point. See below section 2.1.1.

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
525	125	11	125	42	Please try to provide quantifications of yield reductions under GWL where possible	We added the sentence: "Literature providing quantifications of yield reductions in permanent crops under different GWL is not available for Austria and represents a major research and knowledge gap."
526	126	44	126	44	Warum wird hier GLORIA nicht zitiert? Papers von Pauli würde sich bei den elevational shifts von plants eignen. Oder wurde deswegen darauf verzichtet, weil es sich hier vielleicht nicht um Gipfelgebiete handelt, aber das ist wiederum nicht explizit erwähnt.	I specified that this sentence concerns subalpine and lower alpine areas, i.e., areas that are suitable for forests. The high alpine and nival areas do not belong to this category for the time being. But Gloria is currently researching these areas, so quotes from them don't really fit.
527	126	11	126	13	"There is (Haslmayr et al 2018)." please add reference to chapter 1 grasslands 1.6.3	Done
528	127	41	129	6	Maybe I missed it but I would find a reference to chapter 1 of the report useful here (and maybe also elsewhere in ch. 2)...maybe also to chapter 7 (that talks about mountain forests in particular).	a reference to chapter 1 and 7 was given
529	128	13	128	13	in high elevation forests the recent storm events have led to damages (see Carinthia, Eastern Tyrol).	lowlands have been excluded from the sentence and substituted with "generally"
530	128	24	128	25	What is the likelihood here? also for the next sentence?	The probability of a single "bad year" will increase with increasing temperature and can cause that large forest areas are destroyed and will gradual release of previously stored CO2.
531	128	40	129	1	How exactly?	by harvesting old and overmature forests with low increments and regenerating them with productive tree species

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
532	129	18	129	19	Please specify what the biomass is used for (heating?)	Information should be left out for space reasons, and might be more relevant for chapter 4.
533	129	24	129	24	"This will probably also increase the energy supply in the future" --> depends on the considered scenario. Is the reason that salvage wood cannot be used for other purposes anymore?	rephrased
534	128	37	128	38	"Now that this age peak has aged..." please review language and revise.	30 years later forests have matured and Now that tthise age peak has flatedaged, forests have matured,leading to a
535	128	5			See previous comment about the biophysical conditions including the geology. This strongly drives the limiting factor for plant growth and thus the impact of climate change.	We are not sure, how we can overcome this shortcoming (of the whole report) in this paragraph
536	128	14			That coniferous tree species in the lowlands decline has a lot to do with a change in the management strategy since broadleaves are so competitive that if they are not controlled, spruce will have difficulties to survive. Thus, if we work with natural regeneration broadleaved percentage will increase regardless of any climate change impacts. It is suggested to somehow include a sentence like management changes because of expected climate change, have reduced the forest area covered with coniferous by Again it would be wrong to say that broadleaves increase because of climate change, it mainly increases due to changes in management.	Businesses will therefore face a potential scarcity of wood availability for certain assortments or species as forest management will adapt to the changing climate

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
537	128	37	129	3	The problem here is that regeneration of mature stands of the species most common in Austria almost always requires lowering their stand density, which translates into carbon stock reduction and emissions from the living biomass pool (because this has to be done at a level above the current annual increment to be effective). This means: if high increment in coming decades is aimed for, this requires "investments" today. The same problem exists with adaptation and improving resilience, because these too in most cases require stand density reductions.	Mitigation and adaptation measures are discussed in section 2.3
538	128	33	128	33	Please provide for completeness the latin names of the species.	Added <i>Picea abies</i> L. and <i>Fagus sylvatica</i> L.
539	128	38	128	38	age peak has aged --- could be rephrased.	30 years later forests have matured and Now that this age peak has flattened, forests have matured, leading to a decreased and their productivity has decreased from 9.3 m ³ /ha/yr in 1990 to 8.2 m ³ /ha/yr in 2020.
540	128	1	128	18	A reference to chapter 4.2 of the Special Report Landuse is missing. The adaptation of forest management has been discussed in great detail with a more comprehensive literature compilation.	Is chapter 4.2. "Anpassungsmaßnahmen in der Landwirtschaft" ? This does not seem to fit.
541	128	17	128	18	Is the last sentence of this para correct?	rephrased
542	128	8	128	8	What is the difference between productivity and growth?	in order to avoid confusion, we have now excluded "growth" in the sentence
543	128	24	128	24	I guess that this statement must be vice versa. Not the decrease in productivity causes higher mortality rates, but higher mortality rates combined with lower growth of remaining trees result in lower productivity.	A decrease in site suitability will reduce productivity and increase tree mortality rates.

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
544	128	26	128	26	This statement should be reformulated. I do not believe that forests lose their ability to uptake CO ₂ ; it's just that the CO ₂ uptake becomes smaller than the CO ₂ release, therefore turning a forest from a sink to a source. Or do the authors refer to a forest whose trees are all dead because of drought, bark beetles, etc.?	Kindermann (2021) indicates that the CO ₂ uptake becomes smaller than the CO ₂ release, therefore turning a forest from a sink to a source
545	128	1	128	18	Please cross check with chapter 1, 1.6.2 „forests“ and chapter 7, 7.4.2 „Forestry and Agriculture“ and add cross-references	a reference to chapter 1 and 7 was given
546	128	8	128	8	"levels above +2 °C " is this global or local?	there would be the need to translate the +2 C in GWL...
547	129	24	129	25	It is striking that the use of forestry residues as energy seems to be a given. It can, however, be expected that the assortments currently used for energy will demanded for material use in the future. Therefore I suggest refraining from the statement that the energy supply will increase.	sentence has been revised
548	129	24	129	25	The use of forestry residues as energy is just one possible use. It can be expected that the assortments currently used for energy will demanded for material use in the future. Therefore I suggest refraining from the statement that the energy supply will increase. Suggest rephrasing: This will probably also increase the supply of salvage-logged wood, of which currently a large share is used for energy.	sentence has been revised
549	129	34	129	36	Cross-references to the information about precipitation in chapter 1 would be good.	The cross reference can be found already 5 lines below.
550	129	1	129	2	This was true in the past, often caused by site recovery and nitrogen immissions, but must not be true for the decades to come. Please see Chakraborty et al. (2024) (doi: 10.1038/s41558-024-02080-5) for a most recent assessment.	Added: Spieker et al. (1996) described this trend of increasing growth for Europe but Chakraborty et al. (2024) expects that growth will decline in the future.

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
551	129	17	129	17	The statement harvested, imported, or other sources is not clear. I have a vision on harvested and imported, But what are other resources?	explanation in brackets was given
552	129	40	130	9	The assessment is missing. Can a degree of confidence be shown?	confidence statements have been added
553	129	4	129	4	is there a quantification possible?	This sentence has now been added: Based on the analysis of a past storm event in Italy a drop of 40% in timber prices was observed (Udali et al, 2021).
554	129	19	129	19	"chapter 4" - please specify the subsection in chapter 4	Done
555	130	14	130	14	Is a not-yet-accessible manuscript a valid source?	Reference has been deleted.
556	130	3	130	6	The connection between 1,5°C warming which provokes an increase of gross primary productivity but is not limited by nutrient availability is not clear. Maybe a high degree of knowledge summarisation has led to an incomprehensible sentence.	Mistakes in the context as a result from shortening of the paragraph have been removed and text has been adapted.
557	130	3	130	3	"ÖPUL" - please explain or add reference	full name added
558	130	26	130	28	Which GWL do the mentioned scenarios resemble?	The study cited here does not use ensemble-based scenarios, but a statistical climate Model. After consulting with Martin Schönhart, who has been working with the same statistical model, he estimates a GWL of 1.5 (as the scenario is up to 204 and closest to RCP2.6)
559	131	8	131	8	Check reference to section "0".	A new link will be made (TSUs)

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
560	131	18	131	20	I am not sure this is true. Do you mean for Austria? Maybe check with authors from chapter 1 (pedosphere).	The following text has been added: Impacts of climate change on the carbon sink function of wetlands are outlined in Chapter 1.6.1. In peat accumulating wetlands, representing ecosystems storing most carbon per area, land use-related drivers for carbon loss, namely drainage and agricultural and forestry management are estimated to be more severe than climate change. For German peatland sites, with high evidence and agreement, drainage and drying out turns peatlands from a carbon sink into a large greenhouse gas source with emissions averaging at 25 CO ₂ eqiv/ha*a with peaks up to > 60t CO ₂ eqiv/ha*a (Tiemeyer et al., 2016). For Austria, actual amount and location of agriculturally used drained peatland areas are understudied (Hogl et al. 2023). The Austrian NIR 2023 estimates 13.000 ha of grassland on organic soils while arable land on organic soils is not listed. In contrast, a recent study estimates 31.000ha of peatland area under mostly intensive agricultural grassland or cropland management (Hogl et al. 2023). For Austria quantitative modelling studies on the impact of climate change on drained, agriculturally used peat soils and the related carbon sinks remain a research gap.

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
561	131	18	131	20	Please add that this refers to the situation in Austria. Information from neighbouring countries exists, where agriculturally used peatlands usually are drained and thus a source of CO ₂ , due to C losses from decomposition of peat.	The following text has been added: Impacts of climate change on the carbon sink function of wetlands are outlined in Chapter 1.6.1. In peat accumulating wetlands, representing ecosystems storing most carbon per area, land use-related drivers for carbon loss, namely drainage and agricultural and forestry management are estimated to be more severe than climate change. For German peatland sites, with high evidence and agreement, drainage and drying out turns peatlands from a carbon sink into a large greenhouse gas source with emissions averaging at 25 CO ₂ eqiv/ha*a with peaks up to > 60t CO ₂ eqiv/ha*a (Tiemeyer et al., 2016). For Austria, actual amount and location of agriculturally used drained peatland areas are understudied (Hogl et al. 2023). The Austrian NIR 2023 estimates 13.000 ha of grassland on organic soils while arable land on organic soils is not listed. In contrast, a recent study estimates 31.000ha of peatland area under mostly intensive agricultural grassland or cropland management (Hogl et al. 2023). For Austria quantitative modelling studies on the impact of climate change on drained, agriculturally used peat soils and the related carbon sinks remain a research gap.

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
562	131	3	131	3	I wonder how a single reference can be qualified as low conf, high agreem.	By construction, one paper is low evidence, high agreement. We tried to find more literature, but we didn't find other available papers for Austria.
563	131	1	131	15	The authors may have identified the work of Sophie Zechmeister and her numerous former students. There are many papers available for specific sites in Austria.	Thanks for the comment - However, I am not sure, what exactly should be added here.
564	131	3	131	12	Chapter 2 of the Special Report Land use (Fg 2.16) is a comprehensive compilation of available experiments. See also the refs in the respective literature list to Andreas Schindlbacher et al.	We thank for this valuable information We base our assessment also on the Special Report LU, but cannot include specific details of it.
565	131	16	131	17	I read the paper or Repo differently: The abstract of Repo: The forest harvest residue removal reduced the carbon stocks of litter and soil on average by 3% over the period from 2016 to 2100. The reduction was small compared to the size of the carbon stocks but significant in comparison to the amount of energy produced from the residues. The Intro clarifies: ... The residues are comprised of branches, nonmerchantable tops, stumps and other residual biomass from forestry operations that are traditionally left in the forest after timber harvesting .. This is exactly what remains on site in Austria: https://www.klimaaktiv.at/dam/jcr:e2efadef-ab3b-4b7c-8b28-60b058f22b35/Holzstr%C3%B6me_%C3%96sterreich_2021_2023%2018%2008.pdf see 'Natürlicher Abgang and Ernterücklass.	This section is about impacts of CC on C sinks/stocks not about the impact of harvest.

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
566	131	6	131	16	Chapter 2.2.2.1. here C sinks in wetlands could be mentioned as these will change as well. not only due to temp, but also to changes in dry-wet cycles.	Done. We checked with Stephan Glatzel from Chapter 1 and adapted.
567	131	8	131	8	First sentence: other ecosystems are described in 0. What does zero stand for?	A new link will be made (TSUs)
568	131	8	131	8	"described in 0." -> please add correct cross-reference	A new link will be made (TSUs)
569	132	16	132	45	Evaluating the effectiveness of soil erosion measures for cropland in the Austrian Agrienvvironmental Program: A field-based national approach Agriculture Ecosystems & Environment, 2023, 355, (13):108590 DOI: 10.1016/j.agee.2023.108590 should be assessed.	Noted
570	132	46	133	19	The papers of Mortimer Müller on forest fires are not assessed. A reference to Special Report Land use chapter 1.3.6 could close the gap. Eventually, further papers of Mrotimer Müller are already out.	Thank you for the valuable comment. It was agreed that aspects already included in the SRLU should not be repeated. We searched for more recent literature, but there are no new papers from M.Müller out yet.
571	132	26	132	28	unbalanced parentheses	Done
572	132	8	132	15	Chapter 2.2.2.3. it could be beneficial to add also the effect of changing dry-wet cycles on N cycling in wetlands - see Pinto R, Weigelhofer G, Brito AóG, Hein T. 2021. Effects of dry-wet cycles on nitrous oxide emissions in freshwater sediments: a synthesis. PeerJ 9:e10767 http://doi.org/10.7717/peerj.10767	suggested reference is a review on studies on N2O emissions triggered by wet-dry cycles. Nothing specific for Austria, and especially no info on climate change impacts (how would climate change impact on wet-dry cycles?) can be derived
573	132	44	132	45	"See also Section 7.4.2." - please see also chapter 1 - 1.6.2 and 1.7, and please cross check content	Done

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
574	133	9	133	11	General comment from a non-expert: shouldn't all the information in this report relating to the currently cultivated tree species and the associated problems for forests be linked together? It must also be made clear that this is one of the problems that are difficult or impossible to solve, comparable to the problems caused by the decline in snow cover. [See my comment of page 57/4 to 57//: Question by a non specialist: Should this new report on the climate adaptation of tree species be mentioned: Egger, C., Grima, N., Kleine, M., & Radosavljevic, M. (Hrsg.). (2024). Europe's wood supply in disruptive times. An evidence-based synthesis report. International Union of Forest Research Organizations (IUFRO). https://www.iufro.org/fileadmin/material/publications/iufro-series/ws42/ws42.pdf . Found via: Stepanek, M. (2024, März 14). Was tun, wenn uns die Fichte als Superbaum wegstirbt? DER STANDARD. https://www.derstandard.de/story/3000000211551/was-tun-wenn-uns-die-fichte-als-superbaum-wegstirbt . It seems to tackle the difficulties to find tree species that can be planted today and can adapt to the climates to expect in 20 and more years.]	Thank you. We read the papers, but they don't fit in this context. The chapter is about "Impacts of climate change on wind and fire protection" - not the other way round...
575	133	22	133	32	Günter Blöschl. TU Vienna, has gained a lot of international attention for his work on floods in Austria. He could be acknowledged here.	Günter Blöschl's work is indeed very important with respect to research on the development of floods in AT. For this work he has been heavily referenced in chapter 1 of this report. With respect to flood control specifically his work is less relevant.
576	133	1	133	19	Please cross check chapter1 - 1.6.2, 1.2.2 and cc-box risk in chapter 1	Done

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
577	134	9	134	9	pollination, not pollinations (or pollination events? the process of pollination? pollen production?)	Thanks! Pollen production is perfect!
578	134	14	134	46	Link to chapter 1 (biodiversity) here	Done
579	134	18	134	19	If no newer data are available than those from 2002, the past tense should be used in the sentence.	rephrased
580	134	34	134	34	Drier conditions are not necessarily conducive to the spread of these vectors, many of them require moist conditions!	rephrased
581	134	14	134	46	I am wondering whether this section is clear enough about the risks involved with the developments described. Also, it does not refer to countermeasures which could or should be taken to reduce such risks. This might not be the purpose Chapter 2 in general, however, I don't see any other place which would address this aspect of climate change adaptation. As my impression is that action is insufficient (compare the call for action in the most recent report of AGES on their Aedes monitoring programme with the level of action in Austria, or compare actions in Austria [be it about plants or insects] with those in other countries such as Germany, France, Switzerland, or Italy), either this section should be expanded or a new section dealing with such measures introduced elsewhere.	Adaptation and mitigation measures are described in section 2.3. although not lal measures could be included for space reasons.
582	134	19	134	19	Essl and Rabitsch 2002: This seems to be a very old reference. There must be some new ones!	Unfortunately the last published data on neobiota in Austria is from 2002. The more recent data is stored in a database, but it is not accessible. We rephrased giving now only concrete information on non-native vascular plants, citing recent papers.

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
583	135	15	135	15	This sub-chapter is kind of unexpected in 2.2.3. I believe most of its content rather belongs to 4.3	Recreational activities are one of the most important and recognized cultural ecosystem services. We are aware that there are some similarities to section 4.3.3 concerning opportunities for winter activities and water-based activities in summer. However, chapter 4 looks at these impacts from an economic perspective, while in section 2.2.3 the focus is only on the opportunities for carrying out recreational activities and related benefits. We carefully checked the text and slightly shortened section 2.2.3. reducing redundancies and removing statements that were rather related to the tourism industry. We have also asked the authors of section 4.3 to align their content with our section and to add cross-references to section 2.2.3.
584	135	34	135	34	"Although negative impacts on recreational activities prevail,"-> needs further substantiation	This part of the sentence referred to the previous paragraph. To avoid misleading statements, to reduce redundancies, and in response to comment nr. 11, this sentence and the following sentence have been removed.

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
585	135	35	135	35	so the figure is biased in one direction? Why not form an average between positive and negative impacts?	Apologies for the misleading statement. The figure shows average impacts, which result in overall negative values. This sentence now has been removed. See also response to comment 584.
586	135	1	135	14	Chapter 2.2.3. here also, aquatic ecosystem services would be relevant - see Vari et al. 2022 - https://doi.org/10.1007/s13280-021-01556-4	Agreed. Indeed, the section 2.2.3 includes several references to CC impacts on cultural ecosystem services provided by freshwater ecosystems. In section 2.2.3, we now specify that "terrestrial and freshwater ecosystems" provide various cultural ecosystem services.
587	135	23	135	23	"(see Section 4.3.4), " - Please add cross ref to chapter 7 - 7.4 and chapter 1 - 1.3	Done
588	136	12	137	20	Isn't this also linked to tourism, because of the attractiveness of the landscape? Please consider adding links to the respective sub-section(s).	I completely agree that the attractiveness of the landscape may be important for selecting a tourist destination, but I prefer not to add new topics and assumptions in these sections on cultural ecosystem services, as the interlinkages between different ecosystem services are not in the focus of these sections. However, I have asked the authors of chapter 4 to add a cross-references to these sections of chapter 2.
589	136	12	136	12	in the figure you wrote "cultural and heritage" here you use "... or ...".	Thank you. Corrected.
590	136	1	136	1	"...shoulder seasons" - what does that mean?	An explanation was added: "the periods between peak and off-peak seasons"

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
591	137	11	137	11	Why is always Schirpke cited concerning ecosystem services? I am quite sure that also other authors have worked on ES in Austria. The authors should provide a diverse references list!	The literature focusing on climate change on cultural ecosystem services in Austria (and the European Alps) is very limited. Unfortunately, most studies did not include or focus on Austria, or did not assess the impacts of climate change. We have re-checked the literature, but did not find any more studies. Of course, it may be that we have overlooked further literature and would be very happy to include further suitable references if provided.
592	137	24	137	26	Please add cross ref to chapter 1 - 1.6.	Done
593	138	19	138	20	Important to clarify here that carbon removals can only be provided by biomass growth. I suggest referring only to the term sink when it is about biomass growth. All other pools "hold back" emissions from biomass decomposition in various degrees.	The passages has been reformulated. It now reads: Land ecosystems can also provide carbon sinks, in cases when carbon stocks in biomass, soils and and wood products in sum increase, sometimes subsumed under the label.
594	138	43	139	45	Chapter 4.3 of the Special Report Land use deals with adaptation in forestry. It is not cited here.	Reference has been added.

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
595	138	46	138	46	There are efforts in wood technology under way at BOKU. Pramreiter, M.; Nenning, T.; Huber, C.; Müller, U.; Kromoser, B.; Mayencourt, P. & Konnerth, J. A review of the resource efficiency and mechanical performance of commercial wood-based building materials Sustainable Materials and Technologies, Elsevier BV, 2023, 38, e00728 Pramreiter, M.; Nenning, T.; Malzl, L. & Konnerth, J. A plea for the efficient use of wood in construction Nature Reviews Materials, Springer Science and Business Media LLC, 2023, 8, 217-218 These high-impact papers should not be missing from an Austrian Assessment Report.	Thanks for the suggested references. However, the paragraph is focusing on forest management and not constructions - the references might fit better to the chapter 3?
596	139	1	139	1	Please check the number, as it deviates from the value given in the referenced NIR (2023).	Changed to: In the years 2018 and 2019 Austrian forests changed from a carbon sink, which was persistent over several decades, to a source (+5.1 MtCO₂/yr and 1.8 MtCO₂/yr, respectively), and turned back to a sink afterwards (-4.6 MtCO₂/yr in 2022, see Figure 2.2 and Table A2. 2)
597	139	17	139	19	Please consider adding that this must not only be done in close connection to harvesting, but can also be done beforehand, using "Vorbau" / "Vorانبau" to establish regeneration quite some time in front of regular harvests. This can also help in building resilience, and allow species changes with regard to adaptation.	Advanced planting with shade tolerant tree species in mature stands can support. However, because a tree species change, as goes mainly over harvesting mature stands and regenerate them with the new species might, this results in lower forest carbon stocks in the short term (Kindermann, 2021).

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
598	139	1	139	1	I am surprised to see this paper not cited here or another one from the Care4Paris study. (I was not involved in this project). Ledermann, T., Braun, M., Kindermann, G., Jandl, R., Ludvig, A., Schadauer, K., Schwarzbauer, P., Weiss, P., 2022. Effects of Silvicultural Adaptation Measures on Carbon Stock of Austrian Forests. Forests 13. https://doi.org/10.3390/f13040565	reference has been added, and also used for the quantification of the mitigation potentials, see supplementary material in Appendix A2.16
599	139	49	139	49	Table XX --> Which table?	Table 2.1
600	139	46	139	46	Why is the agricultural sector hidden in this chapter. It is such an important sector it should be placed somewhere more prominent	Agriculture occurs in many parts of the chapter - in line with the chapter structure, that treats climate change impacts in section 2.2 (agriculture as part of 2.2.1) and mitigation/adptation in section 2.3 (strong indirect effects on agriculture, such as a demand shift due to changed human diets will be covered in section 2.3.2). We do not understand why the reviewer claims agriculture would be "hidden".
601	139	49	139	49	"Table XX). " - please specify the correct table	Table 2.1
602	139	49	139	49	Please provide correct reference (currently Table XX)	Table 2.1
603	140	11	140	11	According to several meta-analyses, the application of biochar can reduce N2O emissions from soil by 30-40 % (Borchard et al., 2019; https://doi.org/10.1111/sum.12204 ; Liu et al., 2018; https://doi.org/10.1007/s11104-018-3619-4)	references have been added

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
604	140	30	140	30	Biochar application to soils may decrease nitrate leaching from arable soils and horticulture by 10-15 % (Borchard et al., 2019; https://doi.org/10.1016/j.scitotenv.2018.10.060). The efficiency of nitrate retention can be doubled by modifying biochar or by producing biochar composites (Viglasova et al., 2018; DOI: 10.1016/j.wasman.2018.08.005).	sentence on nitrate leaching has been deleted (see response to comment 607)
605	140	47	140	48	Hier sind die CO2 Equivalente unterschiedlich geschrieben	corrected
606	140	35	140	3536	In Zeile 35 steht die "t" vor CO2, in Zeile 36 fehlt sie	corrected
607	140	30	140	30	please specify areas of concern	As correctly noted by the reviewer, there is no direct concern with climate change. Thus, sentence has been deleted.
608	141	26	141	26	Several studies and meta-analyses have confirmed that biochar applications increase plant-available water and water use efficiency by 15-20 % (Omondi et al., 2016; https://doi.org/10.1016/J.GEODE RMA.2016.03.029; Gao et al., 2020; https://doi.org/10.1016/J.FCR.2020.107763).	In the European context, biochar to improve water use efficiency needs to be considered more explorative (suggested sources are Chinese studies) and do not fit well to the well-established measures mentioned here
609	141	46	141	47	Please clarify: does this include changes in crop and animal species and types (origin, breed, ...) or is this meant in a way that these are to be kept "as is"?	Sentence in question has been deleted

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
610	141	5	141	7	Regarding adaptation, Quddoos et al. (2023) show that, on average, adaptation options help to considerably ameliorate the adverse effects of climate change for Austrian farms. First and foremost, this requires adjustments of the current land use; In arable land this includes measures such as the broadening of crop rotations ... Quddoos, A., Salhofer, K., & Morawetz, U. B. (2023). Utilising farm-level panel data to estimate climate change impacts and adaptation potentials. <i>Journal of Agricultural Economics</i>, 74(1), 75-99.	Reference and sentence added accordingly
611	142	44	142	44	This is in line with the results of our project on the new sustainable food-based dietary guidelines for Austria. These would even reduce greenhouse gas emissions by about 50 % compared to the current consumption pattern of the Austrian population (Sturm et al., 2024, not yet published).	Suggested literature source is not published yet, thus cannot be used; statement as such agrees with current text, no change needed. Also the sentence which the comment refers to has been deleted.
612	142	44	142	44	GHG reduction by 33 % compared to which base year value (or quantity)	Sentence has been deleted and replaced with the bandwidth of the mitigation potentials described in table 2.3.
613	142	46	142	46	GHG reduction of 25-40% compared to which base year value (or quantity)	At European level, Westhoek et al. (2014) estimate a 50 % reduction in meat, dairy products and eggs of a 2004 reference diet to lower GHG emissions by 25-40 %.

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
614	143	19	143	21	stress that its a LCA based on current data and that these, relatively new processes have significant room for improvement (in contrast to the animal meat). When considering learning, scaling, and market diffusion, Table 2.3 compares apples with iPhones.	Inserted: Note that these assessments are based on current data and refer to relatively new processes, pointing to large uncertainties and suggesting a significant room for improvement
615	144	19	144	19	0.8 MgCO ₂ eq/cap: What does the cap stand for?	no further action required
616	145	9	145	12	I would recommend to use the data from the Austrian Nutrition Report 2017. Rust et al. (2017) states that on average, the energy intake of women is 1815 kcal per day, that of men 2453 kcal per day. The energy intake is too high for around half of the participants of the study. https://broschuerenservice.sozialministerium.at/Home/Download?publicationId=120&attachmentName=%C3%96sterreichischer_Ern%C3%A4hrungsbericht_2017.pdf	A large-scale survey among Austrians in the year 2014-2016 resulted in total calorie intake of 1815 kcal/cap/day (women) and 2453 kcal/cap/day (men; both excluding food waste), which is substantially lower but still above recommendations for about 50% of the Austrian population (Rust et al., 20217)
617	145	12	145	12	I would recommend using the DGE/ÖGE reference values for nutrient intake here, as we use these in the DACH region. https://www.dge.de/wissenschaft/referenzwerte/energie/	The comment refers to reference values, while the citations refer to empirical estimates of observed diets; related to 616

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
618	146	22	148	50	The structure of 2.3.2.3 and the selection of topics, as well as how this section is integrated with the chapter, could be improved. In our recent publication, we proposed a clustering of circular bioeconomy topics (based on innovative, more comprehensive Sankey diagrams). It includes the discussion of 4 transformation measures - measures on substitution (your "shift"), sufficiency ("avoid"), efficiency (including cascades and circularity, mechanical and ecological recycling...), and reliability/resilience measures (e.g. the NbS section on Disaster risk reduction, but also topics related to flexibilisation, storage, system integration). The combination of transformation measures from those 4 categories will play a role in how the bioeconomy flows in 2050 will look like. Schipfer, F., Burli, P., Fritsche, U., Hennig, C., Stricker, F., Wirth, M., Proskurina, S., Serna-Loaiza, S., 2024. The circular bioeconomy: a driver for system integration. <i>Energ Sustain Soc</i> 14, 34. https://doi.org/10.1186/s13705-024-00461-4	Thank you for pointing us to the reference! We inserted reference to Schipfer et al. (2024) at the end of section 2.3.2.3.
619	146	36	147	6	Well differentiated paragraph! It has to be concluded more clearly though that any energetic use of biomass releases the captured CO2 into the atmosphere. Strategies of wood use therefore need to aim at maximizing lifetime of carbon in products. I think this can be stated with high evidence, high agreement. This is especially true with increasing time due to the diminishing effect of substitution. This aspect should be included in the discussion in this paragraph.	Added a sentence: "Once wood is harvested, increasing the lifetime of wooden products (e.g., using wood in buildings rather than burning it as bioenergy) reduces their climate impact, because carbon is stored in socio-economic structures for some time before it is released to the atmosphere (Erb et al. 2021)."

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
620	146	22	148	50	This section stops short in regard to sufficiency, because it focusses on bio-economic aspects alone. "True" sufficiency would start from society's needs and wants, search for the most climate-friendly way to deliver the associates goods and services, aggregate the associated emissions, compare this to an overall (annual) budget - and start all over again and iterate / "trade" wants and needs until their generation "fits" in the budget. This would require a lot of work and discussion, but would also direct the view to overall emissions, away from sectoral perspectives that will almost always end in sub-optimal solutions. For example, a sufficiency approach would not ask (page 146, line 43) what substitution could be achieved by biomass use, but whether this service (or good) was "necessary" and then look for the most climate-friendly way to generate this.	We agree that options for socially viable sufficiency are not explicitly discussed in this chapter. This has to do with the fact that we are not aware of literature investigating the issue. We therefore included a sentence at the end of paragraph 1 in section 2.3.2.3. to make this focus explicit.
621	146	47	146	48	The concept of additionality is problematic in this context. What is the counterfactual to determine "additional" harvest? What about intrinsic motivations (thinning, resilience, mixture) of disturbance-related biomass removals from forests? Besides, the concept of substitution employed here assumes constant replacement factors across a wide array of product manufacture and use, what is unrealistic (see Rock & Rüter (2023, in German), https://sektionertragskunde.nw-fva.de/2023/14_Rock.pdf).	We clarified that emissions impacts of both substitution and additional harvest are variable over time. "Additionality" here refers to the difference between a reference scenario and any measures investigated. The text does not imply constant substitution or refer to the motivation for harvest, therefore we do not see the need for further modification.
622	147	34	148	1	Double-check the wording > do you mean that timber use is currently responsible for 8% and 14% ?	We added the word "a sector which is" to specify that the values refer to the construction sector as a whole and not to the wood use.
623	147	23	147	23	... for long time periods, and burnt or pyrolyzed only at the end	modified as suggested

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
624	147	32	147	33	The substitution effect will diminish over time. This needs to be considered by studies. Otherwise the effects of reducing emissions through displacing other materials and energies are overestimated and lead to wrong conclusions.	inserted a sentence.
625	147	23	147	24	"burnt only at the end..." Also this would mean that CO2 is released to the atmosphere. A permanent storage would be the most beneficial use.	see previous comment
626	147	7	147	16	The risk of catastrophic C loss due to disturbances is missing from the figure and the text. Also, biodiversity can also be negatively affected by biomass accumulation and this is not reflected in the text.	Inserted disturbances in figure. Note that we do not discuss biodiversity impacts in this section, but mention the potential co-benefits or reduced wood harvest. In the figure, the triangle close to "Biodiversity" indicates the mentioned trade-offs.
627	147	25	147	26	This is a (common) misconception. Lifetime alone influences the turnover time of wood in a specific use, as one unit of wood product can only generate one unit of "product use" at a given point in time. The pool of wood products increases not by lifetime, but by increasing the share of wood in a given product category or "use equivalent". A longer lifetime of wood products will thus not necessarily increase the HWP (only if this increases the amount of wood in use in total), but allow for less input to the HWP to keep the desired services. So a longer lifetime of products may not increase the C stocks in socio-economic stocks, but may allow for lower harvesting.	We thank the reviewer for the insightful comment. We modified accordingly.

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
628	147	16	147	16	This image is unclear, especially since the caption is that short. Please elaborate this. Use consistent colors and arrow size. What does the red triangles show? Unclear.	inserted a sentence on the figure in the text. Revised figure
629	147	15	147	15	Figure 2.8: What das NPP mean?	We explained NPP in the figure caption
630	148	36	148	39	that's difficult to follow. are those examples for the system-level interactions?	Thanks, we deleted the sentence - the text is clearer without it.
631	148	16	148	22	I am missing a look at other natural building materials in the description of possible options. This could be clay, straw etc. that help reduce the environmental footprint of buildings.	inserted a sentence on other biobased materials and knowledge gaps for Austria.
632	148	40	148	46	This paragraph brings up some important points but is not very concise or conclusive. I suggest deleting the sentence starting with Weiss et al. and adding a reason why based on Kranzl et al. a decline is projected. A statement that this frees potentially wood supply for more permanent uses like construction.	inserted half a sentence on the reasons for reduced wood bioenergy demand in Kranzl et al., and revised the sentence on Weiss et al.
633	149	33	149	33	whot does "(foreign)" mean here??	The passage has been deleted.
634	149	43	149	44	It would be important to mention the time-horizon until such a potential stock increase could happen. Is it 10 years or 1000 years...?	the timing problem has now been carefully revisited in the new box text, though the Austrian forest inventory seems to demonstrate that changes can go within a few decades, which available literature would not have expected

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
635	149	5	149	5	NBS are frequently a cost-efficient solution and have multiple benefits: carbon sequestration is only one benefit; NBS also: 1) Restore the natural water cycle 2) Increase the water holding capacity: reduced flood risk, reduced drought risk 3) Provide cooling effects during heat waves 4) Enhance water quality 5) increase biodiversity 6) increase land value by creating recreational areas for residents See: https://www.sciencedirect.com/science/article/pii/S0048969717320752 https://iwaponline.com/bgs/article/2/1/112/71868/A-review-of-nature-based-solutions-for-urban-water	Sentence has been rephrased, and references have been added.

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
636	149	12	149	14	The text in parentheses is not clear and can be improved. I suggest deleting the entire text in parentheses and write instead: Timber stocks in existing forests increase due to an increase in age. This occurs in protected but also in managed forests if management intensity is low (e.g. as observed with small-scale forest owners).	modified as suggested
637	149	28	149	28	Incorrect unit. Stock should be in tC/ha not tC/ha/yr.	changed accordingly
638	149	30	149	31	The text "aiming to extract forest products, but also to remove atmospheric CO2 efficiently" should be removed. Instead I suggest: aiming to achieve fast biomass accumulation and its extraction for wood products	The purpose of the box is to explain carbon sequestration potetnials. Here it matters whether or not C uptake is optimized
639	149	33	149	33	Delete "(foreign)" as it is not required but gives a certain tendency to that option. Foreign species could as well be established for the option favoring growth.	The passage has been deleted.

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
640	149	36	149	46	The whole paragraph is completely incomprehensible. It needs to be carefully rewritten. Most confusing is the sentence on the "natural potential". It is unclear to me what is meant by that. Potential of which forests? Austrian forests? Unmanaged forests? What is meant by "based on accounting"? And what is the message to policymakers of the paragraph? I am trying here a reformulation: Unlike managed forests, unmanaged forest are underlying more strongly natural cycles of forest dynamics. Their carbon accumulation potential depends on the current stage of development. Phases of strong carbon accumulation during regrowth are followed by phases of net emissions due to natural disturbances. Studies that assessed unmanaged forests at landscape level found about 30% higher carbon stocks compared to managed forests (Erb et al. 2004). [Add here numbers from that study, I do not get their meaning from the draft but they seem to be important. Add other studies that are confirming the findings]	Box text has been largely revised for a more consistent and logical structure. While not verbally following the reviewer's suggestions, it follows his/her guidance.
641	149	23	149	29	Here, too, it is important to ensure as far as possible that the information on forests is not repeated and, above all, that reference is made to other places where appropriate. See above all chapter 1.6.2 on forests, but also e.g. p. 133/9-11 and p.57/4-7.	Overlap of information is very limited: chapter 1.6.2 incl. p. 57 very generally describes forests (and points to chapter 2); the box specifically looks into carbon sequestration potentials, and explains why different authors provide widely different interpretations. The text on p. 133 then interprets the climate impacts, again a different view on forests.

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
642	149	25			the average conversion factor of 0.345tC/m ³ leading to 2.9m ³ = 1tC: this needs some explanation how this ratio was defined (e.g. simple example) to see what wood density and proportion of C was used.	conversion according to data provided by the relevant institutions for the 1990 inventory - (standardized inventory data extrapolated to total C according to the Austrian situation of 1990) - info now briefly added
643	149	38	149	38	taken by Erb? What do you mean? Analysed by Erb?	deleted
644	149	28	149	28	Please correct: the work of Gschwandtner is a preliminary analysis of the years 2016 - 2018 of the NFI-cycle 2016 - 2021, not the final evaluation as indicated here.	changed accordingly
645	149	30	149	35	Please include the problems and risks of aiming for maximal C stocks in forests here. These problems are: a) maximizing C stocks by elongation of rotation periods has a decreasing trend over time (annual increment will diminish), b) increase the risk of catastrophic C loss due to disturbances, and c) in case of complete stop of management have severe negative effects on other services from forests to society. The change to other tree species will require reductions in existing C stocks and thus is not a significant short-time contribution, but may pay off in the long run.	Box text has been largely revised for a more consistent and logical structure. While not verbally following the reviewer's suggestions, it follows his/her guidance.

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
646	149	36	149	46	Please consider deleting this paragraph. "Unmanaged forest" is not a viable solution for climate change mitigation. First, forestry today is multi-purpose and generates a lot of benefits for society that would be forgone in case management was halted. Second, the "natural potential" under climate change is unknown, as it is depending on species choice, disturbance regime, climate change trajectory, among other influences, and thus can not be estimated reliably. Third, "natural succession" may be an aspect with "afforestation" / LUC to forest, but not with existing forests because in case of succession (which means: regeneration) they would loose carbon. The future development of existing forests (with their managment history) is more acurately just termed "growt", not "succession". All this makes this concept rather theoretical and limits its usefulness for practical policy advice.	Box text has been largely revised for a more consistent and logical structure. In consequence, also the paragraph in question has been fully rewritten, while some of the contents have been maintained.
647	149	36	149	36	he statement for some natural potential is not fully re-conciled with page 150 / 18-27. There are opinions stated, and rather vague statements such as machine-learning models presumingly confirming them.	Box text has been largely revised for a more consistent and logical structure. In consequence, also the paragraph in question has been fully rewritten, while some of the contents have been maintained.

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
648	149	46	149	46	The conclusion of a biomass gap of 30% due to non-management is NOT confirmed. Only 8 lines above it is argued that Erb 2004 has a systematic flaw. It collects data from stands in the max biomass state. ... The argument is clearly made in lines 36ff. Moreover, for both unmanaged and managed forests a disturbance regime needs to be considered. Ignoring disturbances yields big numbers on paper, do not reflect reality.	in the revised box (better structured) we argue that there are two contradictory positions, which both have some value. The reviewer seems to represent one of these positions. However, the second position is well supported by scientific literature and is used widely in IPCC assessments. It cannot be ignored.
649	149	21	149	21	What is a long-term carbon sink? Which time frame are the authors talking about? Please specify!	changed to "permanent" - this term more clearly expresses what is needed here
650	149	36	149	46	This paragraph seems strange to me. In lines 36-38 the authors report obvious shortcomings within the paper by Erb (2004). However, in lines 42-44 the authors use the main result of this criticized paper to determine the gap between potential and actual carbon stock auf Austrian forests. To emphasize the "correctness" of the Erb (2004) paper, the authors refer to another paper by Erb et al (2018) and to two other papers. They authors state: "... remains in agreement with the results presented by Erb et al (2018)..." and "... seems to confirm such a difference". These statements are rather vague and questionable. Why do the authors not report the values for potential carbon stocks as reported in Erb (2004)?!	thanks for noting the discrepancy. We have revised the whole text of teh box for improved logics, it now should be better able to logically and consistently display the two existing different views on the same topic.
651	149		150		Please add confidence statement(s)	Confidence statements have been added to Box 2.2
652	149	18	150	32	Confidence statements (or evidence / agreement) are missing in the box, please provide them	added as suggested

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
653	150	1	150	1	What is "potential vegetation"? For a non-expert reader this might be unclear by this poor formulation. You may change to "potential future forest vegetation composition"	"potential vegetation" in revised version is better defined, but term needs to remain consistent with the scientific literature
654	150	12	150	12	the unit of "residence time is missing" in this sentence. 27-286 years?	sentence deleted
655	150	34	150	34	"Revising" should be replaced with "Adapting" at the beginning of the sentence.	modified as suggested
656	150	37	150	39	not clear if this (Braun) is about Austrian forests or global. Please add Austria somewhere.	modified as suggested
657	150	1	150	1	The first sentence does not make much sense as an introduction to the following paragraph. The term "potential vegetation" is misleading. I suggest to reformulate to: Projections of forest development and related carbon dynamics are challenging.	"potential vegetation" in revised version is better defined, but term needs to remain consistent with the scientific literature. The sentence the comment is referring to has been deleted.
658	150	16	150	17	Do you mean simultaneously? Please add or make more specific. Otherwise the sentence is very unspecific and not a good summary of the well differentiated discussion above.	Box text has been largely revised for a more consistent and logical structure. In consequence, the discussion on wood products has been removed as outside of the system boundary (as also explained).
659	150	19	150	19	Again, term "potential vegetation" here is misleading. I think potential biomass stocks would be a better term.	"potential vegetation" in revised version is better defined, but term needs to remain consistent with the scientific literature
660	150	24	150	24	Why without deadwood? I think a comparison of total biomass C would be more appropriate.	Basically we agree with the reviewer, but only can use data as available

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
661	150	28	150	32	The paragraph is incomprehensible. I suggest the following reformulation: A specific challenge of natural climate solutions in Austrian forests relates to implementation of adaptation measures in forests. The management legacy resulted in X ha of monocultures of spruce in lower altitudes that are considered not resilient under climate change and need to be converted to mixed forests. The introduction of additional species typically requires a reduction of carbon stocks to achieve more resilient forests and more permanent carbon stocks thereafter. Strategies need to consider these time dynamics to achieve effective mitigation.	Box text has been largely revised for a more consistent and logical structure. In consequence, also the paragraph in question has been fully rewritten, while some of the contents have been maintained.
662	150	49	150	50	Unclear. Do you mean that it is unclear whether it is included in potential studies that do not differentiate results?	revised the sentence, added reference.
663	150	2	150	3	Wind throw and bark beetle are mentioned in several chapters of the report. It would make sense to use them as an opportunity for cross references.	we agree that cross-references are useful, but here the box needs to be referenced rather than the box referring to other occurrences
664	150	44			This needs some editing to better understand why this was included in the report.	we added "currently" to clarify the relevance for today.
665	150	12	150	12	27 and 286 years?	sentence deleted
666	150	8	150	17	Dead wood stocks will be more dynamic in the future, see e.g. Harmon et al. (2020, doi: 10.1186/s13021-019-0136-6) for a detailed discussion.	Reference has been included.

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
667	150	18	150	27	Please consider deleting this paragraph. As you state, data for comparisons is lacking and there is a possibility of strong decreases in C stocks after cessation of management. Both aspects disqualify this approach as mitigation measure. Or do you want to show that this approach is - friendly speaking - not optimal? In this case, the message needs to be elaborated more stringent and more clearly.	Box text has been largely revised for a more consistent and logical structure. Yet the discussion on primeval forests has to be kept - after all, there is no "optimal" method. The idea of using "potential vegetation", to be validated by investigating primeval forests, is consistent with a large body of scientific literature that has been used by the IPCC assessments.
668	150	28	150	32	Please elaborate this further, as this is the more relevant approach then comparisons with "potential vegetation" or the like. The leading question for the decades to come more likely is "what can we achieve from what we have?", not "what could be if ...". Here, e.g., current annual increment and its development over time would be more interesting than maximum C stocks.	Box text has been largely revised for a more consistent and logical structure. But please note that the purpose of the box is to clarify C sequestration potentials, as this topic has been approached from two different, seemingly incoherent perspectives in the past. This cannot be resolved by ignoring.
669	150	24 --> 34	150	43	Please delete or revise this paragraph. A salready stated, myximizing biomass stocks is not the most efficient measure in climate change mitigation with forests. And: How ist the "forest sector" defined here? Including / excluding HWP, substitution, ...? If the debate would be oriented on sufficiency, the focus would shift from forest alone (wood use) to "how can something be realized most climate friendly".	The paragraph was revised thanks to other review comments. We further clarified the definition of the forest sector and the components that Braun et al. refer to.
670	150	29	150	32	I am not sure what this statement means.	approved / see response to comment 661
671	150	39	150	39	I remind that the report by Kirchmeir was not well received.	comment unclear
672	150	39	150	39	see comment to 117/19	comment unclear

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
673	150	43	150	43	... is a ref to 'upcoming' admitted?	deleted the reference to an upcoming publication
674	150	3	150	3	are it 0.4 t C / ha?	Done
675	150	8	150	8	The data of CareForParis fully account for dead wood and follow the rules of the Good Practice Guidance of the IPCC. - A comment may be noted: deadwood is a stock of carbon, but is not taking up CO2 but is releasing it.	approved. We clarified that C4P accounts for deadwood (though the data is not available)
676	150	31	150	32	what is exactly meant by the authors?	deleted
677	150	8	150	8	The statement on deadwood is not correct. The figures in the CareForParis study (BFW, 2020a) do include standing deadwood.	approved. We clarified that C4P accounts for deadwood (though the data is not available)
678	150	30	150	30	It's unclear what is meant by "time constraints of carbon sequestration"	deleted
679	150	12	150	12	residence time 27 and 286? I suppose these are years? Please add a unit	sentence deleted
680	151	16	151	17	Suggest deleting the sentence "Producing sawn timber..." Instead, I suggest pointing to the need of compensation payments and incentives for achieving climate change mitigation goals in forests, followed by the sentence on the EU programme.	sentence was deleted
681	151	17	151	18	Which "European Commission Compensation payments" you refer to? Which programme or regulation?	We deleted "European Commission"
682	151	42	151	43	Replace insecurities with uncertainties. I suggest referring to Austria's National Inventory Report 2023 that provides information on agriculturally uses organic soils. About 13.000 ha of organic soils are reported there, used as grassland.	thank you! We corrected the language and added the value and reference.

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
683	151	27	151	27	The chosen unit is difficult to interpret. Increments are usually given for area time, not for length time. Only then can be established whether the unaccounted hedgerows represent a 'major gap'.	We added "with basal areas of 22.1-44.9 m ² /km" so that the reader can have an idea of the area corresponding to the length of the hedgerows. We also replaced Mg with tC. It is unclear whether the reviewer is also concerned with the timeframe. The reference unfortunately does not provide information on the time periods covered. It states that no tree exceeded an age of 100 years in their sample. Added: "However, no time-frame is given for this estimate".
684	151	1	151	3	are there quantities available from the 5 references?	inserted values provided in the literature
685	151	17	151	17	"[REF needed]. " please provide reference	We deleted the sentence
686	151	17	151	17	Reference missing	We deleted the sentence
687	152	46	153	2	This reasoning can be debated. If there are incentives or regulations to discourage certain energy sources, then the replacement can be calculated against these sources. For example, if "bioenergy" is aimed to replace lignite, then it would be justified to calculate a specific substitution effect and to not use the general energy mix. Missing in this paragraph is as point c) that the calculation also depends on how the substitution is calculated (system boundaries, norms and regulations adhered to).	Section has been deleted and replaced with the overview of mitigation potentials at the beginning of 2.3.
688	152	13	152	13	there is a 'high confidence' statement without a reference.	Two references have been added
689	152	47	153	1	What happens if there is no sunshine or no wind? Now powerplants based on fossil fuels are used for net stabilization, in a decarbonated energy system bioenergy does this job	Section has been deleted and replaced with the overview of mitigation potentials at the beginning of 2.3.

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
690	153	14	153	16	This paragraph raises many problematic questions: - How shall a reduction of consumption be achieved when the population is constantly increasing? - How will the authors convince this increasing population to consume not only less livestock products but also less plant-based products? - In the face of ongoing soil sealing that continues to reduce agricultural area without shifting anything - is this loss of agricultural area not difficult enough to catch up with the increasing food demands? - A large fraction of Austrian grasslands has no other good use than to feed livestock - a shift to plant-based proteins will not work on these (high-altitude, steep) areas. - The (desired, but also necessary) shift from conventional to organic agriculture will rather need more, not less agricultural area for food production. At first the authors should provide plausible answers to these questions before making inconsiderate claims without providing realistic pathways for implementation.	Section has been deleted and replaced with the overview of mitigation potentials at the beginning of 2.3.

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
691	153	32	153	32	A shift to 100 % organic agriculture is wishful thinking. Why don't the authors feed their models with more realistic scenarios, e.g. 50 or 75 % organic agriculture? Even this would be a great achievement, if it could become reality, but we are a far way off. Do the authors have own experience with implementing organic agriculture? If not, why do they spoil the outputs of their own models by feeding unrealistic inputs?	Section has been deleted and replaced with the overview of mitigation potentials at the beginning of 2.3.
692	153	27	153	30	Links with other sections on the CO2 sequestration potential of forests would be useful here (sections 1.6.2, 2.1.1.2). As section 2.3.4.1 is well structured, it could possibly also be used for structuring/overview purposes.	Section has been deleted and replaced with the overview of mitigation potentials at the beginning of 2.3.
693	153	25	154	23	Please rework this section and figure 2.9. There are four measures given (page 154, l. 27 - 37), but only three can be identified in figure 2.9 (sgri-PV is missing). Please correct this.	Section has been deleted and replaced with the overview of mitigation potentials at the beginning of 2.3.
694	153	36	153	36	Is there any further information on this? Land requirements etc. This seems to be a highly relevant topic e.g. in the context of technological considerations for trucks	Section has been deleted and replaced with the overview of mitigation potentials at the beginning of 2.3.

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
695	154	4	154	9	The mitigation strategies are described but give no broad assessment. Chapt 5 of the Special Report Landuse makes clear statements: on p. 289 of SRLU the role of an appropriate age structure for carbon sequestration in the biomass. The reduction of wood harvests leads to an elongation of the rotation period. This is critically described in SRLU p. 290 where the increased risk of disturbances is elaborated. It may be noted that reduction of wood harvest is not among the measures elaborated in Chapter 4.2 of the Special Report Land use. Using the paper of Peng for an Austrian Assessment Report is a strange choice. The authors may read the blog of Brent Sohngen that is very critical (https://u.osu.edu/forest/2023/08/08/why-global-wood-harvests-arent-emitting-3-5-to-4-2-gt-co2-per-year-in-net-emissions/). Sohngen dryly finishes with "No doubt, the press will continue loving what Peng et al. estimate because it sounds big and problematic, when it's just a restatement of an earlier incorrect argument. Hopefully, though, in the policy arena, real science will prevail." -- It is to be hoped that the authors of Chapter 2 of AAR are reflecting on that.	Note to the sub-point to Peng/Sohngen: we decided to keep the quote at another position, because the Peng study is internationally published. We quoted it for their conceptualization of the interrelations of harvest and C-sinks/stocks. The Sohngen blog entry itself can hardly be used as a source for an assessment report, in contrast to peer reviewed literature. Still, please note that there is a commentary/ reply to the Sohngen blog entry, that legitimates why it is still relevant in our chapter: https://www.wri.org/technical-perspectives/wood-harvest-emissions-economic-vs-biophysical-models. The key points in this reply: emissions and avoided emissions are confused, but most not; the key elasticity as assumed by Sohngen is based on a misinterpretation of the underlying study by a factor of 75, and there is a structural bias in the Songhen model. For the conceptulazation, we decided to keep the Peng study.

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
696	155	20	156	2	It is unclear on which data-base the results, which are presented in figure 2.10, were calculated. Is this taken out from a publication? - then please provide the reference. Anyway, please clarify this or remove the figure and according text. "Upcoming" materials (whatever "upcoming" means here) cannot be verified by a reviewer and shall therefore not be included into the second order draft of an assessment report! As the whole chapter is based on these "upcoming" results, the majority of the chapter text is not based on published evidence, hence questionable!	Section has been deleted and replaced with the overview of mitigation potentials at the beginning of 2.3.
697	155	20	155	20	"harverst" spelling in the agenda of the figure 2.10	Section has been deleted and replaced with the overview of mitigation potentials at the beginning of 2.3.

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
698	155	1	156	22	This section is problematic and should be thoroughly revised. First, forestry here is supposed to primarily fulfill a role as C sink. This is a violation of the concept of multipurpose forestry that to my knowledge prevails in Austria. It seems to be neglected that, to reach certain desired states and provisions (like adaptation, resilience, income, ...) some measures must be taken and some trees must be cut, no matter what would be preferable for C sequestration. This isn't even acknowledged in this section, but should be. Second: it is neglected that the sink strength in this approach will not only saturate, it will continuously decrease from the beginning as the forest ages due to reduced harvests. Third: there is no regard of the risks contained in this approach. The "carbon opportunity costs" thus do not only "hinge on how wood is used". Fourth: the concept of substitution is problematic because there are wood uses that can not be substituted. It is not clear how you deal with this problem. Fifth: from a sufficiency point of view, reducing biomass use to reach sink goals bears the risk of increasing the use of other materials (negative substitution) and either increase emissions in other sectors, or, because of disparity in emissions, reduction of overall provision of goods and services (which means: loss of welfare).	Section has been deleted and replaced with the overview of mitigation potentials at the beginning of 2.3.
699	155	21	156	2	Please revise figure and text. There are no positive values given anywhere, so "Total greenhouse gas emissions (+)" is superfluous. Please check and explain or correct: in the inset, (negative) values range from -4.1 to -6.2, but this is linked to -11.1 and -14.4 in the panel on the right. In addition, it is not clear why "low displacement" results in a lower sink then "current harvest", as under current conditions there already is some displacement and this should not be reduced.	Section has been deleted and replaced with the overview of mitigation potentials at the beginning of 2.3.

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
700	155	4	155	428	The text seems to contradict the figure: The text quite plausibly states that material use of wood products has higher mitigation potential than energy use. However according to the figure higher material use performs worse.	Section has been deleted and replaced with the overview of mitigation potentials at the beginning of 2.3.
701	155	23	155	23	Overloaded image. Too small font size. Consider enlarging or reducing content.	Section has been deleted and replaced with the overview of mitigation potentials at the beginning of 2.3.
702	155	17	155	17	what exactly are carbon reserves?	Section has been deleted and replaced with the overview of mitigation potentials at the beginning of 2.3.
703	155	1	156	3	The section describes a calculation referring to Roux (upcoming). The text is not yet available and can therefore not be reviewed. In the caption of figure 2.10 it is said that details on the methods will be made available later. For a review this is a difficult situation because it cannot be evaluated whether or not the chosen method is strong enough to derive valid conclusions. The authors may want to check the cut-off dates for the admitted publications.	Section has been deleted and replaced with the overview of mitigation potentials at the beginning of 2.3.

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
704	155	3	155	3	The study by Roux (not accessible) has been used in Steiniger 2024. Some hints on the methods are given there. Obviously, some graphs of Weiss 2020 were visually inspected, data on the standing stock, the growth rate, and the harvesting level were collected from the Austrian Forest Inventory, presumably from www.waldinventur.at. It is not clear which climate scenario has been used. There are many choices, even within the RCP45 and other RCP families. The choice of the scenario needs to be justified. Weiss 2020 describes the work process of CareForParis as combination of a forest growth model, an economic model, and a LCA. There are many non-linear functions employed. It needs to be assessed thoroughly whether or not the model used by Roux is working at a sufficient level. In Steininger 2024 the authors mention that a 'simple model' has been used. - It may require an additional review loop to honor the outcomes of Roux. Presently, we see an desirable outcome (high C sink) but we have no way of evaluation.	Section has been deleted and replaced with the overview of mitigation potentials at the beginning of 2.3.

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
705	155	3	155	20	The CareForParis study is described in Weiss et al 2020 and also in Box 5.1 of the Special Report Landuse. The description of the modeling results of Roux should reach a similar level of quality. Now referring to the Box 5.1 of the Special Report Land Use - information of times are highly uncertain (p. 286). --Roux gives precise answers for 2040 and 2070 - reduction of harvest of little long-term relevance. The substitution effect of wood for energy and products is higher than the effect of C accumulation of biomass; an analysis focussing on biomass only is incomplete. The entire value chain needs to be evaluated. (p. 287). -- Roux looks at biomass only.	Section has been deleted and replaced with the overview of mitigation potentials at the beginning of 2.3.
706	155	21	155	21	The authors may want to check Fig 2.10 for typos.	Section has been deleted and replaced with the overview of mitigation potentials at the beginning of 2.3.
707	155	26	155	26	In Steininger et al 2024 the wood energy substitution is natural gas. A renewable fuel source is compensated by a fossil fuel.	Section has been deleted and replaced with the overview of mitigation potentials at the beginning of 2.3.
708	155	15	155	15	a relevant question is WHERE wood harvest is reduced and what is expected to happen in the long-term. This question brings the reflection of disturbances back to the attention.	Section has been deleted and replaced with the overview of mitigation potentials at the beginning of 2.3.

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
709	155	18	155	22	Are Austrian conditions well reflected here? The authors may include the relevant information that wood for energy is mostly (80%?) a side stream of timber processing. The larger part of wood that is directly used for energy is fuel wood that is retained by forest owners to cover their own needs, or damaged wood after disturbances where no alternative market is available. I wonder what an socio-economic C pool could be.	Section has been deleted and replaced with the overview of mitigation potentials at the beginning of 2.3.

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
710	155	3	155	3	The description of the study of Roux is supported by three refs. - Weiss -- final report on CareForParis - Erb et al CCCA Factsheet - Steininger et al NKEP Weiss is drawing conclusions that are deviating diametrically from Roux. It appears frivolous to cite Weiss in the context of Roux. Erb et al is a Factsheet of the CCCA, and not a scientific publication. Several errors have been reported to the CCCA. The critique on the Factsheet is available in the records of the CCCA. Steininger et al is an opinion text by the CCCA. It has a chapter on forestry. It is noted that the chapter is authored by Erb, Lauk, Magerl, Mitter, Sinabell (wrongly listed as Sinabel), Tappeiner. Noone among the authors is a forestry expert. Obviously, the authors volunteered on contributing text to the NKEP, but there was - to my knowledge - no review.	Section has been deleted and replaced with the overview of mitigation potentials at the beginning of 2.3.

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
711	156	17	156	17	You could add here the estimates of the Carbon Balance Indicator by Soimakallio et al. 2022 that reviewed 45 simulation studies and compared differences in forest carbon and amount of wood harvested between harvest scenarios of different intensities for different time perspectives. The results show that increased harvest reduces carbon stocks over 100 years in temperate and boreal forests by about 1.6 (stdev 0.9) tC per tC harvested. Soimakallio et al. (2022) Closing an open balance: The impact of increased tree harvest on forest carbon. https://doi.org/10.1111/gcbb.12981	Section has been deleted and replaced with the overview of mitigation potentials at the beginning of 2.3.
712	156	23	156	23	The section 2.4 does not explicitly refer to the lock-in challenge of biomass use in Austria. The sections before describe the issues with bioenergy, especially from forestry and the low performance for mitigation with increasing decarbonisation in other sectors. But biomass is the largest renewable energy source and increasing. I think this should be mentioned and discussed in 2.4	RC712 rightly pointed out that this section does not look into forestry-based biomass. We adapted the title and the introductory text to specify the focus on agricultural land use systems serving as an example to look into barriers and enabling conditions. I have added a sentence in the introductory section above and suggested a specification for the title.
713	156	13	156	17	The 'foregone carbon sink' uses a scheme where aging forests accumulate biomass for some time and later they maintain the biomass at a high level according to a saturation function. Ecosystem dynamics are not reflected. The idealized nature of the function as shown in Mitchell 20212 and Erb 2022 should be mentioned.	Section has been deleted and replaced with the overview of mitigation potentials at the beginning of 2.3.

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
714	156	20	156	21	Here I miss the paper by Churkina et al. 2020. [Churkina G., Organschi A., Reyer Ch.P.O, Ruff A., Vinke K., Liu Z., Reck B.K., Graedel T.E., Schellnhuber H.J., 2020. Buildings as a global carbon sink. Nature Sustainability. DOI:10.1038/s41893-019-0462-4]	Section has been deleted and replaced with the overview of mitigation potentials at the beginning of 2.3.

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
715	156	3	156	17	In this section the authors conclude that the mitigation potential of increasing carbon stocks in forests is higher in the short term than in the long term. This statement is mainly based on a paper by Mitchell et al 2012. In this paper the development of the potential carbon stock of an unmanaged stand is depicted by a typical growth curve approaching an asymptotic carbon stock. However, this is unrealistic since it ignores natural disturbances. So, in many cases the carbon stock reaches a maximum and then declines due to disturbances. Moreover, the model by Mitchell et al 2012 always assumes that carbon stock increases when management is abandoned. However, whether the carbon stock increases or decreases after abandonment of forest management depends on the initial situation at the time of abandonment. The authors cite the study by Weiss et al. (2020) who found a particularly strong sink effect until 2070 (after 60 years of simulation), when the harvesting level is reduced. After 2070 the sink effect of Austrian forests starts to decline. In a comparable study for Switzerland (Taverna R., Hofer P., Werner F., Kaufmann E., Thürig E. 2007: CO₂-Effekte der Schweizer Wald- und Holzwirtschaft. Szenarien zukünftiger Beiträge zum Klimaschutz. Umwelt-Wissen Nr. 0739. Bundesamt für Umwelt, Bern. 102 S.) the scenario with reduced harvesting led to an increase of the carbon sink only for 15 years. After that time the sink effect started to decline. The reason is that Switzerland has a higher proportion of mature forest stands than Austria. Hence, the generalization in lines 3-6 is not appropriate.	Section has been deleted and replaced with the overview of mitigation potentials at the beginning of 2.3.
716	156	18	156	22	Maybe consider this as a key message ?	Section has been deleted and replaced with the overview of mitigation potentials at the beginning of 2.3.

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
717	157	37	157	37	How do you want to convince the Austrian population that diet preferences should be regulated by laws? Do you have any positive example that this works? Please stay on the ground of reality!	This sentence refers to an empirical media analysis of news paper articles published between 2000 and 2019 that look in evolving informal and formal institutions. The authors state an absence of formal institutional change. The sentence is slightly revised to mitigate the author's slightly normative conclusion. Slightly revised sentence to mitigate the author's normative statement: "A media analysis of three Austrian newspapers published between 2000 and 2019 show evolving informal institutions, such as behavioral norms embracing meat-free or reduced-meat diets and no changes in formal institutions, such as regulations and other policy interventions."
718	157	11	157	11	Tappeiner et al 2024 is not a correct citation of the Special Report Landuse.	Changed to Jandl et al.

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
719	157	4	157	6	I do not understand the meaning of this sentence.	Revised and hopefully clearer sentence: In contrast to the strong influence of sector-specific goals and interests, spatial planning struggles to fully assert its organizing and coordinating functions, significantly limiting its ability to mitigate trade-offs across sectors and ensure climate-friendly decision making (Svanda and Zech, 2023)
720	158	44	158	46	with transformation impacts on regional development Schipfer, F., Pfeiffer, A., Hoefnagels, R., 2022. Strategies for the Mobilization and Deployment of Local Low-Value, Heterogeneous Biomass Resources for a Circular Bioeconomy. Energies 15, 433. https://doi.org/10.3390/en15020433	Reference has been included.

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
721	158	40	158	42	The 2nd part of the sentence "albeit its (isolated) contribution in fostering the transformation is partly only weak to moderate" needs more elaboration. Why is education or its contribution to a transformation isolated and in which regard? The cited reference refers only to "Landnutzungsentscheidungen". Can this be generalized?	The sentence was meant to indicate that providing information is, although necessary, not sufficient to drive a transformation of the land use system. The stated Reference (Jäger et al. 2024 = SRLU Chapter 6) states: "Es zeigte sich jedoch, dass die reine Bereitstellung von Information kaum ausreicht, um Fleischkonsum (Downs et al., 2009; Marteau, 2017) oder Lebensmittelabfälle (Stöckli et al., 2018) zu reduzieren." The sentence has hence been moved down the paragraph and changed to: "however, providing information is hardly sufficient, to steer transformations such as reducing the production and consumption of meat and avoiding food waste (Jäger et al., 2024) ."
722	158	24	160	28	Please mention agri-PV as an example where the land conflict can be successfully avoided.	Have added agrivoltaic as an example for an innovation.
723	159	12	159	12	Are the authors not aware that BML and BMK currently are different ministeries? If they speak of the past, they should refer in more detail which years they are speaking about.	Adding the years clarifies that this sentence is about the past. The year (2000-2020), when environment and agriculture were in one Ministry were added.
724	159	3	159	3	Please add cross-reference to chapter 6 incl subsection	Cross reference has been included
725	159	26	159	36	Please add cross-reference to chapter 6 incl subsection	Cross reference has been included
726	159	37	159	43	Please add cross-reference to chapter 6 incl subsection	Cross reference has been included

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
727	160	31	160	31	The term "galloping effects of climate change" rather suits to yellow press than to an assessment report. Such an expression in the first line of a cross-chapter box raises doubts about the scientific character of this section.	I changed it to "massive"

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
728	160	0	160	0	water borne disease in Austria is understudied however there are references esp. concerning V. cholerae non-O1-non-O139 See: Hirk S, Huhulescu S, Allerberger F, Lepuschitz S, Rehak S, Weil S, Gschwandtner E, Hermann M, Neuhold S, Zoufaly A, Indra A. Necrotizing fasciitis due to Vibrio cholerae non-O1/non-O139 after exposure to Austrian bathing sites. Wien Klin Wochenschr. 2016 Feb;128(3-4):141-5. doi: 10.1007/s00508-015-0944-y. Epub 2016 Jan 29. PMID: 26825075; PMCID: PMC4771811. Le Roux F, Wegner KM, Baker-Austin C, Vezzulli L, Osorio CR, Amaro C, Ritchie JM, Defoirdt T, Destoumieux-Garzón D, Blokesch M, Mazel D, Jacq A, Cava F, Gram L, Wendling CC, Strauch E, Kirschner A, Huehn S. The emergence of Vibrio pathogens in Europe: ecology, evolution, and pathogenesis (Paris, 11-12th March 2015). Front Microbiol. 2015 Aug 13;6:830. doi: 10.3389/fmicb.2015.00830. PMID: 26322036; PMCID: PMC4534830. Rehm C, Kolm C, Pleininger S, Heger F, Indra A, Reischer GH, Farnleitner AAH, Kirschner AKT. Vibrio cholerae-An emerging pathogen in Austrian bathing waters? Wien Klin Wochenschr. 2023 Nov;135(21-22):597-608.	References added in section 2.2.3.

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
729	160	40	160	41	Ballester et al. (2023) should be added as reference (https://www.nature.com/articles/s41591-023-02419-z) to avoid confusion since the AGES report different numbers for Austria and the summer of 2022.	Thank you. I added the reference.
730	160	42	160	42	heat impact on pregnant women	yes. Might be! Certainly an effect on the unborn child: reduced birth weight, preterm birth when heat in late pregnancy.
731	160	36	160	36	all box: please reflect / cross-reference on the disparities of health impacts from climate change/temperature extremes in terms of socioeconomic characteristics and adaptation potentials: e.g. poorer & more vulnerable groups are hit by more extreme temperatures/lower night time cooling opportunities, especially in Vienna (urban heat island effect),	A few lines further on, we wrote: "Those most severely affected by heat stress are (...)." I added a sentence on socioeconomically disadvantaged. I added following sources: Gronlund CJ. Racial and socioeconomic disparities in heat-related health effects and their mechanisms: a review. Curr Epidemiol Rep. 2014;1:165-73. de Schrijver E, Royé D, Gasparrini A, Franco OH, Vicedo-Cabrera AM. Exploring vulnerability to heat and cold across urban and rural populations in Switzerland. Environ Res Health. 2023;1:025003-25003. Ellena M, Breil M, Soriani S. The heat-health nexus in the urban context: A systematic literature review exploring the socio-economic vulnerabilities and built environment characteristics. Urban Climate 2020;34:100676.
732	160	38	160	39	"heavy rains and droughts, will likely increase due to climate change therefore intensify their direct impact on human health and well-being" please add cross reference to chapter 1 - 1.2	I added the link.

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
733	160	40	160	40	"the most important impact of climate change on health is due to heat and heat waves. " - please add confidence statement (evidence / agreement)	I added robust evidence and high agreement.
734	160	41	160	45	please add confidence statement (evidence / agreement).	I added medium evidence, high agreement.
735	160		166		CCbox "Health and climate change": please try to avoid review style e.g. paragraph on air pollution.	Assessment style has been implemented throughout
736	161	18	161	18	The societal polarization around climate change issues is likely to deteriorate human wellbeing as well. There is evidence that climate change increases polarization (e.g. Wong-Parodi & Feygina, 2021), and that polarization in turn increases stress and anxiety (e.g. Fraser et al., 2021). In addition to the polarization along the gap between leftism and rightism, many young people suffer from the impression that the elder generations and the government do not take care of them and do not take their worries seriously (Hickman, 2020, Hickman et al., 2021). Fraser, T., Aldrich, D. P., Panagopoulos, C., Hummel, D., & Kim, D. (2022). The harmful effects of partisan polarization on health. PNAS nexus, 1(1), pgac011. Hickman, C. (2020). We need to (find a way to) talk about... Eco-anxiety. Journal of Social Work Practice, 34(4), 411-424. Wong-Parodi, G., & Feygina, I. (2021). Engaging people on climate change: The role of emotional responses. Environmental Communication, 15(5), 571-593.	We included the proposal and the references as suggested

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
737	161	1	161	5	The abbreviation "GWL" should be explained in the subheading of CCBox 3 Figure 1.	GWL is used all along the report, and explained at the beginning of the report.
738	161	7	161	10	please add confidence statement (evidence / agreement).	I added high confidence, strong agreement
739	161	11	161	12	"While effects of temperature extremes on well-being, productivity, and physical health are already well understood" possible to add a confidence statement ?	The confidence is explained in the sentence itself.
740	161	19	161	21	": with increasing average temperatures the threshold beyond which an increase in daily mortality is observed is also increasing (Weitensfelder and Moshhammer, 2020)." - please add a confidence statement	I added (limited evidence, high agreement)
741	162	30	162	30	the role of black carbon should be highlighted. In Austria it is produced by wood burning and Diesels still without filters. Proven as Kat. 1 carcinogen, measures should be done as in switzerland (retrofit diesels, control wood ovens)	It is not clear to me how black carbon will be affected by climate change. Yes, I agree that black carbon would be a relevant indicator of air quality but in Austria, we lack data.

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
742	162	3	162	3	Please explain what the consequences of the development described in the paragraphs would be. Would this result in 1, 10 or 1.000 DALY per 1.000 people? Increase the risk of lung cancer? What is / are the "take home message(s)"?	Clearly, in terms of quantitative health effects, extreme temperatures are the most important. In this paragraph, we discuss air pollution as an example. While air pollution in general has a clear effect on health (maybe not as large as that of extreme temperatures, but in the same order of magnitude), changes in air quality due to climate change are minor and hence the health effects of CC-attributed air pollution is likely also minor. The topic is still important. Not because the large absolute impact on health, but because possible win-win measures that both mitigate climate change and are beneficial to air quality.
743	162	1	162	2	"Individuals most vulnerable to high temperatures have already died in previous heat-waves, leaving the remaining population more resistant to upcoming heat-waves. " please add a confidence statement	This is a personal interpretation with not much published evidence to support it. There is evidence on short (days) and middle-term (months) "harvesting", but not of long-term harvesting so far. But it does sound plausible to me. Therefore, I added: (little evidence except for short-term mortality displacement up to several months, but high plausibility)
744	162	16	162	17	". Most of the studies demonstrated a clear (over-additive) effect of ozone and heat." plesse add a confidence statement	The confidence is explained in the sentence itself (most for agreement and 45 studies for evidence)

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
745	162	26	162	27	"Since the fraction of secondary aerosols to total aerosol concentration can be high (Spangl et al., 2006) ..." please add reference Liu, Z., Rieder, H.E., Schmidt, C. et al. Optimal reactive nitrogen control pathways identified for cost-effective PM2.5 mitigation in Europe. Nat Commun 14, 4246 (2023). https://doi.org/10.1038/s41467-023-39900-9	thank you! We added the reference.
746	162	40	162	41	"Currently, wild fires are not yet perceived as a grave risk to health in Austria, but this could change in case of severe climate change (see Sections 1.6.2 and 2.2.2.5). " - please add confidence statement and add cross reference to 2.2.2.7	I added the cross-reference. I hope the confidence statement is provided in the respective chapters!
747	162	42	162	43	Please add cross reference to subsection in chapter 2 where it is described that pollen will become more allergic due to climate change	Cross reference has been included
748	163	15	163	15	community preparedness is lacking here too. Who knows that you have to leave rooms with windows if a tornado is on the way? People are in danger of drawing in cellars in case of flooding	Thank you for this comment. It is unclear what the reviewer is concretely suggesting.
749	163	37	164	1	This Table is somewhat confusing. Unlike the title suggests, I do not see any mitigation measures, but instead targets for active mobility etc. are shown. If such concise numbers on the mitigation potentials are being used, these should be cross-checked with other chapters (3/8/?). Or alternatively, the column with the mitigation potentials could also be left out, as anyways the health benefits are central here. Also potential overlaps (synergies or inconsistencies) should be checked with the SDG crosscut	This table was a wish of the co-chairs and is central to the report. However, I do not understand why you do not consider green transport or healthy diet a mitigation measure!

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
750	163	7	163	9	Böse O'Reilly et al. (2023) (https://www.frontiersin.org/journals/public-health/articles/10.3389/fpubh.2023.1210072/full) investigated the impact of flood on mental health among young adults in Simbach am Inn (Bavaria, Germany). Maybe an interesting reference?	This is a new paper. Thank you for pointing it out! We added it to the reference list!
751	163	23	163	25	"this will finally also have consequences for public health in Austria, be it because of an increasing risk of (novel) pandemics or be it because of demographic and cultural pressures due to migration (Haas et al., 2019)." - Please add confidence statement	confidence statements have been added (little evidence, high agreement)
752	163	31	163	34	please add confidence statements	This is an introductory sentence with the details given in the table. The estimates come from single studies, so the absolute numbers are based on few/single papers, hence "little/poor evidence", but in my mind we selected examples with high agreement on the overall direction of the effects.
753	164	21	164	21	"As urban greening substantially influences the distribution of solar energy in urban areas" -> I do not follow the line of argumentation	I agree that urban greening is not a relevant mitigation measure but rather an adaptation measure. But it not only has a direct effect on local temperatures, but also on citizens' behavior. The sentence was reformulated to reduce confusion.
754	164	11	164	11	please add reference to AQUELLA Graz, Winter 2017, Bernadette KIRCHSTEIGER Anne KASPER – GIEBL Magdalena KISTLER, 2018 CTA-EAC-01/18 https://app.luis.steiermark.at/berichte/Download/Fachberichte/TUWien_Aerosolquellenanalyse_Graz_2017.pdf	we added the reference!

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
755	164	21	164	21	please specify srelevant subsection in chapter 3	We added a reference to 3.2.3
756	164	22	164	24	"health co-benefits are included in those activities like reduced obesity, cardiovascular disease and improved mental health through increased physical activity, cooling spaces (e.g., shaded areas), and social connectivity. " please add confidence statement	confidence statements have been added (little evidence, high agreement)
757	165	9	165	13	Please explain what "Med Ret" stands for.	done!
758	165	6	164	8	please add the relevant subsections in the mentioned chapters: "Chapter 2 (food production), Chapter 3 (buildings, infrastructure, transport of goods and persons or information and communication technology) and Chapter 4 (industry, energy). "	A reference to chapter 2.3 was added. For other chapters, the statement is too general to specify subchapters.
759	166	10	166	12	Please be aware that "vulnerability" is also a function of management (or lack thereof). So please include this aspect in the statement.	Research gap has been rewritten and the role of management has been included.
760	167	3	167	3	3rd last line: especially in and cycling to cities.	yes, we also lack data on number of cyclists. Or rather on distances cycled. This is a problem when you want to do a health impact study on measures in the transport sector. But I find it is not a major obstacle to climate change policy / management.
761	167	4	169	1	For the sake of laymen readers: please include the titles of the SDGs.	Following the guidelines
762	168	1	168	1	SDG 9: "Industry, Innovation, and Infrastructure" are addressed by e.g. changes in the wood-processing industries or along the agri-food-chain, so there should be some references here.	Sentence has been included.

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
763	168	1	168	1	SDG 11: Please do not mix "sink" and "stock"/"pool". Light thinnings may promote annual increment (--> "optimale Grundflächenhaltung" according to Assmann (1961)) and thus increase the sink (annual C uptake by the vegetation) and allows for use of wood in buildings, while leaving the biomass in the forest will ultimately reduce the annual increment and - accordingly - the sink, albeit the pool size may increase.	All have been changed to stocks.
764	202-->207	22	202-->207	22	see comment 115/4	reference to the technical summary has been removed

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
2343	799	5	800	5	I was asked to provide specific recommendations for improving Table A2 in A2.12, but at this stage, I can only formulate general ones: Clarify among the authors, which message you want to transmit with this table, consider which messages it might transmit in the current format, and then simplify, adjust or refine. To help with that, here is what I personally derive from this table: .) Just increasing agricultural production per area results in most GHG emissions. .) (there is no data in the last two rows, thus I - the "a bit above the average interested reader" - am not even starting to think about them and what information they could provide) .) To achieve the highest negative emissions your recommendation is to increase agricultural production per area BUT to decrease it in total AND to use the freed area for SRC in a WEM energy mix .) you wouldn't recommend going for the (more ambitious) Transition mix though .) If we just reduce total agri production, there are positive and negative outcomes; avoiding emissions can only be reached if SRC is implemented in the freed-up areas. .) Then there is the last column, which is separated from the table (I am	Table has been deleted

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
2344	799	6	799	7	Continued comment on Table A2 in A2.12 (which seemed to have been cut due to length): Especially the extra column invites the reader to derive conclusions on an implicit kWh_electric basis, with the definitive result that any surface radiation is best valorized through electricity production via PV. Is this "Dyson-sphere vision" matching the vision of the authors? From a bioenergy perspective, the comparison is too pragmatic. Potential electricity produced holds much less value than chemical energy carriers produced, which can be stored and used in many more ways (versatility) than electricity, also with regard to CO2 avoidance. Plus, there are many more values beside the CO2 and energy value along the supply chain (especially for more hybrid options than bioenergy only). But the biggest interpretation risk for this pragmatic last column and the implicit "Dyson-sphere vision" is, that it puts electricity production before all other biosphere/ecosystem use of land surfaces (including but not limited to for bioenergy use). I can imagine that the signal of this column overshoots any intentions of the authors and holds the potential to backfire considerably.	Table has been deleted

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
2345	800	1	801	1	A2.14. Mitigation potentials of Interdependent measures related to forests and wood use - Table A2. There is no reference where the data of the two tables are extracted or compiled from - please add this information and references.	Table has been deleted
2346	0		0		Up-date references and bring reference list to a level suitable for publication (add missing information, provide all information for each reference, apply the guidelines)	Done
2347	0		0		Up-date figures and table according to the guidelines for submission	Done
2348	0		0		please standardize capitalizing in titles	Done
2349	0	0	0	0	Please use consistent wording for "climate change" vs "anthropogenic climate change"	n.a.
2350	0	0	0	0	consistent structure for CS in KM - e.g. after bold statement	Done
2351	0	0	0	0	Please use the term "federal province(s)" throughout the report when referring to Austria's <i>Bundesländer</i>	Done
2352	1		637		Please note that the ÖKS15 temperature data for all RCP scenarios have a cold bias that cannot be ignored. This bias is inherent in the EURO-CORDEX runs. Based on observations (SPARTACUS), the Austrian annual mean temperature anomaly is already 2°C above 1971-2000, but this temperature increase is not reached until 2068 for RCP4.5 and 2052 for RCP8.5. (RCP2.6 never reaches a 2°C anomaly). Please mention this cold bias explicitly in Chapter 1, 1.2.2. For impact studies relying on ÖKS15, please ensure that GWLs are used and consider the temporal offset with respect to population or infrastructure projections tied to a timescale.	A general sentence mentioning the issue has been added at the beginning of section 2.2., with a link to chapter 1.2.2. References to years removed where these were not necessary.

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
2353	125	11	125	42	Please try to provide quantifications of yield reductions under GWL where possible	We added the sentence: "Literature providing quantifications of yield reductions in permanent crops under different GWL is not available for Austria and represents a major research and knowledge gap."
2354	139	49	139	49	Please provide correct reference (currently Table XX)	Table 2.1
2355	149		150		Please add confidence statement(s)	Confidence statements have been added to Box 2.2
2356	160		166		CCbox "Health and climate change": please try to avoid review style e.g. par	Assessment style has been implemented throughout
2357	5*	14	5	15	This headline does not seem to capture very well the full content below at least for the ag. related parts and seems rather simplified ("avoid consumption/extraction"). What about something like "Tapping far-reaching mitigation potentials in agriculture and forestry requires reduction in GHG intensities and consideration of opportunity costs..."	Thank you, we have reformulated: "Tapping far-reaching mitigation potentials in agriculture and forestry requires structural measures reducing the use of biomass and changing current economic practices and consumption patterns"
2358	5*	23	5	23	Please reformulate, sentence unclear.	Thank you, we have reformulated: "In the currently only available set of model results for Austria, contrasting two scenarios shows..."

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
2359	5*	40	4	44	Is that precise enough “economic growth”? I guess the underlying science refers to specific sectors that draw on ecosystem services, not to the activities of a startup in Vienna. I suggest revision.	Thank you the new key message: "A fundamental conflict unfolds between economic growth and environmental conservation (high confidence). Economic growth, in its current form, drives increased production and consumption and thus land demand, making it a key driver of climate change and biodiversity loss, e.g., due to land-use intensification and land-conversions. Technological improvements that increase yields partly offset land demand, but rebound effects in the land system often annihilate the efficiency gains."
2360	6*	3	6	7	This is somewhat unclear in scope. It refers to mitigation in the headline statement and then to adaptation but mixing heatpumps and AC appliances. Also unclear how noise from such appliances is health relevant. Suggest revision	Thank you here is the revised wording: Local mitigation measures, while benefiting the climate globally, can also exert remarkable beneficial effects on public health locally, e.g., regarding healthy diets or sustainable (pollution-free) modes of transport (high confidence). Nevertheless, poor implementation of measures (both mitigation and adaptation) could also have negative effects on health. Evaluating measures from a health perspective (health in all policies concept) allows to avoid such implementation failures.

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
2361	31*	12	36	2	Wording should be improved, please also check the numbers. My guess is that you want to show these measures together with potential limitations/caveats AND where relevant research gaps. I would not call a research gap a caveat.	Thank you, Tabel has been revised accordingly, Caption is now: "Overview of mitigation potentials of transformations in the Austrian land use systems. Detailed mitigation potentials of each considered study are listed in 2.A.16."
2362	48*	35	48	35	I would not refer to forests as a "permanent" carbon sink since it implies that they could accumulate carbon indefinitely which is not the case. Even to keep the currently stored carbon in the forests will remain a challenge given the expected increase in disturbances etc.	Thanks, "permanent" delted.
2363	48*	45	48	45	what is this number referring to?	Thank you, we reformulated the whole sentence: Stock estimates (Table 2.1) are derived from the volumetric data of the Austrian Forest Inventory using an average conversion factor of 0.345 tC/m ³ (2.9 m ³ =1 tC), a factor taken from 1990 forest inventory data as converted to total carbon (including branches, leaves, roots) by Umweltbundesamt (for 1990, 973 million m ³ and 339 MtC) and which we maintain here for all comparisons.
2364	49*	4	49	4	I guess removal of biomass is meant here, since wording states uptake from atmosphere before, now using only "removal" might be confusing especially since GHG inventories refer to emissions & removals (carbon sequestration) I'd either reword or be more concise here to avoid confusions.	Thank you , we reformulated the sentence: Stock changes reflect C uptake from the atmosphere (e.g., increment) and biomass C removal (harvest, decomposition and depletion).

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
2365	49*	23	49	33	I'm unsure what message this paragraph tries to convey and how it fits in the flow of the box. When listing all the carbon stocks of different forests, would it make sense for comparison to state the carbon stock in Austrian (managed) forests since the last few sentences move in that direction? Overall, would it make sense to move this paragraph a bit below e.g. following "Management decisions allow a managed forest to exceed the C storage of potential vegetation"?	Thank you, paragraph has been rephrased: Data from existing primeval forests in Europe help to quantify this natural potential. Such forests are sparse and small, so results are uncertain and only partially representative. In a meta-study, Keith et al. (2024) present data from 18 sites in Central Europe characterized as primary forests (none in Austria). Several of these sites had carbon stocks exceeding 200 tC/ha, and only 3 sites had less than 150 tC/ha. For the Bialowieza forest in Poland, potential vegetation has been estimated at 189 tC/ha, while current C stocks are considered to be 123 tC/ha, even though the forest has been left unmanaged for centuries (Matuszkiewicz et al., 2021). In Austria, the small area of Rothwald showed an average stock of 175 tC/ha (timber stock decreases of more than 44 tC/ha were observed during a wind throw in 1966) while surrounding managed stands had 266 tC/ha (Schrempf, 1986). Similarly, the Bavarian Forest National Park (Nationalpark Bayerischer Wald) exhibits lower timber stocks (without deadwood) of 96 tC/ha in the unmanaged core zone, compared to 138 tC/ha in the managed zone next to the core zone (Heurich and Sinner, 2005).

APCC AAR2 Second Order Draft Review Comments and Responses Chapter 2

Comment ID	From page	From line	To page	To line	Comment	Final reply to comment
2366	57*	46	57	46	So I suggest to consider the assessment of the confidence here, rather than evidence / agreement	Thank you, done.

* page and line numbers don't match the SOD draft - comments refer to a revised SOD draft