



INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE



Special Report on Renewable Energy Sources and Climate Change Mitigation

Government and Expert Review of the Second Order Draft
Jun 21, 2010 – Aug 16, 2010

Technical Summary

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¹ see <<<http://ipcc.ch/pdf/ipcc-principles/ipcc-principles-appendix-a.pdf>>>, Section 4.1 and clarification in decision 8 on procedures taken at the 33rd Session of the Panel <<http://www.ipcc.ch/meetings/session33/ipcc_p33_decisions_taken_procedures.pdf>>

**Government and Expert Review of Second-Order Draft
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Special Report on Renewable Energy Sources and Climate Change Mitigation, Second Order Draft

Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table	Comments	Consideration by writing team
United Kingdom (Department of Energy and Climate Change)	TS	0	-	-	-	-	-	-	A general omission in the discussion in this chapter is that there is no discussion with respect to any of the renewable energy options of their Energy Return on Investment, also known as "Net Energy". Each renewable energy option requires an energy input in order to bring it onstream and this needs to be related to its energy output. Net energy is the ratio of the amount of energy produced to the amount of energy expended to produce it. It is a key concept as it offers an insight into the fundamental economics of an energy source and of the amount of surplus energy left over after energy production for social use. The lower the net energy, the less there is to build social complexity. A net energy return of less than one, indicates that a subsidy of some sort is required in order to make it available. A useful reference in this respect of this topic is "Searching for a Miracle: Net energy limits and the fate of industrial society" by Richard Heinberg, published by the International Forum on Globalisation and the Post Carbon Institute in September 2009. Most of the pioneering work on energy returns has been done by Professor Charles Hall of Syracuse University who has written extensively on the subject.	Accept. Will provide "net carbon" and information on "Energy payback ratio". This renders the same information as "Net Energy".
Susanne Kadner (Technical Support Unit)	TS	0	-	-	-	-	-	-	All costs need to be converted to US\$ for 2005!!!	Accepted.
Ladislav Rybach (Geowatt AG Zurich (company))	TS	0	-	-	-	-	-	-	Also the 'Technical Summary' emphasizes the importance of renewable energies in climate change mitigation. In this context, and especially concerning their role as drivers for a Low-Carbon Economy it must be clearly stated also here that new installations of renewable energy systems do not reduce CO2 emissions; only additional emission can be avoided. Real CO2 emission reduction (the goal of the Kyoto Protocol and of other international endeavors) is achieved only when conventional systems with combustible fuel get replaced simultaneously.	Rejected. How much has to be avoided depends on assumptions and scenarios. REN will push out other techs when deployed.
Susanne Kadner (Technical Support Unit)	TS	0	-	-	-	-	-	-	As agreed in Oxford, the wording 'intermittent should be avoided and 'variable' used instead.	See above.
Richard Taylor (International Hydropower Association)	TS	0	-	-	-	-	-	-	Comment: build a comparative table for RES of the most important data/stats/information from the RES chapters (2-7) to climate change mitigation.	Reject. Comparisons can not be done here, as this is ordered according to the SRREN structure. This idea will be considered for the SPM.
Richard Taylor (International Hydropower Association)	TS	0	-	-	-	-	-	-	Comment: Summary tables and figures must harmonise with those in the RES chapters (2-7)	Accepted. Will do so.

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Susanne Kadner (Technical Support Unit)	TS	0	-	-	-	-	-	-	Cost trends: There is no coherent way of presenting cost information in the different technology chapters. The info is either imbedded in text (Chapter 3), shown in graphs (Chapter 4 and 7), or presented in tables. To enable better accessibility to this crucial information, a coherent way of presenting the results need to be agreed on.	Accepted. E.g LCOE graphs for all tech chapters. Accepted
Susanne Kadner (Technical Support Unit)	TS	0	-	-	-	-	-	-	Decision should be made whether chapters should present a list of key messages at the end of their chapter summaries in the TS.	Rejected. As the SPM will be changed line by line, this would lead to consistency conflicts.
Susanne Kadner (Technical Support Unit)	TS	0	-	-	-	-	-	-	Deployment rates: All technology chapters have obtained the graphs from Chapter 10 from the scenario analysis, but only Chapter 7 is showing them in the TS. Some of the other tech chapters present only text or tables with a completely different level of detail. Agreement on a coherent and comparable presentation of the information needs to be made.	Accepted. Will all include graph.
Susanne Kadner (Technical Support Unit)	TS	0	-	-	-	-	-	-	Despite being very well written in some parts, the Technical Summary does - in its present state - not reflect the width of the underlying report. Should one attempt to explain the contents of the SRREN with the graphs and tables included in the TS, the picture would remain rather patchy. Some technologies would gain a lot of attention, while others - despite not being less important - may gain little attention due to the lack of strong and informative graphs. The authors of the TS should think about how the contents of their chapter may be communicated in a powerpoint presentation (the most used means for doing so these days!) - is all the work that has gone into writing the chapter well represented and visually accessible in the TS? Detailed information on this is raised in separate comments.	Accepted.
Oyvind Christophersen (Climate and Pollution Agency)	TS	0	-	-	-	-	-	-	Ethics could have been a dedicated chapter related to production and use of RE. Factors like biological diversity, use of water, food versus energy, cloning of microorganisms, plants and trees, the high energy requirements of CCS, etc.	Rejected. There are no authors on this subject on the author team. As there are no explicit ethical discussion in the underlying chapters, it is not possible to synthesize this out of the report. But a number of topics mentioned will be covered in Chapter 9.
Bernd Wittgens (SINTEF Materials and Chemistry)	TS	0	-	-	-	-	-	-	Ethics could have been a dedicated chapter related to production and use of RE. Factors like biological diversity, use of water, food versus energy, cloning of microorganisms, plants and trees, the high energy requirements of CCS, etc.	SAME COMMENT AS BY CHRISTOFFERSEN, SEE ABOVE

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United States (U.S. Department of State)	TS	0	-	-	-	-	-	-	From the perspective of a larger, non-RE technical community, the current draft of the Technical Summary suffers from a pervasive tone of advocacy, imbalances, too strong and unqualified assertions of benefits, and selective inattention to RE issues, costs and problems. Comparisons to non-RE energy technologies should be avoided if possible, or done sensitively, as they are inherently incomplete (e.g., the purpose of a SRREN is not to state the comparative advantages of non-RE technologies over RE technologies) and suffer from lack of expertise in the non-RE areas. Specific suggestions as to how to fix these issues are provided in detailed comments.	Accept. Will need to selectively compare REN with non-REN to discuss advantages and disadvantages. Otherwise this will be avoided as suggested in the comment.
Susanne Kadner (Technical Support Unit)	TS	0	-	-	-	-	-	-	Impact of Policies: the following was agreed in Oxford - "1 page on policy in each technology chapter. Every technology chapter shall contain a final subsection in this section titled 'Impact of Policies'. That section shall be a maximum of 1 page in length, and should cover barriers and policies that are rather specific to the technology in question (e.g., land use policy for biomass, transmission for wind, etc.)". Some technology chapters have included this in the TS, some haven't. Again, a coherent approach to this needs to be agreed.	Rejected. Every tech Chapter to decide what of what they wrote in this section is worthwhile to be included in the TS.
STEPHANE POUFFARY (Energies 2050)	TS	0	-	-	-	-	-	-	In order to reduce the technical Summary length, I suggest reducing the 'technologies' parts (Bioenergy to Wind energy)	Rejected. Overall lengths of chapters should be reflected in some degree in the TS section lengths.
Susanne Kadner (Technical Support Unit)	TS	0	-	-	-	-	-	-	Intermittency - Variability: as agreed in Oxford, ensure coherent use of the term 'variability' instead of 'intermittency' throughout the report.	Accepted.
John Twidell (AMSET Centre)	TS	0	-	-	-	-	-	-	Much of this repeats what is included in the previous Summary for Policy Makers. Here it can be much reduced, say to 2 pages.	Rejected. The technical summary is structured differently, i.e. structured as the underlying report. As the SPM also the TS is a summary, so the repetitions are intended.
United States (U.S. Department of State)	TS	0	-	-	-	-	-	-	OVERALL: The Technical Summary is missing some larger scale strategic perspectives. These should be framed out at the beginning of this chapter and then woven throughout the text of the report. Some of the fundamental characteristics of most (not all) RE energy systems, with strategic perspectives for each, follow. First, RE sources capture diffuse natural energy flows. As a result, they require large collection areas, leading to high upfront capital costs, low or no fuel costs, and for some uncertain, long-term operating and maintenance costs. This makes financing RE challenging but lowers risks associated with fuel disruption and cost volatility. More below.	Parts will be captured by chapter 9, this then will flow into the TS. Most of these aspects are individually captured in different chapters. Due to the structure of the SRREN, there will not be a strategic perspective throughout the report.

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Susanne Kadner (Technical Support Unit)	TS	0	-	-	-	-	-	-	References: the TS does not contain any references; all references need to be removed and the text needs to be re-written where necessary.	Accepted.
United States (U.S. Department of State)	TS	0	-	-	-	-	-	-	Second, RE-generated power will have impacts on the grid and supporting operations. With low or no fuel costs (biomass is an exception), RE power sources, once built, will be preferred low-cost providers. This will affect dispatch of conventional fossil fueled systems. Variability of RE, such as wind and solar, also requires changes in the grid and its supporting infrastructure and operations. These changes can be addressed, in part, by balancing RE sources over a large area and, in part, by complementing one kind of RE resource (e.g., mid-day solar) by another (e.g., evening wind). Costs associated with enabling these changes will need to be allocated appropriately. Third, RE resources are site-specific. This requires additional attention to make effective use of them, but also conveys advantages by allowing a system to be tailored to local conditions that can improve the use of resources and provide local jobs. Fourth, RE resources are widely distributed and available at reasonable concentration levels in most regions of the world. This allows regionally-sourced power, energy, and job generation. It minimizes externalities associated with trade imbalances and risks of relying on insecure sources of energy imports.	2) General argument accepted. All issues will be addressed in Chapter 5, 7, 8 and 11. Some aspects seen differently. 3) will be addressed by chapter 8 and for jobs in chapter 9, REN not being monolithic is addressed in Ch.11
Susanne Kadner (Technical Support Unit)	TS	0	-	-	-	-	-	-	Section numbers: the TS constitutes an aggregation of the underlying text in the SRREN. Every paragraph should thus clearly indicate where the relevant information presented can be accessed in the full report. Hence, all paragraphs need to contain the corresponding section numbers in brackets [X.X]. In the same manner, brackets that refer to the Executive Summary [ES] need to be removed as they do not link to the appropriate section in the full report.	Accepted. Will check whether still text of ES is used in TS, then this will be replaced.
Babacar Sarr (ENERTEC-SARL)	TS	0	-	-	-	-	-	-	Section titles are not numbered (table of content and text).	Rejected. Will do it as in previous IPCC reports, i.e. without numbering.
Susanne Kadner (Technical Support Unit)	TS	0	-	-	-	-	-	-	Technology and Applications: in the effort of making the information presented in the TS more accessible, one option would be to present some of the very detailed descriptions of the different technologies in tables.	Accepted. Authors will consider this.
Oyvind Christophersen (Climate and Pollution Agency)	TS	0	-	-	-	-	-	-	The chapters does not communicate that general technology development and innovation is needed (both step-by-step, and break-through on processes, materials, etc.) and that this must be done while we still have the oil. It is not mentioned that there are large challenges on advanced materials.	Accepted. The technology chapters discuss this. But, it would be policy prescriptive to say that it must be done while we still have oil.

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Bernd Wittgens (SINTEF Materials and Chemistry)	TS	0	-	-	-	-	-	-	The chapters does not communicate that general technology development and innovation is needed (both step-by-step, and break-through on processes, materials, etc.) and that this must be done while we still have the oil. It is not mentioned that there are large challenges on advanced materials.	SAME COMMENT AS BY CHRISTOFFERSEN, SEE ABOVE
Japan (the Japanese Ministry of Foreign Affairs)	TS	0	-	-	-	-	-	-	The entire chapter requires more editing. Many of the paragraphs come directly from the chapters following. The TS should not contain so many citations.	Accepted.
United Kingdom (Department of Energy and Climate Change)	TS	0	-	-	-	-	-	-	The report makes no mention of fossil fuel subsidies and their impact on the economics of fossil fuel usage and the impact this has on the deployment of renewable energy.	Rejected. Beyond the scope of the SRREN.

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Australia (0)	TS	0	-	-	-	-	-	-	The Technical Summary (TS) needs to define its audience; currently it is trying to be everything to everyone. We assume it is primarily aimed at government and industry. The TS is more a summary of the technology, and on that basis, the report would benefit from an Executive Summary. The TS is also very dense and not consistent in style. The beginning of each section could include highlights to bring out key messages and as presented for Chapter 2 Bioenergy page 25, lines 4-17 and 1-19. There is a need to clarify terminology throughout: 'energy efficiency' is used frequently when it would be more appropriate to talk about 'demand efficiency'. There are also multiple expressions of energy units, and a common yardstick for the lay reader across the report would be useful. The TS needs to clearly articulate that there is no one answer that will deliver required emission reductions, but rather a suite of technologies that combined will enable better grid integration depending on a country's resources and regions, and that buffering technologies or storage will be essential to overcome variability in generation. TS should clearly articulate the 'value proposition' for RE and outline RE opportunities as part of a holistic view of energy systems. This could be done by outlining where RE 'fits' into different parts of the energy system and to outline what key advantages/disadvantages are; for example it is possible that RE deployment could be less driven by economic rationalism and more about obtaining niche advantages. Finally, some general TS issues where algae are not mentioned in the TS bioenergy section although this appears in the Table SPM1. A diagram showing the position of each RE technology in a maturity curve, and discussion of the cost of RE subsidies such as FITs, carbon prices, national grant and incentive schemes would also be useful.	Audience definition: Rejected. The purpose of the TS is to summarize the chapters. So, there is no need to explain this. But there will be a text included explaining that the TS is meant to function as background material for the SPM. Key Messages: Reject. In order to avoid conflicts with key messages in the to be revised SPM these will not be included here. Energy efficiency: Accepted. X-Cut defined how energy efficiency is defined. Units: Accepted. There is an agreement on this. This will be worked on and also the TSU will try to ensure this. Value Proposition: Reject. Advantages of fitting RE into system: Accept. This will be done in respective chapters. Algae: Accept. Will be included by Ch.2 authors in TS team. Maturity curve. Reject. This is not feasible. There is a table with checkmarks in Chapter 1. Chapter 1 authors in TS will be considered to be included in TS. The information will be in the TS, but can not be included in one graph. as a table.
United Kingdom (Department of Energy and Climate Change)	TS	0	-	-	-	-	-	-	The Technical Summary has no analysis of fossil fuel dependencies and the vulnerabilities that this gives rise to. In particular, there is no analysis of oil dependency so any transition path away from oil is an abstract exercise without reference to the practical difficulties that might be involved or what systems would be compromised with a transition away from oil.	Rejected. Beyond the scope of the SRREN.

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Oyvind Christophersen (Climate and Pollution Agency)	TS	0	-	-	-	-	-	-	The TS should be simplified; less information presented with shorter and easier understandable sentences and figures would be more helpful. The chapters are rather summarizing and theoretical, try to connect them more to the practical side of the world.	Reject. The TS is supposed to present background information in a concise manner. The number of figures will be increased.
Japan (the Japanese Ministry of Foreign Affairs)	TS	0	-	-	-	-	-	-	The use of abbreviations should follow a single rule; (e.g) iLUC and (i)LUC/ US\$, US\$, USD	Accepted.
Australia (0)	TS	0	-	-	-	-	-	-	There are several breaches in TS of drafting rule that references should not be included in TS - examples are TS page 16, line 15, page 20 line 42 and line 47.	Accepted.
Gerrit Hansen (TSU)	TS	0	-	-	-	-	-	-	there are several inconsistencies with figures reported as 2007 world PE supply and final consumption, most notably between chapter 1 and chapter 8 contributions. Please reconcile those figures.	Accepted. This will be checked, if true, this will be corrected.
Bernd Wittgens (SINTEF Materials and Chemistry)	TS	0	-	-	-	-	-	-	There are too many words ' saying everything ' and nothing, as caused by a mixture of politics and scratching some candidate technologies. The chapters are rather summarizing and rather theoretical, meaning that there is an obvious gap to the practical side of the world.	Reject. The TS is supposed to present background information in a concise manner. The number of figures will be increased.
John Twidell (AMSET Centre)	TS	0	-	-	-	-	-	-	TOTAL LENGTH OF THIS CHAPTER You ask reviewers to comment on how to shorten the text. The Summary is comprehensive and complete. The main reasons for the excessive length are (1) verbosity (longwinded style), (2) overlap with the previous Summary for Policy Makers (SPM). Solving (1) requires experienced sub-editing; solving (2) requires humility by lead-authors and head-banging by the overall editors. Reducing the length will help readers and improve the impact with no loss of substance.	1) Accepted. There will be subediting. 2) Accepted.
Steffen Schlömer (IPCC WGIII)	TS	0	-	-	-	All Tech, Costs	-	-	Insert figures showing current costs as a function of capacity factor and interest rate, included in SRREN_Draft2_TSU-Review_Schloemer_Steffen_LCOE_graphs_2	Accepted. It was decided to do so in an LA4 X-Cut.
Babacar Sarr (ENERTEC-SARL)	TS	2	7	10	1	-	-	-	Title in page 10, line 1 missing on the table of content on page 2 (Global energy flows and investment in primary RE).	TOC updated accordingly.
Gian-Kasper Plattner (IPCC WGI TSU, University of Bern)	TS	5	4	-	-	-	-	-	"the trapping of radiant heat by carbon dioxide" -- this formulation is strange' suggest to rewrite as something like: "CO2, released ', acting as a greenhouse gas, affecting the earth's radiation balance, is...".	Sentence deleted in rewrite.
United States (U.S. Department of State)	TS	5	15	-	-	-	-	-	Add "emissions" after "CO2"	Accepted.
United States (U.S. Department of State)	TS	5	11	-	-	-	-	-	Avoid editorial use of the pronoun "we". It is used rarely elsewhere.	Accepted.

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United States (U.S. Department of State)	TS	5	26	-	-	-	-	-	Delete sentence "Renewable...CO2.". RE does have "an important role to play in reducing emissions of CO2"; however, at this point in the line of argumentation (i.e., following the discussion of the Kaya equation, but before the introduction the CC benefits of RE), the previous sentence draws the broader, and internally supported, conclusion. The point about the CO2 benefits of RE can be made later.	Accepted.
United Kingdom (Department of Energy and Climate Change)	TS	5	3	5	26	-	-	-	If you are short of space is this section necessary?	Will shorter and reflect new structured Chapter 1
Nico Bauer (Potsdam Institute for Climate Impact Research)	TS	5	11	-	-	-	-	-	Kaya can be used"" instead of ""we can use Kaya""	Will edit if sentence remains after re-write
Nico Bauer (Potsdam Institute for Climate Impact Research)	TS	5	30	6	2	-	-	-	Main text (underlying chapter) only mentions synergies between RE and EE (ch1, p. 12, l. 2-4); coordinate	Comment unclear but should be resolved as a result of editing to align with new Chapter 1 structure
Frank Mastiaux (EON Climate & Renewables)	TS	5	-	135	-	-	-	-	Overall the document is lacking clarity on the key messages of the study, i.e. each chapter. Reducing the amount of datapoints presented in the TS would lead to a stronger focus on the key points the reader should take away. In the current draft the impression of a ""pure data ammassation"" strongly impact the readability and understandability of the document.	Will address in Chapter 1 TS redraft -- other Chapter authors need to address as well
Nico Bauer (Potsdam Institute for Climate Impact Research)	TS	5	3	13	39	-	-	-	Part on ch1 needs to be restructured since there is a lot of restructuring suggested for ch1 (and the TS shall stick to the structure of the underlying chs)	Chapter 1 is being restructured and sumamry will reflect
Gian-Kasper Plattner (IPCC WGI TSU, University of Bern)	TS	5	9	-	-	-	-	-	projected temperature range as given in IPCC AR4 Chapter 10: this range of 1.1 to 6.4 is not only the consequence of the difference in "socioeconomic scenarios", but also includes the uncertainty in climate system behavior, incl. climate sensitivity etc.	Accepted.
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	TS	5	27	7	3	-	-	-	Refer the comment on SPM [page3, Line1-page4, Line3]	Will coordinate with SPM
Gian-Kasper Plattner (IPCC WGI TSU, University of Bern)	TS	5	30	-	-	-	-	-	reference to "the AR4" -- I strongly suggest to be specific when referring to any of the previous IPCC reports: which WG? Which Chapter or SPM or TS etc.	Good comment.
United States (U.S. Department of State)	TS	5	29	6	3	-	-	-	Replace the entire text with: "The AR4 identified numerous means for lowering the heat-trapping emissions from energy sources, while still providing energy services:"	Accepted.

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Stephan Klasen (University of Göttingen)	TS	5	1	13	35	-	-	-	Some general comments on beginning of report: 1) The first section needs a summary table that captures the essence of the whole report. Rows should be REs and columns should be a) potential, b) current technological state, c) likely technological development d) current costs, e) likely future cost trends, f) social and environmental impacts, g) major technological, economic, social barriers for further expansion. Also; should nuclear fusion be a topic of analysis here, even if briefly? In terms of potential to cut, the chapters on the various technologies dwell perhaps too much on the technical details of various systems; some of that could be condensed.	Chapter 1 will summarize but revisions to other chapters summary needs to be addressed by other authors
United States (U.S. Department of State)	TS	5	23	5	26	-	-	-	Substitute with: "In recent years (2000 - 2007), energy intensity has continued to decline, but carbon intensity has increased, being mainly driven by the expansion of coal use in both developed and developing countries. Shifting from carbon-intensive fossil fuels to alternative low-carbon sources for energy services is one way to curb CO2 emissions without curtailing global economic growth. Renewable energy technologies have an important role to play in this transition."	Sentence deleted in rewrite.
Frank Mastiaux (EON Climate & Renewables)	TS	5	-	135	-	-	-	-	The document show recurring inconsistencies in terms of data and formulations. A thorough check on consistency and data accuracy should be performed. At some parts single sections of the document seem disconnected from previous or following sections. A harmonization of content could also lead to a reduction in length, as some parts of the text would become redundant. (i.e. especially true for Biomass)	Will address in Chapter 1 TS redraft -- other Chapter authors need to address as well
Gian-Kasper Plattner (IPCC WGI TSU, University of Bern)	TS	5	6	-	-	-	-	-	the formulation "CO2 is now understood to be a major contributor" appears to diminish the very strong attribution statement from the IPCC WGI SPM stating that "Most of the observed increase in global average temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic greenhouse gas concentrations". I thus suggest to reformulate this statement following the AR4 wording.	Accepted.
United Kingdom (Department of Energy and Climate Change)	TS	5	-	7	-	-	-	-	The initial preamble could be cut down.	Noted.
United States (U.S. Department of State)	TS	5	28	5	29	-	-	-	The phrase "in sustainable manner" begs for definition or introduction at this early stage in the Technical Summary. Suggest deletion of the word "sustainable" at this point, so that the sentence is better supported by the preceding text and reads, "...providing energy and other services in a manner that does not impact climate change." Sustainable development is appropriately defined on page 93 of the Technical Summary.	Noted. Definition included in glossary.

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Netherlands (KNMI (Royal Dutch Meteorological Institute))	TS	5	23	5	25	-	-	-	the sentence here overlooks the decreasing carbon intensity in the earlier period. Also, simply the increase in carbon intensity does not demonstrate the need to shift to low carbon sources. More explanation is required to define the importance of RE. The section in chapter 1 from which this section has been cut provides a better story.	Will include more relevant information from chapter 1
United States (U.S. Department of State)	TS	5	30	6	2	-	-	-	The statement about AR4 identifying RE is correct, but why single out "along with efficiency improvements" as the sole complement to RE, at the exclusion of other non-RE options. Suggest inserting "and other low-emission technologies" after the word "improvements". This would also comport well with the list that follows. This issue appears repeatedly throughout the TS and needs to be likewise corrected.	Will address in Chapter 1 TS redraft -- other Chapter authors need to address as well
Frank Mastiaux (EON Climate & Renewables)	TS	5	17	-	-	-	TS 1.1	-	Figure TS 0.1 wrong - instead 1.1 and legend to the right	Will be amended to contain correct figure number. Graphic designer will amend figure itself.
ICHIRO MAEDA (The Federation of Electric Power Companies of Japan)	TS	6	8	6	9	-	-	-	<comment> Delete "both fossil fuels". <reason> Theme of this report SREEN is Renewable Energy, so that CHP should be set limit only to renewable energy sources.	This does apply to fossil fuels
Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	TS	6	3	6	16	-	-	-	A possibility not listed is to use RE electricity for heating, substituting heat from combustion of fossil fuels. This may not be sensible from the viewpoint of efficiency but can make sense from economic viewpoints and anyway is compatible with the trends for larger share of electricity in developed countries.	Every possibility cannot be mentioned in TS
United States (U.S. Department of State)	TS	6	31	-	-	-	-	-	Add "and/or beneficiaries" after the word, "owners". Not all beneficiaries will be owners.	Sentence deleted in rewrite.
United States (U.S. Department of State)	TS	6	31	-	-	-	-	-	After "RE", insert "(e.g., biofuels)"	Sentence deleted in rewrite.
Oyvind Christophersen (Climate and Pollution Agency)	TS	6	-	-	-	-	-	-	Among the points mentioned on this page as important for reducing CO2 emissions, also 'increasing efficiency of energy technologies in general' should have been included (including also the existing fossil dominated system). This is a major point, in a practical and realistic context, since all other points are connected to replacing the existing energy systems with RE technologies, etc.	Will note if this section remain -- but EE will be highlighted in any case
Ichiro Maeda (Federation of Electric Power Companies, Japan)	TS	6	4	-	-	-	-	-	As in Comment No.1; suggest changing the phrase "zero carbon" to "low-carbon".	zero-carbon phrasing removed from section.

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Germany (Federal Ministry for the Environment, Nature Conservation and Nuclear Safety)	TS	6	3	6	16	-	-	-	As this is a report on renewables, with no in-depth evaluation of the risks and challenges regarding, e.g. nuclear power, constrain this list of mitigation options to those of relevance to renewable energies. Firstly ammend line 3 with "regarding RE" to read "The following mitigation options related to energy supply are relevant regarding RE:". Secondly, delete the point on lines 10 and 11 regarding the fuel switch from fossil fuel to fossil fuel or nuclear. A listing here of this option is unwarranted as the reader is not provided with an in-depth evaluation of security, mining, decommissioning, and nuclear proliferation risks in sufficient detail (neither is this the report that should).	Will refine list to align with new final chapter 1
Susanne Kadner (Technical Support Unit)	TS	6	33	6	34	-	-	-	Ch 1: the SRREN does not explore RE potential in combination with energy efficiency - please remove	combining effeciency with RE is critical to success
Susanne Kadner (Technical Support Unit)	TS	6	36	7	3	-	-	-	Ch 1: this list does cover aspects which are not addressed in the SRREN (such as impacts on global, regional and national energy security; needs to be carefully checked and adapted)	Will address with Chapter 1 and Chapter 1 TS redraft
United States (U.S. Department of State)	TS	6	33	6	34	-	-	-	Delete "in combination with energy efficiency," or, alternatively, include mention of other low emission technologies.	Will mention other technologies
Richard Taylor (International Hydropower Association)	TS	6	17	6	17	-	-	-	Delete first sentence. Comment: Incorrect and made redundant by following sentence.	Will address in Chapter 1 TS redraft
United States (U.S. Department of State)	TS	6	17	-	-	-	-	-	Delete opening sentence in this paragraph. It appears to be repeated in the next sentence.	Accepted.
United States (U.S. Department of State)	TS	6	17	-	-	-	-	-	Delete: "RE is any type of energy produced from natural geophysical or biological sources."	Accepted.
Wolfgang Riecke (Deutscher Wetterdienst)	TS	6	17	-	-	-	-	-	delete: "RE is any type of energy produced from natural geophysical or biological sources" ; see: next sentence (repetition)	Accepted.
Frank Mastiaux (EON Climate & Renewables)	TS	6	17	-	-	-	-	-	Doubling the first sentence	Accepted.
Nico Bauer (Potsdam Institute for Climate Impact Research)	TS	6	33	6	34	-	-	-	EE not covered as main focus in SRREN; general comment from p. 6, l.33 - p. 7, l. 3 applies	combining effeciency with RE is critical to success
Italy (Institute for Environmental Protection and Research (ISPRA))	TS	6	8	6	9	-	-	-	in this bullet point the only tecnological option mentioned is CHP, whereas the text in [10.1] is more general " Improving the efficiency of energy transformation (e.g. through the use of combined heat and power plants) and distribution". As the current text excludes other technological options, such as fuel cells, it should be replaced by the text mentioned above [10.1]	Will replace text if this section remains after re-write

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United States (U.S. Department of State)	TS	6	25	6	27	-	-	-	In this sentence, the TS introduces for the first time some disadvantages of RE, even though it is making a further point about RE advantages. The appearance of objectivity here demands careful wording and completeness. Suggest substituting for the opening sentence, "While the low-energy density, intermittency, high cost, and decentralized nature of many forms of RE resources may not be suitable to some applications, the use of RE and its less concentrated nature of impacts can give rise to a number of unique co-benefits."	Sentence deleted in rewrite.
United States (U.S. Department of State)	TS	6	36	-	-	-	-	-	In Topic I, suggest separating "RE resources" by region from "impacts of climate change" on RE resources by region. These would seem to call for different disciplines and methodologies. Introduce the latter as new Topic II.	Noted.
Frank Mastiaux (EON Climate & Renewables)	TS	6	6	6	11	-	-	-	Is this a contradiction according use of natural gas - shift from natural gas (line6) to alternatives with lower specific CO2 emission (line 11), isn't it?	Accepted.
Australia (0)	TS	6	17	-	-	-	-	-	Line 17 repeated in line 18 - fix drafting.	Accepted.
Nico Bauer (Potsdam Institute for Climate Impact Research)	TS	6	3	6	16	-	-	-	List differs from ch1 but should not, ch1 list needs to be altered as well, coordinate	Will align
Australia (0)	TS	6	26	-	-	-	-	-	Not all renewable energy sources are decentralised eg large hydro.	Noted.
United States (U.S. Department of State)	TS	6	10	-	-	-	-	-	Note need to control methane emissions in switch to gas.	This level of detail not necessary in TS
Nico Bauer (Potsdam Institute for Climate Impact Research)	TS	6	17	7	3	-	-	-	order is partly different from main text that needs to be revised anyway; coordinate with revised main text	Will address with Chapter 1 and Chapter 1 TS redraft
ICHIRO MAEDA (The Federation of Electric Power Companies of Japan)	TS	6	4	6	16	-	-	-	Refer the comment on SPM [page5, Line30-Line39]	Will coordinate with SPM
United States (U.S. Department of State)	TS	6	8	6	9	-	-	-	Replace with: "Use combined heat and power technologies to improve the overall efficiency of thermal electric power from fossil, nuclear, and renewable energy sources."	Bullet deleted in rewrite.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	TS	6	17	6	24	-	-	-	Similar as in chapter 1 (pg10, ln 12-19), the definition of RE here remains fuzzy: first it is stated that RE is energy that is replenished at a rate equal to or higher than its rate of use, later it is stated that RE use rate may be higher than replenishment-rate. These statements are mutually conflicting. A different definition is thus required. the sentence on solar is badly connected to the rest of the section.	Will address with Chapter 1 and Chapter 1 TS redraft

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United States (U.S. Department of State)	TS	6	26	-	-	-	-	-	Strike "the use of RE and its decentralized nature incurs a", and replace with "...the use of decentralized RE produces a ..."	Noted.
Marc Darras (GDF SUEZ)	TS	6	17	-	-	-	-	-	suppress redundancy	Will address in Chapter 1 TS redraft
Frank Mastiaux (EON Climate & Renewables)	TS	6	17	6	24	-	-	-	The paragraph is very unclear and should be rephrased/restructure to provide the reader with a clear understanding of the matter. (please refer to this as an example of the below general comments)	Will address in Chapter 1 TS redraft
United States (U.S. Department of State)	TS	6	27	6	32	-	-	-	The sentence that starts with, "Apart from climate change mitigation, RE can play ...", tees up a series of co-benefits. Suggest listing these: enhancing energy security, reducing adverse impacts, directly or indirectly, on air, land and water environments, selective employment creation, and meeting Millennium Development Goals (MDGs). Avoid use of "sustainable development" here, as it has yet to be defined in the TS and its elements are captured in essence by the MDGs.	Sentence deleted in rewrite.
United States (U.S. Department of State)	TS	6	4	-	-	-	-	-	The use of the word "zero carbon" is potentially contentious from a full fuel cycle perspective. Suggest using, instead, "low-GHG emitting".	zero-carbon phrasing removed from section.
United Kingdom (Department of Energy and Climate Change)	TS	6	25	6	32	-	-	-	This is a noble attempt to define renewables, but to be honest I do not think it is sufficiently robust to be useful in public or technical debates	Will address with Chapter 1 and Chapter 1 TS redraft
United Kingdom (Department of Energy and Climate Change)	TS	6	3	6	16	-	-	-	This is very CO2 specific: where are the rest of the GHG basket? For example what about reduced methane from putrescible waste, N2O impact of land use change and changing combustion options etc.	Will expand scope beyond CO2 -- but specific comment not appropriate for TS
United States (U.S. Department of State)	TS	6	33	6	35	-	-	-	This section lists the topics covered by the SRREN. The addition of the phrase, "in combination with energy efficiency" is selective and confusing. There are other non-RE technologies that can address stated goals. Delete the offending phrase.	combining efficiency with RE is critical to success
United States (U.S. Department of State)	TS	6	37	-	-	-	-	-	Throughout the document, there are references to "theoretical potential", "technical potential", and in the terms used by the AR4, "market potential". Information most useful to policy makers will carefully differentiate among these terms. Suggest clarification in Topic II, Mitigation potential of RE (re)sources.	Will ensure differentiation
United States (U.S. Department of State)	TS	6	38	6	39	-	-	-	Topic III: Suggest rephrasing to, "Linkages among RE growth, co-benefits and sustainable development by region." It is more fact-based and avoids confusion with a complex overlay of the additional goal of "achieving sustainable development".	Accepted.
Frank Mastiaux (EON Climate & Renewables)	TS	6	32	-	-	-	-	-	What about the downsides for farmers/prices for rural goods?	This level of detail not necessary in TS

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United States (U.S. Department of State)	TS	7	24	7	30	-	-	-	In most IPCC reports a distinction is made between theoretical potential, technical potential and market potential. In SRREN these terms are either not defined or poorly defined. These terms need to be differentiated. Technical potential in particular, since it is used so frequently, needs to be placed within a context that the reader can understand with respect to assumptions and constraints.	Will address with Chapter 1 and Chapter 1 TS redraft
Emmanuel Branche (Electricité de France)	TS	7	8	7	8	-	-	-	441 EJ is not consistent with Table SPM2 (481.78 EJ). Why this difference ? It is not due to different methods according to me	Will address with Chapter 1 (and other Chapters) and Chapter 1 TS redraft
United States (U.S. Department of State)	TS	7	8	-	-	-	-	-	Add a sentence: "As shown in Table 1.1, the International Energy Agency projects world energy demand to nearly double again, to 868 EJ, by 2050 under business-as-usual assumptions."	Relevant sentence deleted in rewrite.
Marc Darras (GDF SUEZ)	TS	7	10	-	27	-	-	-	Change in value of the excess potential from 50 to 10. It might be interesting to recall definition of potentials at this stage.	Will address with Chapter 1 (and other Chapters) and Chapter 1 TS redraft
Wolfgang Riecke (Deutscher Wetterdienst)	TS	7	10	-	-	-	-	-	compare: " 50 mby 2050" with same page, line 27 "10 by 2050"	Will address with Chapter 1 (and other Chapters) and Chapter 1 TS redraft
Wolfgang Riecke (Deutscher Wetterdienst)	TS	7	8	-	-	-	-	-	compare: "441 EJ in 2007" with chapter 3, section 3.1.2, page 6, line 24 "500 EJ/year"	Will address with Chapter 1 (and other Chapters) and Chapter 1 TS redraft
United States (U.S. Department of State)	TS	7	11	-	-	-	-	-	Delete "far" and "all". Avoid hyperbole and generalizations. Text needs to be toned down. Sentence still makes its point.	Will edit if sentence remains after re-write
Nico Bauer (Potsdam Institute for Climate Impact Research)	TS	7	29	7	30	-	-	-	delete last part	Will refine text if section remains
United States (U.S. Department of State)	TS	7	22	7	30	-	-	-	Delete last sentence of this paragraph. Remedies for high capital cost can be discussed later in section on barriers.	Deleted
Wolfgang Riecke (Deutscher Wetterdienst)	TS	7	24	7	26	-	-	-	delete: " The theoretical potential for renewable energy significantly exceeds the global demand but the challenge is to capture and utilize RE to provide the desired energy services in a cost effective manner. Still" ; see: same page, line 5 to line 7 (repetition)	Deleted
Australia (0)	TS	7	6	-	-	-	-	-	Drafting of 'it' is confusing when subject of sentence is 'theoretical potential for renewable energy' (which by definition cannot be captured fully. Recraft line 6: '.....to capture and utilise a sizable share of that potential to provide.....'	Will edit if sentence remains after re-write
Australia (0)	TS	7	15	-	-	-	-	-	End of sentence '.....future energy prices, which for many renewables is zero', arguably is not zero. Source of energy (eg wind, solar) may come 'free', but supply cost of renewable energy is not zero (capital costs of infrastructure etc.)	Will note if this section remains

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Jänicke Martin (Environmental Policy Research Centre)	TS	7	10	-	27	-	-	-	factor 50 by 2050.....at least factor 10 by 2050...??	Will address with Chapter 1 (and other Chapters) and Chapter 1 TS redraft
Frank Mastiaux (EON Climate & Renewables)	TS	7	10	7	27	-	-	-	factor at least 10 (line 27) vs. factor of 50 (line 10)	Will address with Chapter 1 (and other Chapters) and Chapter 1 TS redraft
Gerrit Hansen (TSU)	TS	7	5	-	30	-	-	-	figure for 2007 global energy consumption needs to be revised (compare table SPM2 and Table 1.1 reporting 482 EJ), and it should be specified if this relates to primary or final energy consumption. The terms theoretical and technical potential are not used in a consistent manner. In ln. 10, it is "theoretical potential exceeds BAU demand by factor 50", not the technical potential (which is quoted later rightly with factor 10). Still, factor 50 is not justified anywhere neither with regards to technical nor theoretical potential. please also provide [chapter reference] for statements. The statement "tech potential exceeds BAU demand by at least factor 10" could be challenged, as table TS1.1 reports minimum values, that add up to rather 3-4 times BAU, and Krewitt et al. is not presented as the "minimum" estimate. Section Headline could be changed into "(theoretical and technical potential for RE exceeds..."	Will address with Chapter 1 and Chapter 1 TS redraft
STEPHANE POUFFARY (Energies 2050)	TS	7	22	-	-	-	-	-	Higher initial capital" depend of externalities considerations" sentence to be moderated.	Will clarify if this section remains
Matt Davison (University of Western Ontario)	TS	7	17	7	23	-	-	-	I agree that all of these mechanisms are able to reduce the impact of RE variability. The statement as written is too strong, however. At what renewable penetration level is this true?	Will soften if this section remains
United Kingdom (Department of Energy and Climate Change)	TS	7	15	7	16	-	-	-	Is it more accurate to talk of reduced exposure to price volatility?	Noted.
Emmanuel Branche (Electricité de France)	TS	7	-	-	-	-	-	-	It could be interesting to have an overview of the RE current situation, e.g. a table should be added in this section (proposition: to add a copy of Table SPM2)	Will address with Chapter 1 and Chapter 1 TS redraft
Oyvind Christophersen (Climate and Pollution Agency)	TS	7	11	-	16	-	-	-	It is claimed that we approach times of better energy security since RE is more evenly divided in the world than oil. This fully lack reason and common sense. Nothing can be more easily and widely spread than energy dense liquid oil. You can bring it in a bottle of coke to the top of Mount Everest or into Sahara if you need to do it and it is ready to use.	Point unclear
United States (U.S. Department of State)	TS	7	11	7	13	-	-	-	Need to be balanced. A number of renewable resources have an inherent lack of reliability due to intermittency, weather, crop failure.	Will introduce points of section remains in TS redraft

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John Twidell (AMSET Centre)	TS	7	18	-	-	-	-	-	now 'Variability may be overcome'. Change to 'Variability may be UTILIZED' [Note to authors: 'overcome' suggests negativilty; it is important to realise that demand is highly variable; having a constant supply, as with nuclear power, also makes for challenges]	Sentence deleted in rewrite.
Australia (0)	TS	7	15	-	-	-	-	-	Reference to 'price volatility' is confusing and not linked to earlier part of para.	Sentence deleted in rewrite.
United States (U.S. Department of State)	TS	7	9	7	27	-	-	-	Regarding "technical potential", on lines 9-10 it is asserted that TP exceeds BAU by a factor of 50 by 2050. On lines 26-27, it is asserted that TP exceeds BAU by a factor of 10 by 2050. This is confusing and needs clarification.	Will address with Chapter 1 (and other Chapters) and Chapter 1 TS redraft
United States (U.S. Department of State)	TS	7	13	7	15	-	-	-	Rephrase sentence to read, "In most cases, the costs of RE are known and, while there may be local variability, there is likely to be less uncertainty about future RE energy prices compared to those of oil or natural gas." This adds a reference point to which RE price volatility may be compared and deletes the phrase at end of sentence which asserts that the cost of "many renewables is zero".	Sentence deleted in rewrite.
United States (U.S. Department of State)	TS	7	17	7	18	-	-	-	Replace "may be overcome" with "in renewable power can be mitigated"	Sentence deleted in rewrite.
Stephan Klasen (University of Göttingen)	TS	7	30	-	-	-	-	-	Replace 'adds little to the discussion' with 'will not significantly affect the results of the analyses of this report'	Relevant text deleted in rewrite.
United States (U.S. Department of State)	TS	7	7	-	-	-	-	-	Replace with: "... in a cost effective and environmentally sound manner."	Accepted.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	TS	7	17	-	-	-	-	-	resource disadvantages: what are those and possibly an example?	Will provide example
STEPHANE POUFFARY (Energies 2050)	TS	7	17	-	-	-	-	-	Rewrite this sentence in a positive way: ""Potential resource constraints can be addressed.""	Sentence deleted in rewrite.
Canada (Environment Canada)	TS	7	5	7	30	-	-	-	Statistics on technical potential for estimated business-as-usual demand conflict between paragraphs (see lines 10 and 27).	Will address with Chapter 1 and Chapter 1 TS redraft
United States (U.S. Department of State)	TS	7	12	-	-	-	-	-	Strike "energy security" and substitute "domestic energy production". The concept of energy security is complex, not fully defined, and not tied, by itself, to local or national energy production. The word domestic is more consistent with the intent of the discussion.	Energy security is a comonly used term
United States (U.S. Department of State)	TS	7	8	-	-	-	-	-	Strike "universally" available and substitute "widely" available. The former is hyperbole. Strike "readily", as this depends on local circumstances and is not universally true. The sentence without the word "readily" stands in meaning with original intent.	Sentence deleted in rewrite.

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Antoine BONDUELLE (E&E Consultant)	TS	7	-	12	-	-	-	-	Summary is well designed and complete. It fits well with the rest of the report	No action required
Wolfgang Riecke (Deutscher Wetterdienst)	TS	7	26	-	-	-	-	-	table "TS11.1" is table "TS 1.1"	Corrected
Frank Mastiaux (EON Climate & Renewables)	TS	7	26	-	-	-	-	-	Table 1 1.1- bold 1	Corrected
United States (U.S. Department of State)	TS	7	17	-	-	-	-	-	The opening sentence of this paragraph indicates that RE may have some disadvantages, but goes on to assert that they can be addressed. In the interest of objectivity, it might be helpful to articulate what some of these disadvantages are.	Sentence deleted in rewrite.
United Kingdom (Department of Energy and Climate Change)	TS	7	11	7	12	-	-	-	There are other nuclear fuels (e.g. thorium)	Level of detail inappropriate for TS
United States (U.S. Department of State)	TS	7	24	7	30	-	-	-	This paragraph introduces Table TS 1.1, which itself is poorly explained in the TS. Both the paragraph and the table raise questions about methodology and assumptions used for the cited estimates. It is also missing context about scale. More context and explanation about Table TS 1.1 would be helpful.	Will address with Chapter 1 and Chapter 1 TS redraft
Marc Darras (GDF SUEZ)	TS	7	22	-	23	-	-	-	This sentence is not true. Because access to capital is a competition. Therefore higher cost for the same output means that RE investment goes to a lower rank and will not be financed.	Will clarify if this section remains
Nico Bauer (Potsdam Institute for Climate Impact Research)	TS	7	5	7	30	-	-	-	very little of this can be found in main text; factor of 50 (l. 10) contradicts with factor 10 (l. 27)!	Will address with Chapter 1 and Chapter 1 TS redraft
Frank Mastiaux (EON Climate & Renewables)	TS	7	-	8	-	-	-	TS 1.1	I cannot recalculate the excess factor of 50 by 2050 nor 10 from the data in the table.	Table deleted from text in rewrite - replaced with figure.
Oyvind Christophersen (Climate and Pollution Agency)	TS	7	5	7	30	-	TS 1.1	-	Definition of "technical potential"? And of "theoretical potential"?	Full definitions appear in FD Glossary.
Richard Taylor (International Hydropower Association)	TS	8	-	8	-	-	-	TS 1.1	Comment: Table should be reworked to be made consistent with technical potentials for respective RES in Chapters 2-7.	Table deleted from text in rewrite - replaced with figure in which consistency with underlying chapters was assured.

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Oluf Ulseth (Statkraft AS)	TS	8	-	-	-	-	-	TS 1.1	For the sake of consistency, tables presented in summary chapters should be based on information gathered in the respective technical chapters. In the case of hydropower the information provided about technical potential is seriously underestimated (SMP table 4 and TS 1.1); using the data provided by each technical chapter would avoid to have a long legend specifying how these Krewitt et al study actually does not really reflect the reality for each of the RE options, what affects from the onset the credibility of this table. If this should not be possible, then it is necessary to mention as it is done for PV and CSP in an additional footnote that these estimates from Krewitt et al. are significantly underestimating the technical potential for hydropower.	Table deleted from text in rewrite - replaced with figure in which consistency with underlying chapters was assured.
Australia (0)	TS	8	-	-	-	-	-	TS 1.1	No date, attached to heading 'Range of Estimates'.	Table deleted from text in rewrite - replaced with figure.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	TS	8	-	-	-	-	-	TS 1.1	Please check whether the figures on bioenergy in this table are now consistent with the conclusions in chapter 2.	Table deleted from text in rewrite - replaced with figure in which consistency with underlying chapters was assured.
Antoine BONDUELLE (E&E Consultant)	TS	8	-	-	-	-	-	TS 1.1	Table TS1.1 is relevant and gives good information. One additon could be to give sum the total potentials and compare it with energy demand.	Table deleted from text in rewrite - replaced with figure in which energy demand figures are included.
Oyvind Christophersen (Climate and Pollution Agency)	TS	8	-	-	-	-	-	TS 1.1	The offshore wind estimates are based upon old references. The estimates seem to be low compared to the onshore wind estimates . Estimates are very sensitive to acceptable water depth and distance to shore. The assumptions made should therefore be stated.	Table deleted from text in rewrite - replaced with figure that provides reference to underlying assumptions. Authors welcome updated references.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	TS	8	-	-	-	-	-	TS 1.1.	Similar as table 1.3 It is confusing that for some values, the range of estimates does not include the values given as technical resource potential.	Table deleted from text in rewrite - replaced with figure.
Australia (0)	TS	9	5	-	-	-	-	-	'.....currently over 80% of primary energy.....'	Will ck facts with AR4

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ICHIRO MAEDA (The Federation of Electric Power Companies of Japan)	TS	9	21	9	25	-	-	-	<p><comment> Delete the sentences below; "Direct energy conversions from solar, hydro, ocean and wind energy to electricity do not suffer these thermal losses. Direct heating from geothermal, biomass and solar thermal systems can also be highly efficient processes. By comparison, CCS requires substantial energy inputs, which would increase the demand for primary energy to supply the same amount of end use energy for energy services [1.3.1.1]." <reason> It is not fair to make comment only on thermal losses. In the first place, thermal losses and comparison to CCS do not fit the context. In calculating losses in the aspect of energy service, it is obviously necessary to take into instability and low intensity(esp;solar) of RE.</p>	Will clarify or remove
ICHIRO MAEDA (The Federation of Electric Power Companies of Japan)	TS	9	3	-	-	-	-	-	<p><comment> Delete the sentence below; "Renewable energy can supply the same energy services to users as conventional primary energy sources, and in some cases without the thermal losses to which combustible fuels are subject." <reason> The sentence in red character is not accurate.(even RE produce conversion losses as other power generation)</p>	Will re-write
Marc Darras (GDF SUEZ)	TS	9	10	-	-	-	-	-	add cooking	laundry list of examples revised. Cooking now covered in 'thermal energy'
Netherlands (KNMI (Royal Dutch Meteorological Institute))	TS	9	23	9	25	-	-	-	by adding "with similar carbon intensity" to the sentence, it would make clearer that two things are compared on the similar basis here. The reason for comparison with CCS is not mentioned here, which makes CCS come more or less out of thin air.	Sentence deleted in rewrite.
United States (U.S. Department of State)	TS	9	25	-	-	-	-	-	Change to "the same amount of energy for services".	Sentence deleted in rewrite.
United States (U.S. Department of State)	TS	9	4	9	6	-	-	-	Check and confirm facts with AR4, or frame with more clarity. Some sources indicate that 80% or more (not 60%) of anthropogenic GHGs arise from combustion of fossil fuels.	Will ck facts with AR4

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United States (U.S. Department of State)	TS	9	2	9	4	-	-	-	<p>Delete references to thermal losses. Rephrase bolded message to read, "Renewable energy can supply the same energy services to users as conventional primary energy services and do so, in some cases, with significant and distinct advantages."</p> <p>The introduction in this top-line of the technical construct of "thermal losses" is confusing. Energy is conserved and never "lost", so the use of term is interpretive, and what really matters is loss of thermodynamic "availability", not energy, which at rejected temperatures is much less valuable than indicated by absolute measures of energy. None of this is well founded in principles of thermodynamics. Finally, the message about "the same energy services" being provided with "differing amounts of end-use energy" is confusing and should be deleted.</p>	Authors believe this is an important point, but will reword for clarity.
United States (U.S. Department of State)	TS	9	23	9	24	-	-	-	Delete sentence about CCS, since future processes such as integrated gasification fuel cells could nearly eliminate the energy penalty for CO2 capture.	Will refine -- but CCS is important
United States (U.S. Department of State)	TS	9	19	9	25	-	-	-	<p>Discussion of thermal losses is confusing and potentially irrelevant. Parsing this paragraph into its parts with meaning is difficult. Overall, it would be best to delete it, unless it can be made much clearer.</p> <p>Note: While it is true that certain conventional energy conversion processes (to electric power) operate at Carnot efficiencies of 20-30%, and hence there are thermal losses, it is also true that solar or geothermal energy conversion processes (to electric power) operate at similar efficiencies. If the the discussion is restricted to "thermal" end-uses, heating directly from RE sources, such as solar insolation or geothermal sources could be more efficient, but there are still losses. Only a small fraction of solar insolation, for example, falls in the heating (infrared) part of the electromagnetic spectrum. The references to "mechanical" energy are not clear. Is there meant to be a comparison of diesel engines or electric motors to direct drive from water wheels?</p>	Will clarify or remove
Nico Bauer (Potsdam Institute for Climate Impact Research)	TS	9	23	-	-	-	-	-	don't say can; name cases where it is and where it is not	Sentence deleted in rewrite.
Australia (0)	TS	9	6	9	7	-	-	-	End of sentence is confusing. Rewrite '....provide the remainder of energy supply'	Sentence deleted in rewrite.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	TS	9	13	-	-	-	-	-	It is unclear to what exactly the 'this' in the sentence refers to:	Reworded to clarify.

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ICHIRO MAEDA (The Federation of Electric Power Companies of Japan)	TS	9	2	9	4	-	-	-	Refer the comment on SPM [page9, Line2-Line4]	Will coordinate with SPM
United States (U.S. Department of State)	TS	9	10	9	13	-	-	-	Rephrase awkward sentences. Suggest, "Since what is ultimately desired is energy service, in the form of lighting, heating, cooling, transport, industrial processes, motive power, electronics and others, careful design can minimize the required energy inputs for these services, match them to the outputs of RE sources, and in some cases avoid multi-step energy conversion processes altogether. The multi-step conversion processes for various forms of energy are illustrated on Figure TS 1.2."	Rewritten for clarity.
United States (U.S. Department of State)	TS	9	20	9	21	-	-	-	Replace with: "...approximately 50-90%; losses of around 80% occur to supply the mechanical energy needed for transportation."	Sentence rewritten for clarity.
United States (U.S. Department of State)	TS	9	22	-	-	-	-	-	Replace with: "...these thermal losses, but do involve other forms of energy loss."	Sentence reworded for clarity.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	TS	9	10	9	12	-	-	-	Sentence is ill-formulated making it hard to comprehend. Since it is the ultimate energy services ..? Also, how can careful design extract the required energy?	Rewritten for clarity.
Oyvind Christophersen (Climate and Pollution Agency)	TS	9	19	9	25	-	-	-	The statement is incorrect. Inevitable losses based on 2nd law considerations affect all energy technologies. Solar PV has limitations due to the combination of band-gap and solar spectrum, wind energy has losses due to the slowdown of wind and the fact that air cannot come to a standstill after the wind turbine. Of course use of heat directly can be more efficient in a 1st-law sense, but in terms of 2nd law efficiencies, limitations become apparent. I suggest removing this paragraph without replacement.	Will clarify or remove
Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	TS	9	3	-	-	-	-	-	The text mentions reduction of thermal losses when using RE, but there also many cases of reduction of electrical losses, e.g. long-range electricity transportation. It would be both more accurate and less confusing to write ""...without the energy losses to which combustible fuels...""	Discussion on thermal losses has been moved and reworded to clarify.
Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	TS	9	20	-	-	-	-	-	With combined cycles the losses can be as low as 40%, thus 50% mentioned in the text seems a overestimation	Reworded only to mention maximum losses.
Michael Jack (Scion (NZ Forest Research Institute))	TS	9	-	-	-	-	-	TS 1.2	As in SPM 1, I think this table should also include electrochemical conversion approaches that are not only based on hydrogen.	Comment unclear - not referenced to TS 1.2?

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ICHIRO MAEDA (The Federation of Electric Power Companies of Japan)	TS	9	-	-	-	-	-	TS 1.2.	<comment> Change the description from "Some relevant policy instruments" to "Some relevant potential policy instruments". <reason> Whether "policy instruments" could become the solution to barriers depends on the circumstances, so it would be better to describe according to the wording of Line33, 12 of 135 in Technical Summary.	Table deleted from TS. In rewrite.
ICHIRO MAEDA (The Federation of Electric Power Companies of Japan)	TS	9	-	-	-	-	-	TS 1.2.	<comment>It's difficult for readers to understand what you want to say by taking a look, because this table is too simplified. Please complement information to be needed for their understanding. <reason>For example, the same "policy instruments" are written in part of "Markets Failures" and "Economic Barriers". We cannot understand which point is different between the two. Despite this table is included in summary, that doesn't tell them much.	Table deleted from TS. In rewrite.
Oyvind Christophersen (Climate and Pollution Agency)	TS	9	-	-	-	-	TS 1.2	-	Figure TS 1-2 shows that we can do the same with RE as with today's energy sources. To present this as principles with purpose to communicate the message that all type of technology (energy type) can be used for all types of end-use is wrong in relation to reality. Thus, the figure gives a distorted picture of the practical challenges to be encountered. The real challenges remain camouflaged.	Figure has been simplified and revised. Its purpose is to present a schematic of the transformation of energy sources to services, particularly with regard to RE.
China (China Meteorological Administration)	TS	9	-	-	-	-	TS 1.2	-	In the figure, the 'Ocean Energy' should be connected to 'Thermal Conversion'.	Figure revised to clarify.
United Kingdom (Department of Energy and Climate Change)	TS	9	-	-	-	-	TS 1.2	-	Missing heat to cooling link again (if this figure stays, should be included)	Noted.
ICHIRO MAEDA (The Federation of Electric Power Companies of Japan)	TS	9	-	-	-	-	TS 1.2	-	Refer the comment on Figure SPM1.	Noted.
Oyvind Christophersen (Climate and Pollution Agency)	TS	9	-	9	-	-	TS 1.2	-	Same as comment 2.	Comment unclear.
Antoine BONDUELLE (E&E Consultant)	TS	9	-	-	-	-	TS 1.2	-	Same remark for SPM. Figure TS1.2 is complex and difficult to read, for a limited information content. Maybe a simple paragraph could be clearer.	Figure simplified and revised for clarity.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	TS	9	-	-	-	-	TS 1.2	-	similar as fig1.6 Figure is rather messy, repositioning some boxes may help. An arrow from "hydrogen energy" to "thermal conversion" is missing.	Figure simplified and revised for clarity.

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United Kingdom (Department of Energy and Climate Change)	TS	9	-	9	-	-	TS 1.2	-	This figure could be deleted, given that reducing the number of pages is important.	Rejected.
Oluf Ulseth (Statkraft AS)	TS	9	-	-	-	-	TS 1.2	-	This schema is omitting to illustrate the possibility to produce hydrogen from hydropower. Therefore an arrow should be added pointing from Hydro Energy to Hydrogen Energy .	In revised figure, comment no longer relevant.
Oyvind Christophersen (Climate and Pollution Agency)	TS	9	-	-	-	TS 1.2	-	-	This schema is omitting to illustrate the possibility to produce hydrogen from hydropower. Therefore an arrow should be added pointing from Hydro Energy to Hydrogen Energy .	Figure being refined
Nico Bauer (Potsdam Institute for Climate Impact Research)	TS	10	1	11	6	-	-	-	revise as underlying section of ch1 will be revised	Will address with Chapter 1 and Chapter 1 TS redraft
United States (U.S. Department of State)	TS	10	2	10	4	-	-	-	This opening sentence conveys an important message that capital investment in RE is increasing, but would be highly misleading without added context or explanation. Rephrase to, "In 2008, UNEP data indicate that global investment in RE rose by 5%. In absolute terms, total investment in RE was [\$x,xxx billion], which exceeded that for coal and natural gas by \$140 billion and \$110 billion, respectively. The reasons for this are varied and complex, but may be attributed in large measure to an array of national, state and regional policy interventions, such as RE mandates, GHG emissions trading schemes that favor RE over other non-emitting sources, and strong and/or long-term financial subsidies, such as feed-in-tariffs."	Relevant text deleted in rewrite.
United States (U.S. Department of State)	TS	10	4	-	-	-	-	-	Explain \$15 billion investment in energy efficiency--what is the definition of this; far more than this was invested in energy efficient equipment, appliances, lighting, etc., so what does this mean?	Sentence deleted in rewrite.
United States (U.S. Department of State)	TS	10	5	10	7	-	-	-	Delete the parentheses after "5%".	Accepted.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	TS	10	5	10	8	-	-	-	Similar as in Chapter 1, (pg 28,ln23-25) the shares add up to more than 100% even without the hydropower. The \$ 40-45bn dollar imply another ~30% given the stated total investment total of \$ 140bn. Moreover, it would make sense to convert this amount into a percentage as well, to make it comparable to the other percentages.	Will address with Chapter 1 and Chapter 1 TS redraft
Jorge Martínez Chamorro (Agencia Canaria de Desarrollo Sostenible y Cambio Climático)	TS	10	9	10	9	-	-	-	"In recent years, RE has contributed 23% of added capacity". Necessary clarification about what is considered as recent years (2, 5, 10, 15) in order to estimate the added capacity.	Accepted. Clarification made in accompanying figure.

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United States (U.S. Department of State)	TS	10	9	10	11	-	-	-	Clarify. Does this mean that RE has contributed about 1/4 of all added capacity worldwide in recent years?	Accepted.
United States (U.S. Department of State)	TS	10	10	-	-	-	-	-	Replace "due" with "owing" Write "widespread" as one word. Add a comma after "use"	Sentence deleted in rewrite.
Gerrit Hansen (TSU)	TS	10	12	-	-	-	-	-	this number can not be found in the solar chapter	Will coordinate with solar chapter
Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	TS	10	12	10	14	-	-	-	Why the specific mention to Germany here? Indeed it has invested a lot in RE, but other countries perform much better in Europe, such as Sweden, Austria, Portugal,... if an example of success is to be quoted, Germany is certainly not the best choice.	Will address with Chapter 1 and Chapter 1 TS redraft
Susanne Kadner (Technical Support Unit)	TS	10	13	10	14	-	-	-	Ch 1: Considering the following sentence about the developing world, numbers for developed countries would fit better here!	Will address with Chapter 1 and Chapter 1 TS redraft
United States (U.S. Department of State)	TS	10	13	10	14	-	-	-	Replace "at" with "by" Delete the sentence starting with "Germany in 2008..."	Sentence reworded, 1st comment no longer relevant. Sentence beginning "Germany..." deleted in rewrite.
Italy (Institute for Environmental Protection and Research (ISPRA))	TS	10	13	10	14	-	-	-	There is no reason to single out one country, particularly if it is not the country with the highest share of renewables in the world. Delete "Germany in 2008 produced 15% of its electricity and 10% of its total energy from renewable sources".	Will address with Chapter 1 and Chapter 1 TS redraft
Netherlands (KNMI (Royal Dutch Meteorological Institute))	TS	10	13	10	14	-	-	-	why are the German figures mentioned here?	Will address with Chapter 1 and Chapter 1 TS redraft
United Kingdom (Department of Energy and Climate Change)	TS	10	14	10	17	-	-	-	Can, in principle, also see reduced need for expensive infrastructure in developing economies by going for RE.	Intent of comment unclear
United States (U.S. Department of State)	TS	10	15	-	-	-	-	-	"leapfrog adaptation": -- explain; "evolving scenarios --what scenarios, by whom, showing what?"	Sentences deleted in rewrite.
United States (U.S. Department of State)	TS	10	15	10	18	-	-	-	Replace with:"...developed economies. Models suggest that a significant portion of future needs for electricity, heat, and transportation can be met by RE. "Figure TS 1.3 shows how primary RE sources were used in 2007. 'RE' here includes..."	Sentence deleted in rewrite. Figure TS 1.3 caption revised.
Australia (0)	TS	10	15	-	-	-	-	-	Use of word 'adaptation' is confusing. Word is used in IPCC context to do with climate change impacts and consequential adaptation actions. Recommend redrafting sentence.	Sentence deleted in rewrite.

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Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table	Comments	Consideration by writing team
Emmanuel Branche (Electricité de France)	TS	10	27	10	30	-	-	-	It could be interesting to add that hydropower accounts for 86% of RE-electricity (e.g. 3,078 TWh for hydropower out of 3,578 TWh for all RE-electricity, cf. Table 1.6 of Chapter 1). Hydropower with reservoirs and/or pumped-storage PP are the only mature storage technology for electricity grids	While interesting, cannot include all details in TS
Oyvind Christophersen (Climate and Pollution Agency)	TS	10	27	10	28	-	-	-	Sentence is incomprehensible	Sentence deleted in rewrite.
United States (U.S. Department of State)	TS	10	27	10	30	-	-	-	The information conveyed by this paragraph should be made clearer. Based on data in Figure TS 1.3, rephrase to, "In 2007, RE sources generated 18% of global electricity (19,756 TWh). The energy flows from hydroelectric power and bio-fueled boilers and CHP account for 88% of this RE electricity (14.6 of 16.5 EJ). However, there is significant investment and growth in other forms of RE power technologies, as noted above, accounting for 1.9 EJ in 2007.	Paragraph rewritten for clarity.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	TS	10	29	-	-	-	-	-	What does "this figure" refer to? Fig TS 1.3?	Accepted. Text deleted.
Frank Mastiaux (EON Climate & Renewables)	TS	10	-	-	-	-	TS 1.3	-	add unit in the figure for energy supply etc.	Noted.
Oyvind Christophersen (Climate and Pollution Agency)	TS	10	-	10	-	-	TS 1.3	-	Same as Comment 3.	Comment unclear.
Marc Darras (GDF SUEZ)	TS	10	-	-	-	-	TS 1.3	-	This figure is OK. However it might be interesting to have the similar picture for energy at large to understand the role it has presently in the supply and demand. This is important to understand later on the role it will play.	Noted.
United States (U.S. Department of State)	TS	11	1	11	3	-	-	-	The opening sentence of this paragraph is an important summary message and should be bolded. However, the message about challenges should be clear and direct. Rephrase to, "The integration into electric power systems of large portions of power generated from RE sources presents an array of significant challenges. Experience has shown, however, that these challenges can be addressed. They require"	Discussion of integration options moved to TS Section 8.
STEPHANE POUFFARY (Energies 2050)	TS	11	7	7	15	-	-	-	Add somewhere 'no waste risk' (at least there is a word to be said on nuclear waste)	Laundry list of drivers removed from text in FD TS. Full risk discussion now appears in Ch 9.
Oyvind Christophersen (Climate and Pollution Agency)	TS	11	7	11	15	-	-	-	Benefits are emphasized here and costs are not discussed. Of course this comes later, but it seems to be missing here	Will address with Chapter 1 and Chapter 1 TS redraft

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United States (U.S. Department of State)	TS	11	7	11	15	-	-	-	Clarify this section. The statements made here are highly scenario dependent. The same statements could be made for other modern sources of clean electric power.	Laundry list of drivers removed from text in FD TS. Positives and negatives of RE in comparison with other energy sources now appears in Ch 9.
United Kingdom (Department of Energy and Climate Change)	TS	11	7	11	15	-	-	-	Security and resilience of supply should also be mentioned here - they are important in their own right but can have very strong macro economic links back to ability to deliver MDGs etc.	Laundry list of drivers removed from text in FD TS. Paragraph on energy security now included.
Nico Bauer (Potsdam Institute for Climate Impact Research)	TS	11	7	11	26	-	-	-	take out parts that do not belong to ch1, in terms of text flow it belongs to p. 1. 25-32	Will address with Chapter 1 and Chapter 1 TS redraft
United States (U.S. Department of State)	TS	11	8	-	-	-	-	-	Replace "they offer" with "it offers"	Relevant sentence deleted in rewrite.
Marc Darras (GDF SUEZ)	TS	11	11	-	-	-	-	-	ADD energy access	Laundry list of drivers removed from text in FD TS. Paragraph on energy access now included.
Italy (Institute for Environmental Protection and Research (ISPRA))	TS	11	11	11	11	-	-	-	At the end of the line, insert "reduction of dependence from energy imports" (this is a priority issue for many countries)	Laundry list of drivers removed from text in FD TS. Paragraph on energy security now included.
Finland (Finnish Meteorological Institute)	TS	11	11	11	20	-	-	-	Statement "RE technologies have significant benefits for reducing air pollution" is not well backed up by research. See comment 32.	Will ensure referencing in Chapter 1
United States (U.S. Department of State)	TS	11	16	-	-	-	-	-	Add a comma after "generation"	Sentence deleted in rewrite.
United States (U.S. Department of State)	TS	11	16	-	-	-	-	-	Bolded finding should be made clearer and more specific. Rephrase to, "RE electric generation that replaces power generated from conventional fossil fuel technologies reduces air pollution and gives rise to other co-benefits."	Sentence deleted in rewrite.
United States (U.S. Department of State)	TS	11	18	-	-	-	-	-	Replace "to air" with "into the atmosphere, but also through solid and liquid waste streams"	Sentence deleted in rewrite.
Nico Bauer (Potsdam Institute for Climate Impact Research)	TS	11	28	12	22	-	-	-	revise, see critique on main text (ch1)	Will address with Chapter 1 and Chapter 1 TS redraft
United States (U.S. Department of State)	TS	11	28	11	30	-	-	-	The claim that RE can "advance consumers up the energy ladder" is vague. Delete end of sentence after "available locally".	Sentence deleted in rewrite.
United Kingdom (Department of Energy and Climate Change)	TS	11	28	12	2	-	-	-	Where grid infrastructure does not currently exist RE can be the least cost solution (things like PV may not look 'cheap', but it can be cheaper than putting grid wires etc.)	Will address with Chapter 1 and Chapter 1 TS redraft

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Nico Bauer (Potsdam Institute for Climate Impact Research)	TS	11	29	-	-	-	-	-	language, rephrase	Sentence deleted in rewrite.
Nico Bauer (Potsdam Institute for Climate Impact Research)	TS	11	30	-	-	-	-	-	explain energy ladder	Will explain energy ladder
Antoine BONDUELLE (E&E Consultant)	TS	11	-	-	-	-	-	-	Same remark for SPM. Figure TS1.4 is not very clear and adds confusion to the text.	Will coordinate with SPM
Oyvind Christophersen (Climate and Pollution Agency)	TS	11	-	-	-	-	TS 1.4	-	Figure TS 1-4. This figure is far too complicated to have an obvious and clear message. It complicates and contributes to camouflage the message.	Figure removed in revised text.
ICHIRO MAEDA (The Federation of Electric Power Companies of Japan)	TS	11	-	-	-	-	TS 1.4	-	Refer the comments on Figure SPM3.	Noted.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	TS	11	-	-	-	-	TS 1.4	-	similar as for fig 1.5 The message of this figure is incomprehensible, the caption doesn't help to explain it. It is unclear what the different shapes of textboxes and arrows mean. Moreover it states that the figure is a comparison, but how the different means are compared and how they score is not shown..	Figure removed in revised text.
United Kingdom (Department of Energy and Climate Change)	TS	11	-	11	-	-	TS 1.4	-	This figure could be deleted, given that reducing the number of pages is important.	Accepted.
United Kingdom (Department of Energy and Climate Change)	TS	11	-	-	-	-	TS 1.4	-	This is a complex diagram that I do not think adds much to the text. It would be much better to include here instead a table of the relative energy and water requirements	Figure removed in revised text.
Marc Darras (GDF SUEZ)	TS	11	-	-	-	-	TS 1.4	-	To be complemented by biodiversity in term of impact. Plus Hydro has an impact on water quality and CH4 emission (GHG)	Figure removed in revised text.
United States (U.S. Department of State)	TS	12	2	-	-	-	-	-	"as indicated in section 1.1.5." There is no such section identified in Chapter 1.	Will address with Chapter 1 and Chapter 1 TS redraft
Stephan Klasen (University of Göttingen)	TS	12	3	13	6	-	-	-	Emphasize importance of electrification for production (not just household level consumption and well-being).	Relevant text deleted in rewrite.
United States (U.S. Department of State)	TS	12	4	-	-	-	-	-	After "health care" add "poor water quality"	Relevant text deleted in rewrite.
Australia (0)	TS	12	7	-	-	-	-	-dominant energy source at present.....'	Intent of comment unclear
United States (U.S. Department of State)	TS	12	8	-	-	-	-	-	After "insufficient" add "and often unhealthy"	Relevant text deleted in rewrite.
United States (U.S. Department of State)	TS	12	9	-	-	-	-	-	In West Africa, solar thermal for cooking is generally not practical as most cooking is done early in the morning or in the evening when there is little available solar energy (and thermal storage would be expensive).	Relevant text deleted in rewrite.

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Marc Darras (GDF SUEZ)	TS	12	9	-	10	-	-	-	More efficient oven and haters are as well available and a way forward. Biogas has been omitted.	Relevant text deleted in rewrite.
Christoph von Stechow (IPCC WGIII TSU)	TS	12	10	12	11	-	-	-	Since the assertion that "improved biomass stoves save 10% to 50% of biomass consumption" is slightly different to the assertion made on p. 50, l. 6-9 ("fuel savings from 30- 60% (Jetter and Kariher, 2009; Berrueta et al 2008), please amend this in a consistent way.	Will address with Chapter 1 and Chapter 1 TS redraft
United States (U.S. Department of State)	TS	12	12	-	-	-	-	-	Most practical stoves today show only modest reductions in emissions even in lab tests--e.g. 50% when more than 90% reductions are needed, and performance gains are even less in the field.	Relevant text deleted in rewrite.
United States (U.S. Department of State)	TS	12	12	-	-	-	-	-	With "indoor air quality" could usefully note World Health Organization estimate based on Kirk Smith's and others detailed epidemiological data of 1.6 million deaths per year worldwide, primarily women and children, due to the use of biomass for household cooking and, in some areas, heating using traditional stoves.	Relevant text deleted in rewrite.
Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.l.)	TS	12	14	12	15	-	-	-	In addition it can be mentioned that this CSP energy can be a source of income if exported (e.g. Sahara to Europe)	Relevant text deleted in rewrite.
United States (U.S. Department of State)	TS	12	18	-	-	-	-	-	Electricity allows what tasks to be done? Many of the agricultural tasks, in particular, do not have electric equipment available today that can do the job.	Relevant text deleted in rewrite.
Australia (0)	TS	12	21	12	22	-	-	-	Final sentence is unclear and not linked to rest of para.	Relevant text deleted in rewrite.
United States (U.S. Department of State)	TS	12	24	-	-	-	-	-	Replace "Then, why" with "Why"	Sentence deleted in rewrite.
United States (U.S. Department of State)	TS	12	26	-	-	-	-	-	Replace "Firstly" with "First"	Wording revised in rewrite to remove 'first' and/or 'firstly'.
Frank Mastiaux (EON Climate & Renewables)	TS	12	28	-	-	-	-	-	market failures missing the text as type of barrier from the tabel TS 1.2	Accepted.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	TS	12	28	-	-	-	-	-	The category "market failures" is missing in the list of barrier categories	Accepted.
United States (U.S. Department of State)	TS	12	29	12	33	-	-	-	Delete the sentence starting with "More importantly, however." Add the following sentence: "...presence of 'perfect markets.' The barriers are interrelated and need to be dealt with in a comprehensive manner. A summary of barriers ..."	Sentence deleted in rewrite.
STEPHANE POUFFARY (Energies 2050)	TS	12	30	-	-	-	-	-	In some cases, barriers can become opportunities as, for example, cost reduction of not reinforcing the grid through distributed energies.	Noted.
Australia (0)	TS	12	31	12	33	-	-	-	Sentence ('others....') is unclear and is probably incorrect. Suggest deleting.	Accepted.

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Australia (0)	TS	12	-	-	-	-	-	TS 1.2	Delete UNFCCC and UNIDO - enabling measures go wider than these bodies.	Table deleted in revised text.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	TS	12	-	-	-	-	-	TS 1.2	relevant policy instrument for market failure can also be "emission standards" or command and control legislation in general	Table deleted in revised text.
ICHIRO MAEDA (The Federation of Electric Power Companies of Japan)	TS	12	-	-	-	-	-	TS 1.2	technical and Structural barriers <comment> Add the need of infrastructure building and development and diffusion of backup system	Table deleted in revised text.
Stephan Klasen (University of Göttingen)	TS	12	-	-	-	-	-	TS 1.2	The most important economic barrier has been the high costs of many of the RE technologies. This should be emphasized more.	Though table was deleted, revised text and categorization addresses this.
United Kingdom (Department of Energy and Climate Change)	TS	12	-	-	-	-	-	TS 1.2	Where is high (first) cost in this barrier analysis?	Table deleted in revised text.
Taishi Sugiyama (Central Research Institute of Electric Power Industry (CRIEPI))	TS	12	-	-	-	-	-	TS 1.2	You must address costs, intermittency, and stability of supply in the first place. These three are the key barriers of RE.	Though table was deleted, revised text and categorization addresses this.
United States (U.S. Department of State)	TS	13	1	-	-	-	-	-	Replace "Secondly" with "Second"	Wording revised in rewrite to remove 'second' and/or 'secondly'.
United States (U.S. Department of State)	TS	13	2	-	-	-	-	-	Replace with: "...may be too small or too expensive to be useful ..."	Noted. Rewritten to clarify.
ICHIRO MAEDA (The Federation of Electric Power Companies of Japan)	TS	13	9	-	-	-	-	-	<comment> Add the sentence below; To make an applicable energy plan which reflect actual condition of the country and the region is a task that is the primary responsibility of policy maker .	Though sentence not included, sentiments reflected in the text in rewrite.
Seth Dunn (GE)	TS	13	9	-	39	-	-	-	Is this section redundant given policy section to come? Perhaps reference later section to save space.	Will address with Chapter 1 and Chapter 1 TS redraft
Emmanuel Branche (Electricité de France)	TS	13	9	13	39	-	-	-	It could be interesting to define feed-in-tariffs (FIT: a mechanism that put a legal obligation on utility companies to buy electricity from renewable energy producers at a premium rate, usually over a guaranteed period, making the installation of renewable energy systems a worthwhile and secure investment for the producer. The extra cost is shared among all energy users, thereby reducing it to a barely noticeable level) which is a price/value mechanism, in contradiction with tradable green certificates (TGC: a tradable commodity proving that certain amount of electricity is generated using renewable energy sources) which is a quantity mechanism	While interesting, cannot include all details in TS
Nico Bauer (Potsdam Institute for Climate Impact Research)	TS	13	9	13	39	-	-	-	main text of underlying chapter needs to be revised; coordinate and revise accordingly	Will address with Chapter 1 and Chapter 1 TS redraft

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United Kingdom (Department of Energy and Climate Change)	TS	13	10	13	39	-	-	-	After a number of paragraphs focusing on the particular needs and issues around developing economies and the poor, this section seems to ignore them altogether - what is the role of a feed in tariff if you do not have a grid to feed into? This section should recognise the institutional and other challenges associated with providing modern energy in these contexts.	Will address with Chapter 1 and Chapter 1 TS redraft
Emmanuel Branche (Electricité de France)	TS	13	11	13	11	-	-	-	Replace "mandatory RE targets," by "mandatory RE targets with tradable green certificates" as if no scheme is associatec with a target, RE deployment could not occur	Relevant text deleted in rewrite.
Emmanuel Branche (Electricité de France)	TS	13	12	13	13	-	-	-	Replace "inherent in European feed-in-tariffs" by "inherent in some European feed-in-tariffs". Indeed not all EU member States use FIT, some are using TGC which have proven their availability to develop RE in an efficient way (UK). Furthermore some EU FIT do not result in an effective development of RE.	Relevant text deleted in rewrite.
United States (U.S. Department of State)	TS	13	15	-	-	-	-	-	Replace "for the longer term" with "for longer term"	Relevant text deleted in rewrite.
Emmanuel Branche (Electricité de France)	TS	13	18	13	18	-	-	-	"novel" is not appropriate as there is no new RE (they are all known by many years, even if they are non commercially viable at the moment). Proposition to replace "novel" by "non mature"	Will replace novel -- but non-,mature is not appropriate
United States (U.S. Department of State)	TS	13	22	13	23	-	-	-	Replace text after "enhance" with, "the economic benefits of using a particular technology. Others . . ."	Relevant text deleted in rewrite.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	TS	13	25	13	31	-	-	-	Focus for who or what? Also, the statement that the major focus is the electric sector requires more elaboration. Why is that so? The use of RE in industry is not mentioned, although large challenges exists there also.	Will address with Chapter 1 and Chapter 1 TS redraft
Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	TS	13	25	-	-	-	-	-	In some countries the ""major focus"" is not the power sector. Countries that need lots of space and/or water heating also view this as a ""major focus"". It could be rephrased as ""A major focus for RE is...""	Will replace novel -- but non-,mature is not appropriate
STEPHANE POUFFARY (Energies 2050)	TS	13	25	-	-	-	-	-	Not so sure this is ""the"" major focus	Accepted.
United States (U.S. Department of State)	TS	13	26	-	-	-	-	-	Replace "transport" with "transportation"	Noted.
Marc Darras (GDF SUEZ)	TS	13	29	-	-	-	-	-	In order to cover every sector, Add : " In the heating sector, if solar thermal applications such as solar water heater or floor heating are available their development has to be combined with structural measures for the building. Concerning cooling, solar cooling is in the demonstration phase. Beside waste and water treatment sectors", the agriculture sector...	Sentence on Re H/C policies introduced. Full discussion in Ch 11 section.

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United States (U.S. Department of State)	TS	13	32	13	35	-	-	-	The concluding paragraphs of this part of the TS should be phrased carefully. Suggest rephrasing this paragraph to, "For RE sources to assume their proper role in future energy supply, it will be necessary for governing bodies to incorporate externalities into their economic and regulatory frameworks affecting investment and decision-making. These externalities will need to address considerations of climate change, air pollution, impacts on land and water, and an array of other impacts and co-benefits associated with the development a particular form of RE, aesthetics, option values, and more. Ideally, these considerations will be defined and quantified from a life-cycle perspective -- for RE sources and all other energy technologies.	Will address with Chapter 1 and Chapter 1 TS redraft
United States (U.S. Department of State)	TS	13	33	-	-	-	-	-	Replace "as review" with "as to review"	Relevant text deleted in rewrite.
Australia (0)	TS	13	33	-	-	-	-	-	review' is weak - suggest 'harness'.	Relevant text deleted in rewrite.
Matt Davison (University of Western Ontario)	TS	13	35	13	39	-	-	-	Perhaps the most significant regulatory barriers can lie in the operation of storage facilities. In a regulated or price capped deregulated market, it is difficult for storage facilities to make back their efficiency losses, let alone their capital costs.	Relevant text deleted in rewrite.
United States (U.S. Department of State)	TS	13	36	13	39	-	-	-	This is a final and trailing paragraph to the main conclusion, which appeared in the preceding paragraph. Accordingly, its distinct purpose needs to be clearer, focusing not on mixing more in on "externalities" and "co-benefits", but on unique institutional barriers. Rephrase to, "In addition to the need for addressing externalities and benefits of RE sources, most countries have found that there are significant non-economic, non-technical, institutional barriers to introducing RE power to the grid. This is often a result of the regulatory structures that govern power supply and delivery to the public. These tend toward conservatism and risk avoidance, emphasize reliability, favor traditional technologies over innovation, and seek community-wide benefits of low-cost power delivery. While these values have their place, broader perspectives can give rise to win-win solutions. Where these issues have been addressed, the penetration of RE has been greatest."	Relevant text deleted in rewrite.
United States (U.S. Department of State)	TS	13	37	-	-	-	-	-	Replace "recognize that" with "account for the full"	Relevant text deleted in rewrite.
United States (U.S. Department of State)	TS	13	38	-	-	-	-	-	Add "that" after "and"	Relevant text deleted in rewrite.

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Marc Darras (GDF SUEZ)	TS	13	39	-	-	-	-	-	Add at the end of the sentence: especially if their integration in the energy system and the enrgy mix is taken into account.	Relevant text deleted in rewrite.
United States (U.S. Department of State)	TS	-	-	-	-	-	TS 0.1	-	It would be useful to also show the total CO2. The population increase/discrepancy in 2006 should be explained.	Noted.
Susanne Kadner (Technical Support Unit)	TS	-	-	-	-	-	TS 0.2	-	Ch 10 Table of this size does not fit the summary character of the TS and needs to be removed. Instead, summary of the information should be provided in the text.	There is no figure 0.2 in TS text. Nonetheless, effort will be made to avoid large tables in the TS.
Ladislau Rybach (Geowatt AG Zurich (company))	TS	-	-	-	-	-	TS 1.2	-	1) no connecting line can be drawn between the boxes Nuclear fission and Geothermal energy: geothermal heat is generated by the decay of naturally radioactive isotopes and not by nuclear fission;	Accepted.
Ladislau Rybach (Geowatt AG Zurich (company))	TS	-	-	-	-	-	TS 1.2	-	2) a line needs to be drawn between the boxes Heat and Cooling (the wide-spread absorption chillers use heat sources like solar or geothermal).	Amended in revised figure along these sentiments.
Marc Darras (GDF SUEZ)	TS	-	-	-	-	-		TS 1.2	carbon taxes and emission trading schemes are related to market failure and not economic barriers. RDD and specific financing are more relevant here. Concerning technical barriers, tech transfer may happen under any form and not specifically through UNFCCC.	Market failures and economic barriers have been grouped together in revised categorization. Relevant table deleted from text.
United States (U.S. Department of State)	TS	-	-	-	-	-	TS 1.2	-	Figure is missing a variety of important connections. For example, there is no line from solar energy directly to electricity or to fuels. For ocean energy, only tidal energy is connected to gravitational force, and only current and OTEC is directly connected to solar; much of ocean energy is wind-generated. A bent arrow needs to go from the Nuclear Energy box to the Thermal Energy box. Also, it is not clear to me that this figure provides much value added; a table would be more informative.	Figure substantially improved for FD considering these inputs.
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	TS	-	-	-	-	-	TS 1.2	-	Figure is not well explained, the arrows in both directions are not explained, disarranged.	Figure substantially improved for FD to improve readability.
Ladislau Rybach (Geowatt AG Zurich (company))	TS	-	-	-	-	-	TS 1.2	-	Figure TS 1.2 is incorrect and incomplete:	Figure substantially improved for FD.
Nico Bauer (Potsdam Institute for Climate Impact Research)	TS	-	-	-	-	-	TS 1.2	-	see figure 1.6 of ch1 for critique	Noted.
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	TS	-	-	-	-	-	TS 1.3	-	Figure is disarranged.	Figure substantially improved for FD.
Ladislau Rybach (Geowatt AG Zurich (company))	TS	-	-	-	-	-	TS 1.3	-	The EJ number for Geothermal in Primary Energy Supply (second from bottom) should be 0.4 (see Table SMP 2 [2]) instead of 2.1.	Accepted.
United States (U.S. Department of State)	TS	-	-	-	-	-	TS 1.4	-	Figure is overly complex. Delete or handle by table.	Figure deleted in FD.

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United States (U.S. Department of State)	TS	-	-	-	-	-	TS 1.4	-	Figure TS 1.4 mixes different issues, and does not show the magnitude of the different effects, such as how much CO2 from biofuel crop cultivation vs. fossil fuel production and use. See comments on TS 1.4 elsewhere.	Figure deleted in FD.
Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	TS	-	-	-	-	-	TS 1.4	-	In addition to the exceptions mentioned in the caption of the Figure, there would be co-benefits related to waste treatment and decontamination in the cases of anaerobic digestion with biogas burned for electricity	Figure deleted in FD.
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	TS	-	-	-	-	-	TS 1.4	-	Mistake: In the first box it should mean Nuclear Energy Production and not Nuclear Fuel Production. Figure is not well explained, the symbols are not explained, chaotic.	Figure deleted in FD.
Seth Dunn (GE)	TS	-	-	-	-	-	TS 1.4	-	This is a confusing figure and could be removed to save space.	Figure deleted in FD.
Nico Bauer (Potsdam Institute for Climate Impact Research)	TS	-	-	-	-	-	TS 1.4	-	value added questionable, see comments on Figure 1.5 ch1	Figure deleted in FD.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	TS	13	32	13	35	-	-	-	This section feels like an obligatory addition of the life cycle concept. It could use more introduction. The reason for its specific inclusion here in the text is unclear - maybe it should be introduced earlier already?	Paragraph in itself removed from FD. Concept addressed in policy discussion as an important consideration for policymakers.
Gerrit Hansen (TSU)	TS	14	31	-	32	-	-	-	"several hundreds of EJ" is not in line with values reported e.g. in table TS1.1, "in the future" is should be specified. Statement could be challenged given the wide range of recent assessments reporting figures below 100, or max. 200 EJ. A reference to what is considered technical potential in bioenergy context might be useful, given the fact that technical potentials are reported in various tables.	The text reports data from the literature and as such has many figures for the potential. But also we report our conclusion from the many studies reported. Consistency with Table TS1.1 will be cared.
Marc Darras (GDF SUEZ)	TS	14	8	-	-	-	-	-	ADD "and biodiversity" after forest and suppress "and more"	Accepted
United States (U.S. Department of State)	TS	14	31	-	-	-	-	-	Add "sustainably" after "provided".	Accepted
Marc Darras (GDF SUEZ)	TS	14	17	-	-	-	-	-	ADD Furthermore, for traditional uses, modern oven and appliances can enhance significantly efficiency while reducing health and environment hazards.	In introduction is not the place to make judgements on bioenergy quality
United States (U.S. Department of State)	TS	14	22	-	-	-	-	-	After "US\$/GJ" insert "for" before "biofuels".	Accepted
John Twidell (AMSET Centre)	TS	14	-	26	-	-	-	-	Bioenergy section. Whilst not in error, this whole section is needlessly wordy and poorly written. It is far too long and should be pre'cised. Having it so long makes it boring! An important subject is therefore spoilt.	Noted.

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Seth Dunn (GE)	TS	14	-	25	-	-	-	-	Biomass section proportionally long.	There is no general consensus between reviewers that the section is long.
Susanne Kadner (Technical Support Unit)	TS	14	12	14	13	-	-	-	Ch 2: Please give year for which this estimate is given.	At the begin of sentence in line 13 add: "Presently (2008) a major part..."
Susanne Kadner (Technical Support Unit)	TS	14	30	14	30	-	-	-	Ch 2: While it might not be possible to narrow the potential to distinct numbers, the TS should still present some of the information that is covered in section 2.2.2.	Accepted
Frank Behrendt (Institute for Energy Engineering)	TS	14	43	-	-	-	-	-	constrains -> constraints	The final draft of the SRREN will be processed by a professional copy-editor. All editorial comments such as this will be resolved at that time.
Jorge Bonnet Fernández-Trujillo (Agencia Canaria de Desarrollo Sostenible y Cambio Climático)	TS	14	21	14	22	-	-	-	Cost figures should be converted into 2005 US \$.	All cost will be in 2005 US\$
United States (U.S. Department of State)	TS	14	33	-	-	-	-	-	Delete "already today". Replace "strongly" with "significantly".	"Significantly" will be used.
United States (U.S. Department of State)	TS	14	10	-	-	-	-	-	Delete "Methodological and practical challenges are overcome by undertaking". Capitalize "An". Add at end of sentence "needs to be conducted."	Accepted
United States (U.S. Department of State)	TS	14	20	-	-	-	-	-	Delete "transformation". Delete "Their economics" and replace with "Feedstock costs."	Delete "transformation". Start sentence by "Their costs and yields..."
Australia (0)	TS	14	9	14	11	-	-	-	Final sentence does not make sense. A global review of mitigation potential cannot overcome 'challenges'.	Sentence will be changed according with suggestion given on Comment # 270
Michael Jack (Scion (NZ Forest Research Institute))	TS	14	27	14	44	-	-	-	Found this section lacking in detail compared to the very comprehensive treatment carried out in Chapter 2. Some of the numbers from Chapter 2 should be included here. Maybe a table showing successive degrees of potential from the theoretical maximum to a more likely scenario would help. Otherwise the section just seems a bit too light.	The text will be redrafted
Michael Jack (Scion (NZ Forest Research Institute))	TS	14	9	14	9	-	-	-	I do not like the sentence ""Since society began..." better to say something like ""Bioenergy is the most important renewable energy resources it currently provides 10% ...""	"Since thousands years ago, biomass is the most used renewable energy source..
Australia (0)	TS	14	18	14	26	-	-	-	Include reference to algae in the list of potential feedstocks.	We just provide na example of small-scale rural activity. Algae doesn't fit here.
United States (U.S. Department of State)	TS	14	41	-	-	-	-	-	Insert "biomass" after "limit". Delete "help adaptation" and replace with "enhance soil quality".	First comment accepted. Regarding "help adaptation" there is no reason to delete it.
United States (U.S. Department of State)	TS	14	12	-	-	-	-	-	Insert comma after "began", delete "is" and replace with "has been".	See comment # 267

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United States (U.S. Department of State)	TS	14	26	-	-	-	-	-	Insert commas after "power" and "heat". Insert "be cost competitive" after "can". Delete "compete such as Jatropha oil production in rural settings."	See comment # 287
Luiz A. Horta Nogueira (Instituto de Recursos Naturais)	TS	14	26	-	-	-	-	-	It is very risky to quote that Jatropha oil production in rural settings can compete. How? Where? This route is still in development and it seems pretty early to state that it is feasible. If this sentence will be kept, it is essential add good references.	Replace "can" by "may".
Kyung-Jin Boo (Korea Energy Economics Institute)	TS	14	17	-	-	-	-	-	Modern bioenergy use (for industry, power generation, or transport fuels) is already making a significant contribution of 9EJ, and this share is growing... which year?	See comment # 271
Australia (0)	TS	14	30	-	-	-	-	-	Phrase 'distinct numbers' is unclear. Does this mean single point estimates?	Replace "distinct" by "precise".
Christoph von Stechow (IPCC WGIII TSU)	TS	14	32	-	-	-	-	-	Please consider deleting the words "It can also be concluded that", since the bullet points list favourable conditions that are already mentioned in the previous sentence.	Sentence will be replaced by "It is also important to mention that:".
Christoph von Stechow (IPCC WGIII TSU)	TS	14	12	14	13	-	-	-	Please consider inserting the word "today" at the end of the sentence	See comment # 271
Christoph von Stechow (IPCC WGIII TSU)	TS	14	5	14	9	-	-	-	Please consider numbering the different influences on the future mitigation potential, since the reader is otherwise likely to loose oversight.	Long sentence. Add numbers.
Christoph von Stechow (IPCC WGIII TSU)	TS	14	30	14	32	-	-	-	Please consider rephrasing in the manner of p. 25, l. 5/6, since "is is clear that" may sound slightly biased.	Remove "it is clear that"
Christoph von Stechow (IPCC WGIII TSU)	TS	14	28	14	29	-	-	-	Please consider replacing "as well as" with the words "which strongly depend on the different assumptions".	Accepted
Christoph von Stechow (IPCC WGIII TSU)	TS	14	1	26	19	-	-	-	Please make sure that each paragraph is followed by an indication of where to find this information in the original chapter text. Currently this is not the case for the introduction, "Global and Regional Status of Market and Industry Development", "Environmental and Social Issues", "Potential Deployment" and partly for "Prospects for Technology Improvement, Innovation and Integration".	Accepted
Frank Behrendt (Institute for Energy Engineering)	TS	14	26	-	-	-	-	-	power heat and biofuels -> power, heat, and biofuels	Accepted
Australia (0)	TS	14	38	14	40	-	-	-	Sentence is unclear, suggest rewording to clarify that there is the potential for lower soil carbon emissions in the production of lignocellulosic crops compared to growing food crops on unsuitable land.	The final draft of the SRREN will be processed by a professional copy-editor. All editorial comments such as this will be resolved at that time.

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United States (U.S. Department of State)	TS	14	31	-	-	-	-	-	Some detailed, credible analysis is needed here to support the following claim, "several hundred EJ per year." Given that careful analysis of the U.S. has identified a max resource base, irrespective of cost, of 1.3 B tons at 16 MJ/kg or 20 EJ of raw biomass, and analyses that evaluate what is likely to be available at some reasonable price is half of that or less, or 10 EJ, then it is unlikely that hundreds of EJ can be produced globally on a sustainable basis with foreseeable technology.	The text has many references to higher potential. The example of US is not a good one since land is already well explored, compared with many tropical countries.
Australia (0)	TS	14	31	-	-	-	-	-	Statement about 'several hundred EJ' of bioenergy not consistent with Table TS 1.1 which states technical potential by 2050 is less than 200EJ (and practical potential will be less than that).	See comment # 296
United States (U.S. Department of State)	TS	14	33	14	34	-	-	-	Strike the phrase "energy can already today" and substitute "could". Strike the word "strongly" and substitute the word "significantly."	We show that forestry and agricultural residues are presently available and not used.
United States (U.S. Department of State)	TS	14	31	14	32	-	-	-	Strike the word "clear that," and substitute "likely that up to". Add "technical and economic" after "favorable" and before "developments".	It is not likely. Depending on assumptions it is possible to have the potential described. Regarding better wording it is accepted.
Japan (the Japanese Ministry of Foreign Affairs)	TS	14	-	79	-	-	-	-	The composition of each subsection, or at least the introductory paragraph should be more standardized. Bioenergy (p14) begins with the "Introductory Current Pattern of Bioenergy Use and Trends"; Direct Solar Energy gives a technological explanation in "Introduction" ; Geothermal Energy (p39), Hydropower (p48) and Ocean Energy (p57) begin with "Resource Potential" and "Wind Energy" (p65) begins with an "Introduction."	All technological chapters are being homogenized as extensively as possible.
Christoph von Stechow (IPCC WGIII TSU)	TS	14	13	14	17	-	-	-	The numbers mentioned in these lines (46, 37 and 9 EJ) do not match the figures mentioned on p. 17, l. 12 and in Figure TS 2.1. Please amend these in a consistent way.	We will check for consistent figures
Christoph von Stechow (IPCC WGIII TSU)	TS	14	21	14	22	-	-	-	The numbers provided here do not match the numbers in Table 2.7.3 in Chapter 2. Please amend these in a consistent way.	We will make then consistent.
Australia (0)	TS	14	1	26	20	-	-	-	The section on bioenergy is difficult to understand, and could benefit from redrafting to clarify arguments and issues.	We will improve the text based in many other specific suggestions received. Nevertheless, more specific comments are welcome
Christoph von Stechow (IPCC WGIII TSU)	TS	14	2	-	-	-	-	-	The title adjunct "Current Pattern of Bioenergy Use and Trends" is different to the official outline. Please delete it.	The title will be changed to "Introduction".

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United States (U.S. Department of State)	TS	14	38	-	-	-	-	-	This bullet could be re-written as follows: "The cultivation of lignocellulosic crops on marginal lands can result in significant additional biomass resources. Marginal lands are unsuitable for conventional food crops and cultivation of bioenergy crops can increase the soil carbon sequestered in these lands."	The sentence sounds fine. We are stating that lignocellulose biomass can increase biomass potential by allowing the use of lands not useful for food crops; also will avoid production of food crops for energy in areas where large soil carbon are emitted.
United States (U.S. Department of State)	TS	14	28	-	-	-	-	-	This sentence can be re-worded as follows: "There is a wide range of estimates for global biomass resource potential due to varying assumptions about the competition for land, water, and other resources."	See Comment # 290
Modesto Fernandez Diaz-Silveira (Ministry of Science, Technology and Environment)	TS	14	37	-	-	-	-	-	TO include a new bullet: "Bioenergy systems using food crops, mostly those for biofuels production, could impose a challenge to human food access and availability, mainly because of increasing food prices"	This conclusion depends strongly from the amount of food crops used for energy and the assumptions regarding agricultural yield improvement.
Modesto Fernandez Diaz-Silveira (Ministry of Science, Technology and Environment)	TS	14	7	-	-	-	-	-	TO include text, after ...the many: "positive and negative"	Accepted
United Kingdom (Department of Energy and Climate Change)	TS	14	3	14	11	-	-	-	To make it even more complex I think you could also add the potential impact of biomass/bioenergy on soil carbon (i.e. changes in sinks)	We will add "feedstocks production and their impacts on existent above, belowground vegeytation and soil"
Frank Behrendt (Institute for Energy Engineering)	TS	14	22	-	-	-	-	-	Why are costs of heat generation limited to solid fuels or waste; what about, e.g., biogas or plant oil?	We are only listing some examples. Furthermore, plant oil costs are included in biofuels
United Kingdom (Department of Energy and Climate Change)	TS	14	26	-	-	-	-	-	Why mention jatropha when other crops such as palm oil are currently larger sources of biodiesel?	We are just quoting na example for rural uses. This is not the case of Palm oil.
Oyvind Christophersen (Climate and Pollution Agency)	TS	14	-	26	-	Bioenergy	-	-	An important issue that is not addressed is the net energy output of a RE based energy system (net = out ... in .. positive or negative). Use of RE demands far higher energy input for cultivating, harvesting, collection, pretreatment (mechanical work), before energy can be released at stage of end-use. For oil it is rather obvious still, that we get more energy out than we use for production and distribution. For RE this picture is likely very different.	A sentence on that will be added. Nevertheless, the issue of energy balance has been very well discussed in the literature and it is known to be favourable for many feedstocks and technology. This is the reason why the issue of emissions due LUC and ILUC became so relevant.

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Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table	Comments	Consideration by writing team
Bernd Wittgens (SINTEF Materials and Chemistry)	TS	14	-	26	-	Bioenergy	-	-	An important issue that is not addressed is the net energy output of a RE based energy system (net = out ... in .. positive or negative). Use of RE demands far higher energy input for cultivating, harvesting, collection, pretreatment (mechanical work), before energy can be released at stage of end-use. For oil it is rather obvious still, that we get more energy out than we use for production and distribution. For RE this picture is likely very different.	Energy and GHGs balances are considered in the Bioenergy text. and
United Kingdom (Department of Energy and Climate Change)	TS	14	10	14	10	Bioenergy	-	-	are overcome': replace with 'may be overcome'; 'are' implies that the challenges have been overcome, but few would claim this.	See comment # 268
United Kingdom (Department of Energy and Climate Change)	TS	14	15	14	15	Bioenergy	-	-	called traditional bioenergy': sentence structure is poor; replace with: 'A major part of this biomass use (37 EJ) is traditional and is related to...'	Accepted
Netherlands (KNMI (Royal Dutch Meteorological Institute))	TS	14	-	26	-	Bioenergy	-	-	I trust the authors will process any comments-induced changes in the chapter 2 text also in the text of the TS and the SPM.	Accepted
United Kingdom (Department of Energy and Climate Change)	TS	14	12	14	12	Bioenergy	-	-	is the most important': the verb tense is not quite right - replace with: 'has been and remains'	See comment # 267
Richard Plevin (UC Berkeley)	TS	14	-	26	-	Bioenergy	-	-	Numerous references are made to the 80-90% reduction in GHGs from cellulosic biofuels. See my comments from the chapter regarding this claim.	Comments were taken into consideration.
Several experts 0 (Ministry of the Industry, Tourism and Trade)	TS	14	-	26	-	Bioenergy	-	-	Sustainable production of biomass intended to energy uses is a critical issue that must be considered. Further attention to certification schemes seems advisable. Additionally impacts of small scale farming ("agriculture for survival" in many developing countries) in biomass production could, in principle, be lower, specially in terms of social impacts, than large scale farming. These differences should be assessed and mentioned, if applicable.	The text discuss extensively sustainable production of biomass. It is also obvious that we are always considerin biomass produced sustainably in our conclusions.

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Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table	Comments	Consideration by writing team
United States (U.S. Department of State)	TS	14	-	26	-	Bioenergy	-	-	The bioenergy section of the Technical Summary touches on many useful issues and has some useful content. However, as written, it just touches on each issue and does not provide much depth or context. Broadly, the section does not provide any strategic sense of the role and value that biomass can play, ranging from enabling the rebuilding of marginal lands by providing a useful cash crop to serving as a net carbon sink through both rebuilding soils or use in power plants with sequestration of the carbon. The chapter provides no real sense of how to make best use of biomass, given that it is a resource of limited size and local availability, and this section does not address the comparative economics for where the highest value uses of biomass are. Instead, by providing a uniformly superficial survey of biomass issues, the section loses the special value of biomass and the strategic role it can play.	A summary can be as detailed as the full document. Nevertheless, we are reviewing the text to improve it.
Oyvind Christophersen (Climate and Pollution Agency)	TS	14	-	26	-	Bioenergy	-	-	The transition from synthetic fertilizers to natural is not addressed. This is an important issue since the 'upper bound' energy potentials are based on highly increased productivity per area.	Do you mean that higher yields are obtainable with natural fertilizers??
Dr. Md. Sirajul Islam (North South University)	TS	14	-	26	-	Bioenergy	-	-	TS2.1 or 2.2 Biogas ignored	In TS2.1 we mention anaerobic digestion.
Dr. Md. Sirajul Islam (North South University)	TS	14	-	26	-	Bioenergy	-	-	ts2.1 ts 2.2 bioenergy/biogas ignored	See comment # 312
United States (U.S. Department of State)	TS	15	21	-	-	-	-	-	"100 EJ" is similarly unlikely without policy.	Sorry, but this is not our conclusion.
Sampo Soimakallio (VTT Technical Research Centre of Finland)	TS	15	17	15	7	-	-	-	ADD: ""biodiversity, and to increase in GHG emissions.""	Accepted
Susanne Kadner (Technical Support Unit)	TS	15	1	15	3	-	-	-	Ch 2: What are these influential parameters?	We will add them in brackets.
Christoph von Stechow (IPCC WGIII TSU)	TS	15	23	-	-	-	-	-	Dedicated crops or trees, mentioned here, do not seem to be discussed in more detail further down. Please consider doing this.	Text is being redrafted
United States (U.S. Department of State)	TS	15	5	-	-	-	-	-	Delete "crucial" and replace with "areas that need". Delete "areas" in line 6.	Accepted
United States (U.S. Department of State)	TS	15	11	-	-	-	-	-	Delete "halfway this century" and replace with "by 2050".	The final draft of the SRREN will be processed by a professional copy-editor. All editorial comments such as this will be resolved at that time.
United States (U.S. Department of State)	TS	15	26	-	-	-	-	-	Delete "industry origin" and replace with "industrial waste".	Accepted

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Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table	Comments	Consideration by writing team
United States (U.S. Department of State)	TS	15	34	-	-	-	-	-	Delete "is" and replace with "ranges from". Delete "and" and replace with "to". Delete "33 and 80%" and replace with "0 to 80%". For corn stover certain land types require all residue to remain in the field to provide nutrient and soil carbon.	See comment # 349
United States (U.S. Department of State)	TS	15	8	-	-	-	-	-	Delete "largely conditional: deployment will strongly depend on" and replace with "dependant on".	We understand the way is written provides more information on the relationship.
United States (U.S. Department of State)	TS	15	7	-	-	-	-	-	Delete "on medium to longer term" and replace with "in the future".	We understand that as stated we are emphasizing the short and long term better than just telling in the future".
United States (U.S. Department of State)	TS	15	13	-	-	-	-	-	Delete "storylines" and replace with "scenarios".	Storylines is common in the literature
United Kingdom (Department of Energy and Climate Change)	TS	15	22	-	-	-	-	-	Does this text adequately deal with the indirect land use debate that is currently underway?	The ILUC debate is still evolving. Evidences are showing it can be small in some cases and these cases are included in the right scenario we named.
United States (U.S. Department of State)	TS	15	10	-	-	-	-	-	Insert "," after "infrastructure".	The final draft of the SRREN will be processed by a professional copy-editor. All editorial comments such as this will be resolved at that time.
United States (U.S. Department of State)	TS	15	3	-	-	-	-	-	Insert "of" after "understanding".	Accepted
United States (U.S. Department of State)	TS	15	12	-	-	-	-	-	Insert "to" after "amount". Delete "should be" and replace with "is". Delete "in line" and replace with "consistent".	The final draft of the SRREN will be processed by a professional copy-editor. All editorial comments such as this will be resolved at that time.
Shigeiki KOBAYASHI (Toyota R&D Labs.)	TS	15	3	-	-	-	-	-	It is more kind to describe what are these important parameters.	See comment # 320
Oyvind Christophersen (Climate and Pollution Agency)	TS	15	11	-	12	-	-	-	lower bound' of the RE energy potential should be given as well!	Accepted
United Kingdom (Department of Energy and Climate Change)	TS	15	23	-	46	-	-	-	Most of this could be removed - all that is needed is an acknowledgement that real potential is less than technical for some of the reasons stated. The detail is not needed for a summary.	The mandate we receive includes technology description.
Christoph von Stechow (IPCC WGIII TSU)	TS	15	7	15	10	-	-	-	Please consider moving these lines to the "Potential Deployment" section in the TS.	Accepted
Christoph von Stechow (IPCC WGIII TSU)	TS	15	31	15	33	-	-	-	Please consider rephrasing, sincethe message of this paragraph is not quite clear.	Accepted

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Christoph von Stechow (IPCC WGIII TSU)	TS	15	13	15	14	-	-	-	Please consider replacing the words "sustainability and" with "sustainable development of the resource basis based on"; and please delete the words "are secured" at the end of the sentence.	The word sustainability used in the IPCC scenarios refereed are more general than only sustainable development of the resource potential.
Christoph von Stechow (IPCC WGIII TSU)	TS	15	21	-	-	-	-	-	Please replace the "ES" in the brackets with "2.2.2", since the Executive Summary is itself a summary and cannot serve as a reference to the Technical Summary.	Accepted
United States (U.S. Department of State)	TS	15	21	-	-	-	-	-	Recommend deleting "100" and replacing with "80" as per the mean value in Figure SPM4.	Text and Figure will be consistent.
United States (U.S. Department of State)	TS	15	32	-	-	-	-	-	Recommend deleting sentence starting with "Within a given region..."	Why? It is a new and useful information.
United States (U.S. Department of State)	TS	15	15	-	-	-	-	-	Strike the word "right" and substitute the word "appropriate".	We are discussing the "right" and the "wrong" scenarios as we named them.
Keigo Akimoto (Research Institute of Innovative Technology for the Earth (RITE))	TS	15	17	15	20	-	-	-	The insights does not apply only for RE, but also other new types of mitigation technologies. The sentence should be revised.	Can you clarify your comment?
Christoph von Stechow (IPCC WGIII TSU)	TS	15	34	15	42	-	-	-	The numbers mentioned in this paragraph do not seem to be explained in the chapter text. This should not be the case!	The numbers will be added to Ch2 text
Australia (0)	TS	15	34	-	-	-	-	-	The use of the percentage ranges is unclear. Should 'between' be inserted before '25' and before '33'?	See comment # 349
United States (U.S. Department of State)	TS	15	12	-	-	-	-	-	The value of 400 EJ is inconsistent with Figure SPM4 which shows an upper bound of 200 EJ. This value should be reviewed for accuracy and all references corrected.	The value here and in Figure will be made consistent.
Luiz A. Horta Nogueira (Instituto de Recursos Naturais)	TS	15	34	-	-	-	-	-	This readability of this sentence could be improved (...residues is between 25 and 50%...)	See comment # 349
John Twidell (AMSET Centre)	TS	15	31	15	33	-	-	-	We are asked to suggest reducing the length of this Technical Summary. This needs careful sub-editing, since the style is verbose. For instance, we now have: "The intensity in the use of production factors (inputs, machinery, labour or land) may vary across world regions for a similar species. Within a given region, similar yield levels may be reached through a variety of cropping systems and production intensities. [2.3.1.1]" {41 words}. Sub-editing gives 'Even in one region, different agricultural practices (inputs, machinery, labour or land) produce similar yields [2.3.1.1]' {15 words}. Similar reductions in text length are possible throughout this document.	Your suggestion will be used in the full Ch2 text. The technical Summary has the right size.

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United Kingdom (Department of Energy and Climate Change)	TS	15	11	15	12	Bioenergy	-	-	can amount': replace with 'could amount to' or 'may amount to'	The potential is evaluated as few hundreds EJ and as such its amount is real.
United Kingdom (Department of Energy and Climate Change)	TS	15	34	15	34	Bioenergy	-	-	recoverability is 'between' or '25-50%' etc	Accepted
United States (U.S. Department of State)	TS	16	34	-	-	-	-	-	"major health problems" -- see note above on 1.6 million deaths per year	Noted
Michael Jack (Scion (NZ Forest Research Institute))	TS	16	28	16	38	-	-	-	Also found this summary of conversion technologies extremely light and not really painting the correct picture about the huge developments that are occurring in this area internationally. Chapter 2 has a very complete treatment but this summary does not do that justice.	We are redrafting the text. Nevertheless, note that we are talking here about technologies already in commercial use. In next pages we discuss conversion process for emerging technologies.
Susanne Kadner (Technical Support Unit)	TS	16	24	16	25	-	-	-	Ch 2: Remove, sentence does not fit context.	Accepted
Frank Behrendt (Institute for Energy Engineering)	TS	16	36	-	-	-	-	-	cogenerationof -> cogeneration of	The final draft of the SRREN will be processed by a professional copy-editor. All editorial comments such as this will be resolved at that time.
United States (U.S. Department of State)	TS	16	15	-	-	-	-	-	Delete "According to Practical Action Consulting (2009)". Capitalize "bioenergy".	See comment # 357
United States (U.S. Department of State)	TS	16	23	-	-	-	-	-	Delete "burns without smoke".	We will say "burns with less smoke".
United States (U.S. Department of State)	TS	16	43	-	-	-	-	-	Delete "heat, power and".	"heat&power" means cogeneration and is one of the uses of biomass
United States (U.S. Department of State)	TS	16	36	-	-	-	-	-	Delete "Simultaneously,". Insert space between "cogeneration" and "of".	Our message is that both technologies are occurring simultaneously.
Frank Behrendt (Institute for Energy Engineering)	TS	16	21	-	-	-	-	-	fuelwoodthat -> fuelwood that	The final draft of the SRREN will be processed by a professional copy-editor. All editorial comments such as this will be resolved at that time.
United States (U.S. Department of State)	TS	16	37	-	-	-	-	-	Insert ", are being" after "and".	Accepted
United States (U.S. Department of State)	TS	16	29	-	-	-	-	-	Insert "s" after "end-use".	The final draft of the SRREN will be processed by a professional copy-editor. All editorial comments such as this will be resolved at that time.
United States (U.S. Department of State)	TS	16	38	-	-	-	-	-	Insert "systems" after "heating".	The sentence is clear enough

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Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table	Comments	Consideration by writing team
United States (U.S. Department of State)	TS	16	24	-	-	-	-	-	Insert period after "widely". Insert "However," before "In Africa...".	See comment 364
United States (U.S. Department of State)	TS	16	9	-	-	-	-	-	Insert period after species. Capitalize "integrated".	The final draft of the SRREN will be processed by a professional copy-editor. All editorial comments such as this will be resolved at that time.
Shigeki KOBAYASHI (Toyota R&D Labs.)	TS	16	40	16	41	-	-	-	It is more informative to give the comparison with gasoline price.	Gasoline price to consumers has taxes which are very country specific.
United Kingdom (Department of Energy and Climate Change)	TS	16	-	17	-	-	-	-	It is worth mentioning somewhere in here that different fuels have different physical and chemical properties and that this introduces a variety of technical and engineering issues which may impact on plant performance. For industrial deployment the contribution of biomass is frequently curtailed by the technical and engineering challenges of fouling, corrosion etc., which result in reduced output and availability. This is particularly the case as attempts are made to expand to utilize some of the more difficult feedstocks, which make up a large proportion of the technical potential.	Too much detail for a Summary.
United States (U.S. Department of State)	TS	16	11	-	-	-	-	-	Modify "reductions" to "reduction".	The final draft of the SRREN will be processed by a professional copy-editor. All editorial comments such as this will be resolved at that time.
United States (U.S. Department of State)	TS	16	23	-	-	-	-	-	Note that charcoal production is very inefficient, with typical systems in developing countries losing over half of the input energy. Also note that charcoal does have small amounts of smoke, but also can have quite large amounts of carbon monoxide generation.	We are not listing all advantages and disadvantages of charcoal here. We are just referring a some aspects dealing with logistics.
Christoph von Stechow (IPCC WGIII TSU)	TS	16	44	-	-	-	-	-	Please add the word "biomass" at the end of this line.	The final draft of the SRREN will be processed by a professional copy-editor. All editorial comments such as this will be resolved at that time.
United States (U.S. Department of State)	TS	16	30	-	-	-	-	-	Replace "in" with "at".	The final draft of the SRREN will be processed by a professional copy-editor. All editorial comments such as this will be resolved at that time.
United Kingdom (Department of Energy and Climate Change)	TS	16	42	-	-	-	-	-	See earlier comment - earlier jatropa is mentioned, het it is rapeseed, soya and oil palm that are named	we are only listing some feedstocks.

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Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table	Comments	Consideration by writing team
Luiz A. Horta Nogueira (Instituto de Recursos Naturais)	TS	16	21	-	-	-	-	-	separate the words: fuelwoodthat	The final draft of the SRREN will be processed by a professional copy-editor. All editorial comments such as this will be resolved at that time.
United States (U.S. Department of State)	TS	16	36	-	-	-	-	-	Suggest rewriting to explain the statement "more than one form of energy from one source".	This is the basic definition of cogeneration. Well known fact
United Kingdom (Department of Energy and Climate Change)	TS	16	40	-	41	-	-	-	The comment on ethanol costing less than biodiesel should be removed - it is very sensitive to feedstock (cost) e.g. ethanol from wheat does not (normally) cost less than biodiesel from used cooking oil.	Add after "ethanol costs" "(based on sugar cane and corn)"
Christoph von Stechow (IPCC WGIII TSU)	TS	16	24	16	27	-	-	-	The structure of arguments do not seem to be well linked in this paragraph. Please consider rewording.	See comment # 364
United Kingdom (Department of Energy and Climate Change)	TS	16	15	-	17	-	-	-	This is a very bold statement for a technical summary which could easily be taken out of context. It should be qualified by some acknowledgement that these issues are variable depending on the feedstock, food supply and local land-use patterns.	See comment # 357
United States (U.S. Department of State)	TS	16	32	16	38	-	-	-	This paragraph places too much emphasis on traditional biomass (i.e. burning of biomass) and not enough on the newest technologies now operating at demonstration scale for drop-in replacement gasoline, diesel, and jet fuels.	Note that we are talking here about technologies already in commercial use. In next pages we discuss conversion process for emerging technologies.
Michael Jack (Scion (NZ Forest Research Institute))	TS	16	3	16	5	-	-	-	This sentence should be revised. The term ""stream of biomass"" should not be used.	The final draft of the SRREN will be processed by a professional copy-editor. All editorial comments such as this will be resolved at that time.
Modesto Fernandez Diaz-Silveira (Ministry of Science, Technology and Environment)	TS	16	5	-	-	-	-	-	TO include text, after last bracket: "As well as short-cycle crops for bioenergy production competing with water demands with other agricultural crops, mostly those commonly used for human food".	Space shortage limits the number of examples
United Kingdom (Department of Energy and Climate Change)	TS	16	15	16	17	Bioenergy	-	-	Reference to Practical Action: other agencies/authors are not singled out and to do so here seems rhetorical (i.e. intended to persuade). It is the argument/claim per se that matters, not its source. However it would be better to make the claim more conditional, as an inequitable or unwanted form of local distribution is possible: 'There is evidence that impact on local staple food security may be mitigated against by ensuring that feedstock benefits are distributed to local communities. [2.3.1.2]'. [2.3.1.2]'	Accepted
Susanne Kadner (Technical Support Unit)	TS	17	4	-	-	-	-	-	Ch 2: Remove sentence.	Accepted
Susanne Kadner (Technical Support Unit)	TS	17	4	17	6	-	-	-	Ch 2: This is probably mainly true for developing countries - please specify.	There are examples of heating houses with biomass in developed countries

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Susanne Kadner (Technical Support Unit)	TS	17	10	17	11	-	-	-	Ch 2: What are these estimates for - please clarify what kind of analysis is being referred to.	We are quantifying present amount of biomass used. Necessary to refer to proper site in Ch2 where reference is provided
United States (U.S. Department of State)	TS	17	4	-	-	-	-	-	Delete "We provide the global and regional status of market and industry development in bioenergy. For local markets".	Accepted
United States (U.S. Department of State)	TS	17	4	-	-	-	-	-	It is suggested that authors avoid the use of the personal pronoun "we".	Editorial
Kyung-Jin Boo (Korea Energy Economics Institute)	TS	17	12	-	-	-	-	-	Modern bioenergy use (for industry, power generation, or transport fuels) is already making a significant contribution of 10EJ, and this share is growing... which one is correct, pp 14, line 17 or this one?	Check consistency
Luiz A. Horta Nogueira (Instituto de Recursos Naturais)	TS	17	4	-	-	-	-	-	The first sentence can be removed	Accepted
United States (U.S. Department of State)	TS	17	12	-	-	-	-	-	The value of 10 EJ is inconsistent with the value of 9 EJ as stated in page 14, line 16.	Check consistency
Christoph von Stechow (IPCC WGIII TSU)	TS	17	11	17	15	-	-	-	These lines and the second paragraph on page 14 are redundant. Please consider rewording.	On P14 keep only the total biomass use. Breakdown is provided here
Frank Behrendt (Institute for Energy Engineering)	TS	17	1	-	-	-	-	TS 2.1	Currently no technically realized process available for direct (Bergius-Pier like) liquefaction aiming at liquid diesel-like hydrocarbons; the economic viability of two-step (Fischer-Tropsch based) processes needs to be proven	This point was made very clear with the new diagram.
Finland (Finnish Meteorological Institute)	TS	17	-	-	-	-	-	TS 2.1	Row 'Biochemical', box 'End use of conversion technologies" deals only with liquid biofuels, why not also with gaseous biofuels?	Gaseous biofuel will be added
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	TS	-	-	-	-	-	-	TS 2.1	End use from conversion technologies für biochemical process should be extended by "natural gas replacement by biogas".	It will be added
United States (U.S. Department of State)	TS	-	-	-	-	-	-	TS 2.1	Formatting needs to be fixed. For "thermochemical conversion" under "Type of feedstock" add "agricultural" after "secondary". For "Biochemical" under "Type of feedstock" add "primary and secondary agricultural" after "wood".	Too much detail for a Summary.
United States (U.S. Department of State)	TS	-	-	-	-	-	-	TS 2.1	Table TS 2.1 should include the newest biomass conversion technologies, such as Aqueous Phase Processing in the Process column. Delete "also" from "End Use" column in "Thermo-chemical" row. Include gasoline fuels and jet fuels. The main products of Aqueous Phase Processing, Pyrolysis, Gasification, and Liquefaction are hydrocarbon intermediates and fuels for drop-in replacements for gasoline, diesel, and jet fuel. "Type of feedstock" column should include Carbohydrates for Thermo-Chemical Conversion process, in addition to feedstocks already listed.	We are listing the main routes, not all routes.

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Susanne Kadner (Technical Support Unit)	TS	-	-	-	-	-	TS 2.1	-	Ch 2: Please check page 14, lines 12-13; here a number of 46 EJ is given.	Accepted. All figures will be checked
United States (U.S. Department of State)	TS	-	-	-	-	-	TS 2.1	-	This figure is not readable. It needs to be bigger. It also appears to be inconsistent with SPM page 18 line 29 which says that non-commercial biomass use is 37 EJ.	Accepted. All figures will be checked
Frank Behrendt (Institute for Energy Engineering)	TS	17	17	-	-	-	TS 2.1	-	In this Fig. a total of 48 EJ is split 38 and 10 EJ between traditional and commercial uses. On p 14/1 12-17 a total of 46 EJ is split 37 to 9 EJ.	Accepted. All figures will be checked
Christoph von Stechow (IPCC WGIII TSU)	TS	18	13	18	14	-	-	-	"14.7 EJ higher than in the Reference Scenario" tells the reader nothing about the absolute level of biomass consumption. Please consider adding this information.	Accepted
Japan (the Japanese Ministry of Foreign Affairs)	TS	18	37	-	38	-	-	-	"Priorities, stage of development and physical potential and resource availability differ widely from country and for different settings." should be deleted; it is a repetition of the first sentence of the same paragraph.	Accepted
United States (U.S. Department of State)	TS	18	40	18	42	-	-	-	"The effects..." This sentence needs to be broken down into more manageable pieces, and some explanation of each of the pieces provided--what are the effects of bioenergy on health and poverty specifically? What local conditions determine this? What specific feedstock production systems determine this and what is their impact?, etc.	This is just the introduction to this section discussion. On P 20 more details are provided.
United States (U.S. Department of State)	TS	18	19	-	-	-	-	-	Add "and" after "demand,". Delete "for both".	Accepted
United States (U.S. Department of State)	TS	18	16	-	-	-	-	-	Add "s" after "pellet". Delete "production for energy producing" and replace with "being". Replace "trade" with "traded."	Accepted
Susanne Kadner (Technical Support Unit)	TS	18	10	18	13	-	-	-	Ch 2: meeting about 5-11% of total world road-transport energy demand by when?	Date will be added - 2030
Susanne Kadner (Technical Support Unit)	TS	18	22	18	24	-	-	-	Ch 2: Unclear, please reword, what are starting levels, 13% of what?	Should read "increases in food prices in 2007 reaching a peak in 2008 and then falling rapidly again in 2009, down 13% for the year compared with 2008, while non-food agricultural commodities are up 20%".
Susanne Kadner (Technical Support Unit)	TS	18	20	18	21	-	-	-	Ch 2: Unclear, please reword.	See comment # 413
United States (U.S. Department of State)	TS	18	23	-	-	-	-	-	Delete "...to now down 13% for the year while non-food agricultural commodities are up 20%".	See comment # 416
United States (U.S. Department of State)	TS	18	28	-	-	-	-	-	Delete "does to" and add "s" after "drive".	See comment # 421

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Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table	Comments	Consideration by writing team
United States (U.S. Department of State)	TS	18	30	-	-	-	-	-	Delete "Leading modern biomass use nations like".	These words are reality.
United States (U.S. Department of State)	TS	18	31	-	-	-	-	-	Delete "persistent policy and".	We are only reporting what is observed about these countries.
United States (U.S. Department of State)	TS	18	27	-	-	-	-	-	Delete "temporization of".	Replaced by "timing"
United States (U.S. Department of State)	TS	18	20	-	-	-	-	-	Delete "well working", replace "commodity" with "commodity-scale", delete "of" and replace with "mechanisms for".	Accepted
United States (U.S. Department of State)	TS	18	8	-	-	-	-	-	Delete sentence "Significant overcapacity was built...projected to recover."	See comment # 395
United States (U.S. Department of State)	TS	18	13	-	-	-	-	-	Delete sentence "Significant overcapacity was built...projected to recover."	See comment # 395
Michael Jack (Scion (NZ Forest Research Institute))	TS	18	27	18	27	-	-	-	Do not use the term ""temporization of targets"", this needs to be revised.	Sentence redrafted
Frank Behrendt (Institute for Energy Engineering)	TS	18	28	-	-	-	-	-	does to drive -> does drive	See comment # 421
Australia (0)	TS	18	16	-	-	-	-	-	Energy producing trade' - what does that mean?	Should read "energy trade".
Michael Jack (Scion (NZ Forest Research Institute))	TS	18	39	21	32	-	-	-	Found this whole section quite confused and also repetitive. This section could be dramatically shortened. The key concepts of direct and indirect LUC must be clearly explained.	Based in more than 50 reviewers' comments about this section several changes are being made.
Shigeki KOBAYASHI (Toyota R&D Labs.)	TS	18	3	18	4	-	-	-	How about the contribution of Brazil?	We are quoting the rate of increase not the amount
United Kingdom (Department of Energy and Climate Change)	TS	18	30	18	33	-	-	-	I think that all of these countries would agree that having a substantial biomass resource is just as important as having a good support framework	No action
Christoph von Stechow (IPCC WGIII TSU)	TS	18	40	21	31	-	-	-	In this section, several key issues are mentioned very often and thus seem overly repetitive: management and/or governance of land-use (6 times), land-use planning (2 times), zoning (3 times), feedstock/biomass production system (3 times), location (4 times). Please consider streamlining this section.	The text will be reviewed and shortened
United States (U.S. Department of State)	TS	18	34	-	-	-	-	-	Insert "for" after "schemes".	Accepted
United States (U.S. Department of State)	TS	18	32	-	-	-	-	-	Insert period after "markets". Insert "Enabling policies also create" before "the required infrastructure...".	Accepted
United States (U.S. Department of State)	TS	18	3	-	-	-	-	-	Insert space between "from" and "1.43".	See comment # 393

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Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table	Comments	Consideration by writing team
United Kingdom (Department of Energy and Climate Change)	TS	18	15	18	21	-	-	-	Is this a coded way of saying that we need to do more on (LCA based) standards?	In reality LCA standards may help. But it is necessary more than that. Is the political understanding that trade is good, even for biofuels.
United States (U.S. Department of State)	TS	18	30	18	33	-	-	-	Paragraph is unclear. See comments elsewhere.	Paragraph redrafted
Christoph von Stechow (IPCC WGIII TSU)	TS	18	44	-	-	-	-	-	Please delete the word "additional".	Accepted
Jorge Martínez Chamorro (Agencia Canaria de Desarrollo Sostenible y Cambio Climático)	TS	18	10	18	12	-	-	-	Please, indicate the projected year of the 2009 World Energy Outlook.	See comment #400
Australia (0)	TS	18	37	-	-	-	-	-	Replace 'policies' by 'outcomes'.	Accepted
Finland (Finnish Meteorological Institute)	TS	18	-	-	-	-	-	-	Section "Environmental and Social Issues" is lacking a paragraph on potential negative impacts of increased use of bioenergy on air quality and human health. References to relevant scientific literature should be added.	Most impacts of bioenergy use on air pollution and health are associated with the use of traditional biomass. This kind of use is supposed to decline. In the main text these impacts are fully discussed.
Australia (0)	TS	18	17	18	21	-	-	-	Sentence hard to understand.	Sentence will be redrafted
Luiz A. Horta Nogueira (Instituto de Recursos Naturais)	TS	18	8	-	-	-	-	-	separate: 2009.Significant	The final draft of the SRREN will be processed by a professional copy-editor. All editorial comments such as this will be resolved at that time.
Luiz A. Horta Nogueira (Instituto de Recursos Naturais)	TS	18	3	-	-	-	-	-	separate: from1.43	The final draft of the SRREN will be processed by a professional copy-editor. All editorial comments such as this will be resolved at that time.
Michael Jack (Scion (NZ Forest Research Institute))	TS	18	32	18	32	-	-	-	Should read ""... capacity gets more ...""	Accepted
Michael Jack (Scion (NZ Forest Research Institute))	TS	18	28	18	28	-	-	-	Should read ""...biofuel options drives bioenergy to ...""	biorefineries and second generation biofuel options drive bioenergy to more sustainable directions

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Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table	Comments	Consideration by writing team
Michael Jack (Scion (NZ Forest Research Institute))	TS	18	34	18	34	-	-	-	Should read ""...support schemes for bioenergy ...""	Leading modern biomass use nations like Brazil, Sweden, Finland and the US, have shown that persistent policy and stable policy support is a key factor in building biomass production capacity and working markets, the required infrastructure and conversion capacity that gets more competitive over time, and generates considerable economic activity.
Christoph von Stechow (IPCC WGIII TSU)	TS	18	7	18	9	-	-	-	Talking of growing demand and overcapacity and the same time is confusing. Please also mention that the demand for biofuels contracted along with the recession but that it is projected to recover along with economic recovery.	Text will be changed
Christoph von Stechow (IPCC WGIII TSU)	TS	18	34	18	38	-	-	-	The first and last sentence of the paragraph could be shortened; whereas the first focuses on the precondition of bioenergy potential, the first focuses on policy choices. This order is not intuitive.	Both sentences were slightly shortened
Christoph von Stechow (IPCC WGIII TSU)	TS	18	22	18	24	-	-	-	The time horizon of for such a price development analysis is far too narrow. Please review the relevant literature, such as Chakravorty, Ujjayant & Magné, Bertrand & Moreaux, Michel, 2008. "A dynamic model of food and clean energy," Journal of Economic Dynamics and Control, Elsevier, vol. 32(4), pages 1181-1203, April.	We fully agree that the time horizon is too short. What we are trying to call the attention is how hard it is to conclude anything based in only 2 or 3 years data availability.
Christoph von Stechow (IPCC WGIII TSU)	TS	18	31	18	32	-	-	-	This information is derived from the section 2.4.6 which is itself a summar and thus not backed up by scientific literature. Please insert additional information and references to the chapter text or delete this assertion.	We don't need references. The statement is based in what is known of the biofuel market in these countries.
Shigeki KOBAYASHI (Toyota R&D Labs.)	TS	18	13	-	-	-	-	-	This number is for the primary energy, and numbers for biofuels are of final energy. Please make clear this point, such as ""the primary biomass demand also increase...""	Accepted
Antoine BONDUELLE (E&E Consultant)	TS	18	8	18	9	-	-	-	This part of the text is not relevant to most countries, except that chaos was brought by decisions in several countries to subsidize first generation biofuels. Maybe the message is that there is a contradiction between the need for bold policy decisions on one hand, and careful tampering with markets on the other ?	We need evidences of the "Chaos"to mention it here.
Michael Jack (Scion (NZ Forest Research Institute))	TS	18	22	18	24	-	-	-	This sentence is very hard to understand. This needs to be revised	See comment # 415
Modesto Fernandez Diaz-Silveira (Ministry of Science, Technology and Environment)	TS	18	29	-	-	-	-	-	TO include text, after the end of the line: "Nevertheless, concerns remain in many developing countries on challenges related to food security and the use of food crops as biofuels. Strategies should be developed to harmonize both needs and productions"	We need references too add this new statement.

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Australia (0)	TS	18	10	18	14	-	-	-	WEO scenarios are not linked to a date.	See comment #400
Christoph von Stechow (IPCC WGIII TSU)	TS	18	12	-	-	-	-	-	Which time frame is the scenario referring to?	See comment #400
United Kingdom (Department of Energy and Climate Change)	TS	18	11	18	12	Bioenergy	-	-	State the year(s) for the World Energy Outlook scenarios. (note that the sections that follow on that page have several instances of dubious English)	See comment #400
United States (U.S. Department of State)	TS	19	26	-	-	-	-	-	"35%-50%" -- but the first sentence said GHG impacts were well quantified. Is this considered good quantification? Provide a full set of data from various sources with explanations of the variability.	The range is due specific sites, technology variation, and assumptions..
Frank Behrendt (Institute for Energy Engineering)	TS	19	22	-	-	-	-	-	... and when commercially (etc) - incomplete sentence	A comma is missed after "available".
Sampo Soimakallio (VTT Technical Research Centre of Finland)	TS	19	31	19	31	-	-	-	Add reference after Wicke et al. 2008 : ""Edwards, R., Szekeres et al. 2008). ""	Reference will be checked
Sampo Soimakallio (VTT Technical Research Centre of Finland)	TS	19	29	19	29	-	-	-	Add reference: ""...to oil palm (Hooijer et al. 2006) rather than...""	Reference will be checked
United States (U.S. Department of State)	TS	19	20	-	-	-	-	-	Delete "deliver high" and replace with "reduce". Delete "mitigation percentages" and replace with "emissions by". Delete brackets around 80 - 90%.	Why? We are just quoting important conclusion from the reference.
United States (U.S. Department of State)	TS	19	28	-	-	-	-	-	Delete "emission benefits can shift to negative levels." and replace with "emissions can increase significantly." Recommend next sentence be re-written as follows: "For example, emissions can be high if peatlands are drained and converted to oil palm. Oil palm can be produced with lower emissions if they are established on marginal grasslands with low soil carbon stocks (Wicke et al., 2008)."	We will use: "For example, emissions can be high if peatlands are drained and converted to oil palm. Nevertheless, oil palm can be produced with lower emissions if they are established on marginal grasslands with low soil carbon stocks (Wicke et al., 2008)".
United States (U.S. Department of State)	TS	19	24	-	-	-	-	-	Delete "positive", delete "balances" and replace with "reduction benefits". Recommend next sentence be re-written as follows: "On a lifecycle basis, sugar cane-based ethanol can reduce GHG emissions by over 80% and most biofuels produced from corn and rapeseed, when managed properly, can reduce GHG emissions by 35% to 50%."	GHG balance is a well known and extensively used word. Most reviewers claim for more information on GHG balance. Regarding the more complete sentence you suggest , on a lifecycle basis can or can't incorporate ILUC emissions. Thus we prefer don't use it.
United States (U.S. Department of State)	TS	19	17	-	-	-	-	-	Delete "well", delete "state-of-the-art" and replace with "the".	See comment # 453
United States (U.S. Department of State)	TS	19	22	-	-	-	-	-	Delete "when commercially available".	2nd generation biofuels are not yet in the market.

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Frank Behrendt (Institute for Energy Engineering)	TS	19	19	-	-	-	-	-	end sentence after ... calculation methods. (Hoefnagels ...	Why? We are just quoting important conclusion from the reference.
United Kingdom (Department of Energy and Climate Change)	TS	19	17	-	-	-	-	-	Figures may be well quantified but are still subject to very substantial levels of uncertainty (e.g. N2O emissions from fertilisers) and some potentially significant elements (e.g. soil carbon stock changes) are not well understood	The discussion is still evolving but it is clear that with proper agricultural management these impacts can be much lower than the first publication claimed.
Australia (0)	TS	19	1	19	2	-	-	-	First sentence poorly drafted. Spell out (i) LUC on first occurrence.	Sentence has been changed. ILUC will be spell out.
Michael Jack (Scion (NZ Forest Research Institute))	TS	19	28	19	31	-	-	-	Found this sentence confusing.	Sentence will be redrafted
Sampo Soimakallio (VTT Technical Research Centre of Finland)	TS	19	31	20	3	-	-	-	Fundamentally, like the results of any life cycle assessment, the GHG mitigation impact of bioenergy systems depends on the methodological choices (i.e. spatial and temporal system boundaries, allocation procedure and indicators) and data set selection. Secondly, the impact depends on the case specific properties. As regards to temporal system boundary, the target for climate change mitigation determines the time frame for carbon debt. The more rapidly the GHG emissions should be reduced the shorter pay back time for carbon debt.	Thanks, but no action.
Finland (Finnish Meteorological Institute)	TS	19	31	20	3	-	-	-	Fundamentally, like the results of any life cycle assessment, the GHG mitigation impact of bioenergy systems depends on the methodological choices (i.e. spatial and temporal system boundaries, allocation procedure and indicators) and data set selection. Secondly, the impact depends on the case specific properties. As regards to temporal system boundary, the target for climate change mitigation determines the time frame for carbon debt. The more rapidly the GHG emissions should be reduced the shorter pay back time for carbon debt.	Thanks for the comments, but no action.

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Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table	Comments	Consideration by writing team
Sampo Soimakallio (VTT Technical Research Centre of Finland)	TS	19	1	19	2	-	-	-	I didn't find proofs for this statement from the report. From my point of view it is too optimistic to argue that undesirable iLUC effect can be avoided just if biomass production is in balance with improvements in agricultural management. This may be true as long as there is no competition of this kind of bioenergy system and other land use systems. However, significant increase in competition of land patterns may take place due to growth in population and the economy. In such case it is only an issue of 'equity' whether the particular bioenergy system is considered ""iLUC free"" or not.	We present literature that claims it is possible to attend food demand and bioenergy production without competition between use of soil - examples given include intensification of agriculture and pasture where from the same land additional biofuels can be made. This applies to countries that practice low density cattle production and have high level of degradation of pasture. Management of pasture would release land for agriculture production. Obviously, this can occur if the right bioenergy policy is in place.
Frank Behrendt (Institute for Energy Engineering)	TS	19	24	-	-	-	-	-	iLUC, elsewhere (i)LUC - definition is missing	See comment # 462
United States (U.S. Department of State)	TS	19	21	-	-	-	-	-	Insert space between "counterparts," and "especially".	The final draft of the SRREN will be processed by a professional copy-editor. All editorial comments such as this will be resolved at that time.
Oyvind Christophersen (Climate and Pollution Agency)	TS	19	24	-	26	-	-	-	It is difficult to trust these numbers, as given without a basis and discussion. Taken from a single source.	See comment # 464
Bernd Wittgens (SINTEF Materials and Chemistry)	TS	19	24	-	26	-	-	-	It is difficult to trust these numbers, as given without a basis and discussion. Taken from a single source.	They are from a single source but the reference makes a review of the literature.
Christoph von Stechow (IPCC WGIII TSU)	TS	19	26	-	-	-	-	-	It is not quite clear, where the numbers 80% and 35%-50% are taken from in the chapter text. Please clarify.	The numbers are extensively discussed in Chapter 2 - Bioenergy and references listed.
Frank Behrendt (Institute for Energy Engineering)	TS	19	2	-	-	-	-	-	LUC is defined below on p19/1 10, definition of (i) not given	Accepted
John Twidell (AMSET Centre)	TS	19	1	19	2	-	-	-	Now 'In case biomass production is in balance with improvements in agricultural management undesirable (i)LUC effects can be avoided, while unmanaged, conflicts may emerge'. IMPOSSIBLE TO UNDERSTAND THIS SENTENCE - CLARIFY	See comment # 448
Christoph von Stechow (IPCC WGIII TSU)	TS	19	17	-	-	-	-	-	Please relocate "state-of-the-art" before "bioenergy systems".	Accepted

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United States (U.S. Department of State)	TS	19	17	-	-	-	-	-	Recommend providing a table to illustrate that "GHG impacts of bioenergy systems are well quantified in state-of-the-art literature", together with a description of the methodology used. There remains substantial variation in estimates, driven in part by how the boundaries of the system evaluated are drawn. Show some data.	Space limitation. The main text has more detailed information
United States (U.S. Department of State)	TS	19	1	-	-	-	-	-	Recommend sentence be re-written as follows: "Biomass production that is in balance with improvements in agricultural management can mitigate undesirable land use change effects. Unmanaged biomass growth can result in conflicts."	Accepted
Michael Jack (Scion (NZ Forest Research Institute))	TS	19	1	19	2	-	-	-	Revise sentence. Do not use the notation (i)LUC, no one will know what is meant by this	The notation is very common in the literature and will be explained in the glossary.
Australia (0)	TS	19	28	19	31	-	-	-	Sentence does not make sense, clarify.	Sentence redrafted
United States (U.S. Department of State)	TS	19	2	-	-	-	-	-	Spell out with first use "i(LUC)".	Accepted
United States (U.S. Department of State)	TS	19	17	19	31	-	-	-	The paragraph touches on some of the issues in drawing a boundary for the problem, such as the issue of peatlands, marginal grasslands, etc. The paragraph needs to have a systematic discussion of these issues to help the reader understand what the different situations are and what their impact is.	This is a technical summary. Detailed explanation is provided in main text.
Australia (0)	TS	19	24	20	2	-	-	-	The use of 'iLUC' and '(i) LUC' in this paragraph (and elsewhere in TS) is unclear.	We will spell out LUC and ILUC.
Finland (Finnish Meteorological Institute)	TS	19	1	19	2	-	-	-	There were no proof for this statement from the report. It is too optimistic to argue that undesirable iLUC effect can be avoided just if biomass production is in balance with improvements in agricultural management. This may be true as long as there is no competition of this kind of bioenergy system and other land use systems. However, significant increase in competition of land patterns may take place due to growth in population and the economy. In such case it is only an issue of 'equity' whether the particular bioenergy system is considered "iLUC free" or not.	See comment # 444
Michael Jack (Scion (NZ Forest Research Institute))	TS	19	1	19	13	-	-	-	This hole paragraph needs to be reworked	Figure TS2.2 was redrafted and the text referred to it has changed
Jorge Martínez Chamorro (Agencia Canaria de Desarrollo Sostenible y Cambio Climático)	TS	19	2	19	2	-	-	-	This is the first time iLUC is used in TS. Please, expand the acronym here (indirect land use change) instead of doing that in page 54 line 30.	Accepted

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Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table	Comments	Consideration by writing team
Australia (0)	TS	19	27	20	6	-	-	-	This paragraph should more clearly describe the potential for land use change associated with bioenergy production to increase greenhouse emissions (for example, if forests converted to agricultural crops), or to reduce greenhouse emissions (for example, if degraded land rehabilitated and converted to woody biomass).	This is a Summary. The complete discussion available in main text.
Sampo Soimakallio (VTT Technical Research Centre of Finland)	TS	19	31	19	31	-	-	-	What do you mean by: ""the overall negative emissions can be obtained""? Better expression needed!!!	See comment # 472
United States (U.S. Department of State)	TS	-	-	-	-	-	TS 2.2	-	Figure needs to be bigger to make it more readable. Insert "of" after "genetic diversity".	Accepted
Australia (0)	TS	19	-	-	-	-	TS 2.2	-	Environment pressures' under Risks.	Rejected. We already quote "environment"
United States (U.S. Department of State)	TS	20	42	-	-	-	-	-	A recent paper from Purdue University should be taken into consideration for this paragraph. The peer reviewed paper by Wallace Tyner and others examines the land use impacts associated with corn ethanol and is available at https://www.gtap.agecon.purdue.edu/resources/res_display.asp?RecordID=3288 . The results of this work have been presented to the California Air Resources Board for consideration in their Low Carbon Fuel Standard.	Reference will be checked
United States (U.S. Department of State)	TS	20	18	-	-	-	-	-	Argonne National Laboratory has written a recent report on water requirement for corn ethanol. This peer reviewed report "Consumptive Water Use in the Production of Ethanol and Petroleum Gasoline" by May Wu and others is available at http://www.transportation.anl.gov/modeling_simulation/GREET/publications.html and could be used as a source material to supplement this paragraph.	Reference will be checked

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Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table	Comments	Consideration by writing team
Richard Plevin (UC Berkeley)	TS	20	37	21	3	-	-	-	Because of the use of the passive voice, it's not clear whether the "Assessment of the available literature" was done by the author of the TS or if some other work is being referenced but not cited. In any case, some citations are warranted here. It's true that model spatial resolution is poor, but that's not the only issue with ILUC models, and other factors would tend cause these models to underestimate emissions. Singling out one issue appears to be cherry-picking from the literature. The characterization of ILUC modeling and the convergence toward lower values is, in my view, a misrepresentation of the literature. There are many models based on different assumptions and different timeframes that have arrived at different results. I have observed no convergence even in the definition of the problem, much less in the results of modeling. Overall, I find this section dismissive of many of the ILUC modeling efforts and overly optimistic about avoidance of ILUC.	Text was changed significantly taking into consideration the comments from the reviewer
Sampo Soimakallio (VTT Technical Research Centre of Finland)	TS	20	42	20	44	-	-	-	Both of these references used to carry out important conclusions concerning the iLUC are missing from the reference list	We were unable to locate your comment quoting the 2 references
Finland (Finnish Meteorological Institute)	TS	20	42	20	44	-	-	-	Both of these references used to carry out important conclusions concerning the iLUC are missing from the reference list	We were unable to locate your comment quoting the 2 references
Susanne Kadner (Technical Support Unit)	TS	20	2	-	-	-	-	-	Ch 2: Define i(LUC)	It will be spell-out.
United States (U.S. Department of State)	TS	20	14	-	-	-	-	-	Delete "Location is the key driver." Delete "more broadly".	We will replace "key"by important". The second comment is accepted.
United States (U.S. Department of State)	TS	20	7	-	-	-	-	-	Delete "Other key environmental impacts...bioenergy products suited for specific projects." Recommend replacing with the following text: "Other key environmental impacts include water use, biodiversity, and other emissions. Appropriately designed management schemes can lower emissions impacts. The development of standards and criteria are necessary to encourage low emissions bioenergy pathways."	See comment # 481
United States (U.S. Department of State)	TS	20	48	-	-	-	-	-	Delete "to adapt to the complex type of analysis required".	The analysis is really complex.
United Kingdom (Department of Energy and Climate Change)	TS	20	8	-	9	-	-	-	Disagree on the role of standards and criteria here. There is no evidence as yet that these have the impacts claimed. Legislative enforcement might make a difference or improving understanding of the underlying issues or dissemination/awareness; but standards and criteria are not an essential pre-requisite nor are they guaranteed to make a difference.	We will change to "Development and enforcement of standards and criteria pushes bioenergy production to low emission management".
Frank Behrendt (Institute for Energy Engineering)	TS	20	13	-	-	-	-	-	food, feed, and biofuel - elsewhere: food, fodder, fuel - should be used consistently	Accepted

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Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table	Comments	Consideration by writing team
United Kingdom (Department of Energy and Climate Change)	TS	20	32	31	10	-	-	-	iLUC detail is not needed here and could be reduced	Some ILUC details will be removed while considering other reviewers' comments.
United States (U.S. Department of State)	TS	20	36	-	-	-	-	-	Insert period after "related sectors" and delete "economic systems".	Accepted
Christoph von Stechow (IPCC WGIII TSU)	TS	20	32	20	33	-	-	-	Please review the relevant literature in order to arrive at more substantial comments on the interaction between food and energy prices (such as Chakravorty, Ujjayant & Magné, Bertrand & Moreaux, Michel, 2008. "A dynamic model of food and clean energy," Journal of Economic Dynamics and Control, Elsevier, vol. 32(4), pages 1181-1203, April).	Reference will be checked
United States (U.S. Department of State)	TS	20	19	-	-	-	-	-	Provide some examples or a table of data to explain how "considerable improvements can be made in water use efficiency...".	This is a summary. More details in the main text.
United States (U.S. Department of State)	TS	20	4	-	-	-	-	-	Recommend sentence be re-written as follows: "Good governance of land-use regulations, enforcement of zoning laws, and appropriate choice of biomass production systems are critical to achieve positive environmental impacts."	Accepted
United States (U.S. Department of State)	TS	20	25	-	-	-	-	-	Recommend sentence be re-written as follows: "Similar issues exist for biodiversity, although there is greater uncertainty due to a lack of consensus on methodologies to quantify impacts. Large scale monocultures clearly occur at the expense of natural biodiversity (CBD, 2007). In contrast, mixed cropping systems (such as agroforestry) could increase biodiversity. This is highly location specific and dependent on decisions with respect to land-use planning, zoning, and choice of biomass production systems. This area deserves more research and monitoring."	Sentence will be: "Similar issues exist for biodiversity, although there is greater uncertainty due to a lack of consensus on methodologies to quantify impacts. Large scale monocultures clearly occur at the expense of natural biodiversity (for example highlighted in CBD, 2007). In contrast, mixed cropping systems (such as agroforestry) could increase biodiversity. This is highly location specific and dependent on land-use planning, zoning, and choice of biomass production systems. This area deserves more research and monitoring."
Christoph von Stechow (IPCC WGIII TSU)	TS	20	39	-	-	-	-	-	The expression "lack of lands" is not very accessible. Please consider rephrasing.	Sentence redrafted
Australia (0)	TS	20	7	20	8	-	-	-	The first sentence refers to water, biodiversity and other emissions, while the second sentence refers to emissions, to water, air and soils. Suggest clarifying the types of emissions being considered here.	Second sentence will be: "Just as for GHG impact, proper management determines impact levels to water, air and soil".
Antoine BONDUELLE (E&E Consultant)	TS	20	32	21	3	-	-	-	The narrative is well written, and represents well the chapter.	No action

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Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table	Comments	Consideration by writing team
Australia (0)	TS	20	26	20	27	-	-	-	The statement on negative impacts of large scale monocultures on biodiversity implies that this is always the case, whereas forest establishment (including monocultures) on degraded former forest land may improve biodiversity values. Suggest replacing 'clearly' with 'may'.	We understand that this always occur.
Australia (0)	TS	20	9	20	12	-	-	-	The third sentence introduces multiple issues, including reference to both biofuel and bioenergy, and the meaning is unclear. What does 'many functionalities' mean?	Multiple functional units. Text was better explained.
United States (U.S. Department of State)	TS	20	0	-	-	-	-	-	This section on biomass has the frequent problem of stating generalities with little data or insight.	We present many quantifications
United Kingdom (Department of Energy and Climate Change)	TS	20	17	-	24	-	-	-	This underplays a bit the potentially very significant issues related to water. Studies indicate more than just "improvements" can be made. They indicate significant potential concerns e.g. UNEP "Water and Bioenergy" in the Bioenergy Issue Paper series, which need to be considered against future climate change projections in terms of changing precipitation patterns and potential impacts of e.g. perennial plantations on ground water. The evaluation of these issues is still emerging e.g. Cabral, O.M.R., et al., The energy and water balance of a Eucalyptus plantation in southeast Brazil. Journal of Hydrology. In Press, Corrected Proof.	Impacts of climate change on biomass production are discussed later on in the text.
Japan (the Japanese Ministry of Foreign Affairs)	TS	21	46	-	-	-	-	-	"Conversion technologies & bioenergy systems" does not make sense.	See comment # 534.
Jorge Bonnet Fernández-Trujillo (Agencia Canaria de Desarrollo Sostenible y Cambio Climático)	TS	21	46	21	46	-	-	-	"Conversion technologies & bioenergy systems" Is this a section of the subchapter? Please, keep the style uniformity of the subchapter.	See comment # 534.
Kyung-Jin Boo (Korea Energy Economics Institute)	TS	21	46	-	-	-	-	-	? This paragraph addresses a new trend of conversion technology in biomass. The first sentence needs to be highlighted in the form of full sentence.	See comment # 534.
Sampo Soimakallio (VTT Technical Research Centre of Finland)	TS	21	29	21	29	-	-	-	After "...countries." add sentence "However, in worst case the GHG emissions from the terrestrial stocks would just be increased and there would be no net mitigation benefits."	This is not mentioned in the main text. We need a reference on that.

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Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table	Comments	Consideration by writing team
Richard Plevin (UC Berkeley)	TS	21	11	-	24	-	-	-	After highlighting the complexity and challenge of estimating social impacts, this section highlights all the potential positive impacts and downplays the negative ones, e.g., implying that food price increases are limited to the rapid expansion of first generation fuels produced from food crops. In fact, it's not clear that the speed of expansion is a critical factor, and second generation fuels that compete with food crops also cause food prices to increase. I hope not to insult anyone, but it's difficult to read this section without concluding that the author is intent on showing bioenergy in the most positive light. I find this lack of balance inappropriate for an IPCC report. A serious, balanced discussion of potential costs and benefits is warranted.	Section was rebalanced taking into consideration the reviewer's comments.
United Kingdom (Department of Energy and Climate Change)	TS	21	-	23	-	-	-	-	Big scope for reduction in length here by focusing on the end implications for the industry rather than giving the examples.	Text will be reduced, but we must cover all sections of the main text in the Summary.
Sampo Soimakallio (VTT Technical Research Centre of Finland)	TS	21	25	21	26	-	-	-	Correct to the form: ""Bioenergy is a component of much larger agriculture and forestry systems of the world, forming a large terrestrial carbon stock. Land and water resources... ""	This paragraph is a conclusion of what has been discussed. So, no new information can be added.
United States (U.S. Department of State)	TS	21	36	-	-	-	-	-	Delete "a".	The final draft of the SRREN will be processed by a professional copy-editor. All editorial comments such as this will be resolved at that time.
United States (U.S. Department of State)	TS	21	46	-	-	-	-	-	Delete "Conversion technologies and bioenergy systems". Sentence beginning with "Advanced cultivation techniques..." can be merged with previous paragraph. Sentence beginning with "Various developments..." can be the beginning of a new paragraph.	Accepted
United States (U.S. Department of State)	TS	21	2	-	-	-	-	-	Delete "is" and replace with "are".	The final draft of the SRREN will be processed by a professional copy-editor. All editorial comments such as this will be resolved at that time.
United States (U.S. Department of State)	TS	21	4	-	-	-	-	-	Delete "value".	We need value judgement.
United States (U.S. Department of State)	TS	21	13	-	-	-	-	-	Delete sentence "Rationalized conventional agriculture... (see e.g. Wicke et al., 2009)."	expression deleted
United Kingdom (Department of Energy and Climate Change)	TS	21	31	31	45	-	-	-	Does this yield improvement rate apply to all energy crops? It is surprising that this is felt to apply to woody biomass which can have multi year establishment time and subsequent harvest cycle.	Yes. No action

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Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table	Comments	Consideration by writing team
Frank Behrendt (Institute for Energy Engineering)	TS	21	14	-	-	-	-	-	employmentt -> employment	The final draft of the SRREN will be processed by a professional copy-editor. All editorial comments such as this will be resolved at that time.
Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	TS	21	25	21	31	-	-	-	For reducing TS length: this paragraph is mostly redundant	We understand that this is the important conclusion of whar has been discussed in this section.
Michael Jack (Scion (NZ Forest Research Institute))	TS	21	25	21	31	-	-	-	Found this paragraph to be a repetition of some of the things said earlier.	We understand that this is the important conclusion of whar has been discussed in this section.
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	TS	21	39	21	41	-	-	-	Important remark in regard to food-or-fuel discussion in Germany.	No action
United States (U.S. Department of State)	TS	21	39	-	-	-	-	-	Insert "A" before "recent". Delete "foresight" and replace with "forecast". Spell out FAO.	"A"will be included. FAO will be spell out in the glossary.
United States (U.S. Department of State)	TS	21	18	-	-	-	-	-	Insert "regulations" after "governance". Delete "Rapid" and replace with "Unsustainable".	The term governance is well defined in literature. Regarding the 2nd comment we are specific talking about the growth in biomass deployment.
United States (U.S. Department of State)	TS	21	3	-	-	-	-	-	Insert period after "impacts". Insert "There is also an" prior to "acknowledgement". Delete "at large".	Your proposition is very similar to our text and breaking the sentence in 2 other sentences will increase the complexity to refer to the main text section 2.5.3.1.
United Kingdom (Department of Energy and Climate Change)	TS	21	46	22	12	-	-	-	It would be good if somewhere out of this we could emerge with an agreed definition of 'second generation' biofuels (see earlier comment)	definition will be included in glossary.
Oyvind Christophersen (Climate and Pollution Agency)	TS	21	33	21	45	-	-	-	Marine biomass - both microalgae and macroalgae should be mentioned here. This is a potential future important source.	This is a summary. Marine biomass is described in the main text and not necessarily quoted in the Summary.
Christoph von Stechow (IPCC WGIII TSU)	TS	21	25	-	-	-	-	-	Please consider inserting "In summary" at the beginning of the paragraph.	Accepted
Christoph von Stechow (IPCC WGIII TSU)	TS	21	15	-	-	-	-	-	Please consider inserting the word "that" between "potential" and "bioenergy" to avoid confusion.	Accepted
Christoph von Stechow (IPCC WGIII TSU)	TS	21	18	-	-	-	-	-	Please consider linking these two arguments with an expression along the lines "on the negative side...".	Accepted
Christoph von Stechow (IPCC WGIII TSU)	TS	21	46	21	47	-	-	-	Please consider to integrate the second sentence of this paragraph into the previous paragraph.	See comment # 534.

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Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table	Comments	Consideration by writing team
Sampo Soimakallio (VTT Technical Research Centre of Finland)	TS	21	11	21	21	-	-	-	Social concerns should be explicitly listed. Not just competition with food production, but e.g. concentration of land and other social impacts, employment issues. For instance, cf. Chapter 2, section 2.5.5, p. 73, lines 31-35; Ch. 2, section 2.5.5.6, p. 79, lines 30-33.	This is a summary and no space to add all information from main text.
Antoine BONDUELLE (E&E Consultant)	TS	21	33	21	45	-	-	-	This segment is too optimistic. Other authors see 1) problems in equity and environment in the proposed intensification of agriculture 2) unlikely growth of productivity over population growth, especially in the context of Climate Change. The whole paragraph is too ideological in nature and should be rewritten in the line of the ""key messages"" p.25.	On lines 44 and 45 we mention that some barriers may restrict our conclusion.
Modesto Fernandez Diaz-Silveira (Ministry of Science, Technology and Environment)	TS	21	24	-	-	-	-	-	TO include a new para, after line 24: "Increasing the use of agricultural areas dedicated to crops for bioenergy production, mainly biofuels, may impose a reduction of biodiversity, because of expanded mono-crop areas. It can be a challenge for biodiversity and also to traditional systems for food production in some areas, most possible in developing countries."	This point has been already highlighted in P 20
Modesto Fernandez Diaz-Silveira (Ministry of Science, Technology and Environment)	TS	21	45	-	-	-	-	-	TO include text, after the end of the line: "Increase of crops productivity, mostly in developing countries, must take into account the necessary consideration of traditional and local production systems, that should be preserved while high-productivity systems are developed."	At lines 45 and 46 we mention some negative aspects. We will include "social and " before "environmental tradeoffs".
United Kingdom (Department of Energy and Climate Change)	TS	21	33	-	45	-	-	-	Why is increasing productivity is a pre-requisite, when it has been stated above that we only use and are ever likely to use a small fraction of the technical potential?	Even using a small fraction of technical potential, yield improvement will help to reduce soil competition for food and fuel.
United Kingdom (Department of Energy and Climate Change)	TS	21	11	-	24	-	-	-	Worth noting here though that perennial crops such as SRC usually require less labour than food crops such as cereals (Thornley et al, "Quantification of employment from biomass power plants", Renewable Energy, 2008	This is a summary and no space to add all information from main text.

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Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table	Comments	Consideration by writing team
United Kingdom (Department of Energy and Climate Change)	TS	21	8	21	12	Bioenergy	-	-	Key is that (i)LUC can be avoided': true, but to what extent will this be the case? This is unknowable ex-ante. It seems the authors are claiming that adverse LUC and ILUC can be avoided if particular conditions are met, which is a more qualified expression. Also, the evidence base on ILUC is still limited. As the authors state later: 'Establishing causal relationship between biofuel development and distal land use change is still controversial.' (p.108, section 2.8.2). Although Lapola et al 2010 is used in the text to caution against pessimism with respect to ILUC, the main finding of that paper is that ILUC can be a major problem - again if particular circumstances pertain. In general, the tone of this part of the section is more optimistic and selective in its presentation of evidence than neutral. Counterbalancing, more sceptical arguments about the governance challenges are given, for example, in: Tomei, J. and Upham, P. (2009) 'Argentinean soy based biodiesel: an introduction to production and impacts', Energy Policy 37 (10), pp. 3890-3898. Upham, P., Thornley, P., Tomei, J. and Boucher, P. (2009) 'Substitutable biodiesel feedstocks for the UK: a review of sustainability issues', Journal of Cleaner Production, vol. 17, supplement 1, pp. S37-S45, http://dx.doi.org/10.1016/j.jclepro.2009.04.014	Reference will be checked
Japan (the Japanese Ministry of Foreign Affairs)	TS	22	30	-	-	-	-	-	"If 20-30 US\$/tonne carbon taxes were deployed (or CCS)" does not make sense; carbon taxes are economic instruments and should not be compared with CCS, which is a technology.	We will make the sentence more clear.
Michael Jack (Scion (NZ Forest Research Institute))	TS	22	22	22	22	-	-	-	In the table percentages are used rather than ratios. Need to be consistent	Text will be made consistent with table.
Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	TS	22	14	22	16	-	-	-	It is remarked that while other partes of SSREN use the ""learning curve"" concept, here the ""progress ratio"" is used	We will use learning curve in some places.
Christoph von Stechow (IPCC WGIII TSU)	TS	22	30	-	-	-	-	-	Please consider inserting the word "combustion" behind "biomass".	It is very clear that biomass will be combusted to generate electricity
Christoph von Stechow (IPCC WGIII TSU)	TS	22	31	22	36	-	-	-	Please consider integrating these lines into the previous paragraph, since it also covers technical learning issues.	It is in another paragraph since we are now discussing how PR for bioenergy compares with other renewable energies.
United States (U.S. Department of State)	TS	22	37	22	38	-	-	-	The 60 - 70 dollar a barrel price is a sufficiently dramatic reduction from current technology that key assumptions should be stated. For example, source and cost of biomass.	Literature is quoted in the main text.

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Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table	Comments	Consideration by writing team
Oyvind Christophersen (Climate and Pollution Agency)	TS	22	38	-	-	-	-	-	The given number (dollars/barrel oil) for indicator of Renewable Energy competitiveness is well known, however, not to much has happened regarding to implementation of RE. Oil price is not the only issue that matters. If this number was true more would have happened in the world already today.	Here we are discussing only this aspect. We are not stating that biofuels will be deployed as a substitute of oil due this condition.
Bernd Wittgens (SINTEF Materials and Chemistry)	TS	22	38	-	-	-	-	-	The given number (dollars/barrel oil) for indicator of Renewable Energy competitiveness is well known, however, not to much has happened regarding to implementation of RE. Oil price is not the only issue that matters. If this number was true more would have happened in the world already today.	Here we are discussing only this aspect. We are not stating that biofuels will be deployed as a substitute of oil due this condition.
Christoph von Stechow (IPCC WGIII TSU)	TS	22	23	22	26	-	-	-	The last sentence of this paragraph would only make sense if the Table 2.5.1 was actually shown in the TS.	TSU agrees that we can mention Tables and Figures from the main text in the Summary.
Christoph von Stechow (IPCC WGIII TSU)	TS	22	30	22	31	-	-	-	This assertion is in stark contrast to lines 204 on page 105 of Chapter 2: "In case of deployment of carbon taxes of up to 50 U\$/ton (or CCS), biomass can also be competitive with coal based power generation."	We will make both statements compatible.
Jorge Martínez Chamorro (Agencia Canaria de Desarrollo Sostenible y Cambio Climático)	TS	22	41	22	41	-	-	-	This is the first time CHP is used in TS. Please expand the acronym here (combined heat and power) instead of doing that for the first time in page 78 line 2.	Accepted
United Kingdom (Department of Energy and Climate Change)	TS	22	14	23	9	-	-	-	This seems to ignore 2 very important factors: 1. Most bioenergy systems need to be designed practically on a bespoke basis to suit the very individual fuel supply situation (acknowledged in the section on environmental impacts) and this results in high project development and engineering costs, which will not automatically reduce as described and 2. reductions in technology costs for power plants are driven by the steam generation sector not the bioenergy sector. Steam combustion and generation technology is well established and there is little room for technological learning cost reductions. Therefore it seems inappropriate to be considering progress ratios for bioenergy generally - only for more advanced technologies, nor is the information presented particularly illuminating. Most of this could be deleted.	Most modern biomass use technologies are based in few biomass production activities. These feedstock production process are very homogeneous and can take advantage of economy of scale. Also, feedstock cost has a significant weight in the final bioenergy production cost.
Modesto Fernandez Diaz-Silveira (Ministry of Science, Technology and Environment)	TS	22	8	-	-	-	-	-	TO include text, after ...with fossil fuels.: "At the same time, there should be a careful analysis of the need for using petroleum derived products or energy-consuming techniques that could mask the real contribution of some biofuels to the real and effective reduction of carbon emissions.	This isn't discussed in the main text. We will see if it can be included there and consequently mentioned in the TS.

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Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table	Comments	Consideration by writing team
United Kingdom (Department of Energy and Climate Change)	TS	22	41	22	44	-	-	-	To labour (and illustrate) the point - is this text talking about first or second generation bioethanol?	Here we are talking about 1st generation. We will add this information in the paragraph.
United Kingdom (Department of Energy and Climate Change)	TS	23	16	-	21	-	-	-	As above this does not seem to address the issue of appropriate location for planting based on expected changes in precipitation patterns.	At the begin of paragraph we mention that there will be strong regional differences in this respect
Australia (0)	TS	23	19	-	-	-	-	-	Change 'raise' to 'rise'	Accepted
Christoph von Stechow (IPCC WGIII TSU)	TS	23	16	23	19	-	-	-	How is it possible to know that serious constraints do not occur if "temperature raise is limited to 2°C" if, at the same time, the text mentions that "the detailed impacts are still poorly understood"?	Sentence will read: "Climate change impacts on bioenergy feedstocks production are real but <u>may</u> not pose serious constraints
Frank Behrendt (Institute for Energy Engineering)	TS	23	3	-	-	-	-	-	R2 needs 2 as superskript	Accepted
Christoph von Stechow (IPCC WGIII TSU)	TS	23	19	23	21	-	-	-	Since the chapter's assertions about adaptation are poorly substantiated by references, this sentence should be rephrased in order to reflect this lack of literature in a better way.	Sentence will read: "Bioenergy and new (perennial) cropping systems may also offer opportunities to combine adaptation measures".
Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	TS	23	17	23	19	-	-	-	The sentence is true only if enough water is available, which in many regions will not, due to climate change itself.	At the begin of paragraph we mention that there will be strong regional differences in this respect
Christoph von Stechow (IPCC WGIII TSU)	TS	23	14	26	1	-	-	-	The statement that "80-90% GHG reduction" could be achieved with certain bioenergy options is only mentioned in chapter 2 on page 108, line 19 and on page 116, line 18, without any reference. If no reference will be provided in the chapter to substantiate this statement, it has to be deleted from the Technical Summary. If the number is based on the literature review in chapter 2, this has to be made explicit!	References will be added in Ch 2 main text
Oyvind Christophersen (Climate and Pollution Agency)	TS	23	8	23	9	-	-	-	There are ongoing demoprojects both concerning micro and macro algae, and if successful the deployment could be significant earlier than 2030. Consider 2030 perspective to be very conservative, especially for macro algae.	To add more optimistic views about algae we need unbiased references.
Christoph von Stechow (IPCC WGIII TSU)	TS	23	6	-	-	-	-	-	Which "recent scenario analyses" is the text here referring to? This is not clear from the respective section in the chapter text.	The detail is provided in main text. This is just a Summary.
Susanne Kadner (Technical Support Unit)	TS	-	-	-	-	-	-	TS 2.2	Ch 2: Press releases and interviews are not sources for data to be presented in an IPCC assessment. Remove respective data. Also, remove references from table to improve readability and place into table legend or footnote.	Deleted

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Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table	Comments	Consideration by writing team
United States (U.S. Department of State)	TS	-	-	-	-	-	-	TS 2.2	This table is not very useful for most readers. For example, it does not give the costs of the activity, the total costs, or any comparisons to other competing fuel production systems.	Deleted
Christoph von Stechow (IPCC WGIII TSU)	TS	-	-	-	-	-	-	TS 2.2	Why are books, press releases and interviews mentioned in the caption text, since all reference analysed in the table seem to be journal articles?	Deleted
Frank Behrendt (Institute for Energy Engineering)	TS	23	-	-	-	-	-	TS 2.2	column head ""n"" needs to be defined	Accepted.
Jorge Bonnet Fernández-Trujillo (Agencia Canaria de Desarrollo Sostenible y Cambio Climático)	TS	23	1	23	4	-	-	TS 2.2	Indicate what is "n" in the 5th column of the table.	Accepted.
Japan (the Japanese Ministry of Foreign Affairs)	TS	24	18	-	-	-	-	-	The sentence does not make clear where consensus exists.	Sentence will be redrafted
Christoph von Stechow (IPCC WGIII TSU)	TS	24	21	-	-	-	-	-	The words "possible extreme" may sound like an oxymoron to some readers.	Sentence will be redrafted.
Sampo Soimakallio (VTT Technical Research Centre of Finland)	TS	24	16	24	18	-	-	-	There is no evidence available that introduction of sustainability criteria for biomass, bioenergy or biofuels will drive bioenergy to more sustainable direction. The EU has introduced the first ever mandatory criteria for biofuels but it will be applied first time in 2011. Therefore, the first consequences can be seen - if they can be recognized - only after a few years. There is also a risk that the use of mandatory targets for bioenergy and narrow system boundary when assessing the sustainability of bioenergy systems could lead to the promotion of significantly unsustainable solutions, for example due to indirect market effects.	We will add the word "enforcement" on top of "development of sustainability criteria".
Jorge Bonnet Fernández-Trujillo (Agencia Canaria de Desarrollo Sostenible y Cambio Climático)	TS	24	1	24	2	-	TS 2.3	-	Instead of "EJ/a" it should be "EJ/year"	Standard acronym convention will be applied throughout SRREN in final stages.
Sampo Soimakallio (VTT Technical Research Centre of Finland)	TS	24	-	-	-	-	TS 2.3	-	This Figure could be misleading. Concerns and uncertainties of the climate impacts should be stated somewhere. There is a risk that deployment of the potentials will either increase deforestation or decrease the existing terrestrial carbon sink in temperate and boreal regions. For instance, utilising the ""surplus forestry"" would have an impact on land sink, i.e. the baseline, which is not carbon neutral, although the forestry itself would be on sustainable basis. The difficulties and uncertainties in estimating the true climate impacts should be emphasized in the text.	Figure improved. Comments incorporated.

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Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table	Comments	Consideration by writing team
Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	TS	24	-	-	-	-	TS 2.3	-	Why the broken Y-axis? Not much is gain in figure height and confuses the interpretation.	Figure improved. Comments incorporated.
Susanne Kadner (Technical Support Unit)	TS	-	-	-	-	-	TS 2.3	-	Ch 2: Remove source information from figure, sufficient if mentioned in figure legend.	Figure improved. Comments incorporated.
United States (U.S. Department of State)	TS	-	-	-	-	-	TS 2.3	-	Figure is difficult to read.	Figure improved.
United States (U.S. Department of State)	TS	-	-	-	-	-	TS 2.3	-	<p>This figure is a somewhat optimistic assessment of the biomass resource potential. The biomass technical potential upper range of 1,500 EJ gives the erroneous impression that biomass alone can exceed all of the world's energy needs. The negative consequences of that scenario are not articulated in this figure and cannot be stated in an abbreviated format. Recommend that the technical upper potential be deleted.</p> <p>This chapter will be much more credible if it is conservative in terms of reducing the biomass resource potential given sustainability considerations. For example, a sustainably managed biomass resource utilization upper bound of 200 EJ would meet about 40% of current world energy demand. This is a significant contribution to world energy needs. A conservatively reduced resource estimate will tell policymakers that they cannot rely on biomass alone to meet all energy needs but must pursue a wide range of energy options including biomass.</p> <p>The figure is inconsistent with Figure SPM 4 on page 15 of the Summary for Policymakers. Figure SPM4 shows an upper bound of 200 EJ by 2050 and a more realistic upper bound of about 120 EJ by 2050.</p> <p>In addition to this figure it would be very helpful to have a breakdown by country of the biomass resource potential in million dry tonnes/year. A country-specific biomass resource assessment table would be a valuable contribution that this report could make.</p>	Figure was improved. The 1500 EJ figure is a theoretical potential for terrestrial biomass based on global modeling with assumptions that are explained in the text of the full chapter (no aquatic biomass considered). This is not the technical potential. The upper technical potential is 500 EJ but this is not the most likely potential. The ranges go from 50 to 500 EJ with specifications in the figure given for what kind of biomass and land is used. It is not intended for this figure to show that biomass can meet all the needs. On the contrary. The range of values that the review of authors found is 100 to 300 EJ with the lower values being the same as modeled by Chapter 10.
United States (U.S. Department of State)	TS	-	-	-	-	-	-	TS 2.3	Delete "storylines" and replace with "scenarios". Delete "on the long term". Reword "High biomass scenario" with "Sustainable biomass scenario." This table is somewhat confusing. In the "Sustainable" scenario the biomass utilization is 300 EJ, but in the "unsustainable" scenario the biomass utilization is 100 EJ. This is counter-intuitive. It is unclear what is being conveyed in this table and the heading and text needs to be modified to make the table internally consistent. This table also appears to be inconsistent with Figure TS2.3 and Figure SPM 4.	Better explained now. Both 100 and 300 EJ scenarios can be met sustainably or unsustainably. Reading the storylines explain the preconditions for both cases.
Finland (Finnish Meteorological Institute)	TS	-	-	-	-	-	-	TS 2.3	The range given for bioenergy is not in line with the range given in Table 2.2.1. The figures given in different tables should be analogical to each other.	Consistent now

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Sampo Soimakallio (VTT Technical Research Centre of Finland)	TS	-	-	-	-	-	-	TS 2.3	The range given for bioenergy is not in line with the range given in Table 2.2.1. The figures given in different tables should be consistent with each other.	Consistent now
Finland (Finnish Meteorological Institute)	TS	25	17	25	17	-	-	-	"...provided the right bioenergy systems are applied." Also here, what is "the right" system? Please use other wording.	Right system is discussed in several parts of this text and in particular in the preconditions of the Figure TS-2.9.
Finland (Finnish Meteorological Institute)	TS	25	10	25	10	-	-	-	"If the right policy framework..." What is "the right" system? Please use other wording.	The text has discussed in several places the right system, in particular in the preconditions of the Figure TS-2.9.
Sampo Soimakallio (VTT Technical Research Centre of Finland)	TS	25	17	25	17	-	-	-	...provided the right bioenergy systems are applied." I'm not sure what is "the right" system. Please use other wording.	Right system is discussed in several parts of this text, in particular in the preconditions of the Figure TS-2.9
Sampo Soimakallio (VTT Technical Research Centre of Finland)	TS	25	6	25	6	-	-	-	Add text to the sentence: "" ... but conditional, as well as its contribution to climate change mitigation.""	The contribution to CC is described in another bullet.
Sampo Soimakallio (VTT Technical Research Centre of Finland)	TS	25	11	25	11	-	-	-	Add text to the sentence: ""... and biodiversity and to bad impacts on climate.""	GHGs emissions are discussed in a separate bullet.
John Twidell (AMSET Centre)	TS	25	4	26	19	-	-	-	An excellent summary. If only this direct style had been used throughout this Bioenergy section.	No action
United Kingdom (Department of Energy and Climate Change)	TS	25	5	26	19	-	-	-	Better to open by reiterating the opening paragraphs which more clearly showed the complexity of the variety of sources of bio-feedstock, the wide range of applicable conversion processes and the diversity of potential end uses. If nothing else this makes it a very difficult area to effectively target policy and other support actions.	Space limitation requires no repetition on issues.
Susanne Kadner (Technical Support Unit)	TS	25	-	26	-	-	-	-	Ch 2: It is a good idea to present key message at the end of each chapter in the TS; however, these should also be supplemented with the relevant section information in brackets.	Accepted
Sampo Soimakallio (VTT Technical Research Centre of Finland)	TS	25	10	25	10	-	-	-	If the right policy framework..." I'm not sure what is "the right" system. Please use other wording.	The text has discussed in several places the right system. Please see the preconditions of the Figure TS-2.9
Taishi Sugiyama (Central Research Institute of Electric Power Industry (CRIEPI))	TS	25	4	-	-	-	-	-	IPCC is not allowed to recommend a policy.2) In the third bullet we recognized that wrong policy can create conflicts	We will change the heading to: "Key messages and policies identified from Chapter 2".

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Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table	Comments	Consideration by writing team
United States (U.S. Department of State)	TS	25	6	-	-	-	-	-	It is doubtful that biomass can provide anything approaching "up to 30% of world's primary energy demand in 2050". Authors must provide the data and analysis to support such a statement.	The 30% provides a range based on the projected scenarios for 2050. Taking the extremes of the scenarios studied in detail, the range of energy demand goes from 410 to 750EJ (120-225EJ). These figures are included in the range of upper values, as are lower values.
Australia (0)	TS	25	5	25	6	-	-	-	It is not clear how the statement 'up to 30% of energy demand in 2050' is derived. Table TS 1.1 and Fig TS 2.3 are both expressed at 'technical potential' (not actual potential). Table TS 2.3 shows 2 scenarios - presumably they are equally probable. It is important that biomass resource potential is expressed as actual potential. And it may be better to express as a range - not as an upper bound. It is important to not overstate claims on potential.	Agreed but since the energy demand in 2050 is a range from the various models used, the 30% itself refers to a range of values. Ranges are given elsewhere. For instance, from modeled data it is 50 to 500 EJ. The report itself has a range of 100-300 EJ.
Michael Jack (Scion (NZ Forest Research Institute))	TS	25	16	25	16	-	-	-	Remove the work ""largely"".	We understand that even 30% emission reduction compared with fossil fuel is a large reduction.
Michael Jack (Scion (NZ Forest Research Institute))	TS	25	5	25	6	-	-	-	Revise this sentence. Does not read well.	Sentence will be changed
Michael Jack (Scion (NZ Forest Research Institute))	TS	25	11	25	15	-	-	-	Revise this sentence. Does not read well.	The word "synergize" will be replaced by "combine positively"
Sampo Soimakallio (VTT Technical Research Centre of Finland)	TS	25	4	26	20	-	-	-	Some key messages are missing: 1) ""Biomass resources are limited and the challenge to mitigate climate change is huge. In principle, biomass resources should be used as optimal as possible in climate change mitigation"", 2) ""Large uncertainties are involved in GHG emissions from LUC which makes the GHG performance of many bioenergy systems uncertain"", 3) ""Bioenergy options always compete with other biomass utilisation options such as food, feed, fibre, and ecosystem services including storage and sink for organic carbon. The development of population, economy, food habitat, and use of land patterns are key limiting factors for bioenergy."", 4) ""The target for climate change mitigation determines the time frame for carbon debt. The more rapidly the GHG emissions should be reduced the shorter payback time for carbon debt. Sustainability of biomass utilisation does not mean climate neutrality."" In fact, even compensation of the carbon debt over a long period is not sufficient for climate neutrality. For estimation the true climate impact radiative forcing based measures should be applied. These approaches should be considered in Chapter 2.	Comments considered and explained in the full chapter.

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Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table	Comments	Consideration by writing team
Finland (Finnish Meteorological Institute)	TS	25	4	26	20	-	-	-	Some key messages are missing: 1) "Biomass resources are limited and the challenge to mitigate climate change is huge. In principle, biomass resources should be used as optimal as possible in climate change mitigation", 2) "Large uncertainties are involved in GHG emissions from LUC which makes the GHG performance of many bioenergy systems uncertain", 3) "Bioenergy options always compete with other biomass utilisation options such as food, feed, fibre, and ecosystem services including storage and sink for organic carbon. The development of population, economy, food habitat, and use of land patterns are key limiting factors for bioenergy.", 4) "The target for climate change mitigation determines the time frame for carbon debt. The more rapidly the GHG emissions should be reduced the shorter pay back time for carbon debt. Sustainability of biomass utilisation does not mean climate neutrality."	1) One of our conclusions states that biomass potential is conditional. 2) In the third bullet we recognize that GHGs emissions can be high if wrong policy is followed.) We also recognize food competition in case wrong policy is followed. 4) Timing is important and this is the reason we recommend the use of sustainable bioenergy. Comments from reviewer are reflected in the main chapter but not developed as presented by the reviewer for the TS.
Modesto Fernandez Diaz-Silveira (Ministry of Science, Technology and Environment)	TS	25	11	-	-	-	-	-	TO include text, after food supplies: "and accessibility of food by poor people mostly in developing countries,"	We understand that "conflicts" already covers your proposed sentence.
Modesto Fernandez Diaz-Silveira (Ministry of Science, Technology and Environment)	TS	25	13	-	-	-	-	-	TO include text, inside the brackets, after ...water retention functions: ", management of biodiversity through coordinated strategies leading to avoid biodiversity losses) "	We are only quoting some examples, not all of them. Water and biodiversity are well discussed in the chapter.
Michael Jack (Scion (NZ Forest Research Institute))	TS	25	-	-	-	-	-	TS 2.3	The statement ""successful deployment of degraded lands"" does not make sense.	This statement refers to recovery of degraded lands for bioenergy production. One example is the recovery of degraded pastureland in Brazil and plantation of sugarcane. Concomitant with pasture intensification (for 1 head/ha to a few heads/ha) provides a significant amount of land for bioenergy and agriculture.
United Kingdom (Department of Energy and Climate Change)	TS	25	-	-	-	-	-	TS 2.3	This table is one view of the world that adds little to the main text - could easily be removed.	Revised
Finland (Finnish Meteorological Institute)	TS	26	3	26	3	-	-	-	"Optimal use and performance of biomass production and use...". There is something wrong with this sentence.	Sentence will be redrafted.

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Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table	Comments	Consideration by writing team
Sampo Soimakallio (VTT Technical Research Centre of Finland)	TS	26	1	-	-	-	-	-	1) It is misleading to give so high emission reduction percentages, as there are so many options where there are no emission reductions or they are much more moderate, mainly due to manufacturing of fertilisers and their nitrous oxide emissions from soil. 2) The percentual measure itself is also sometimes misleading, because it does not take into account the amount of biomass needed and land area used to provide the emission reductions.	Many reviewers asked for quantification. We are quoting one of the results according with one possible scenario.
Sampo Soimakallio (VTT Technical Research Centre of Finland)	TS	26	3	26	3	-	-	-	Optimal use and performance of biomass production and use...". There is something wrong with this sentence.	Sentence will be redrafted.
Michael Jack (Scion (NZ Forest Research Institute))	TS	26	1	26	2	-	-	-	Sentence should read: "...to deliver a reduction in GHGs of 80-90% compared to the fossil fuel baseline."	Our sentence express better the mitigation idea.
Christoph von Stechow (IPCC WGIII TSU)	TS	26	17	26	19	-	-	-	Since the chapter's assertions about adaptation are poorly substantiated by references, this sentence should be rephrased in order to reflect this lack of literature in a better way.	See comment # 558.
Oyvind Christophersen (Climate and Pollution Agency)	TS	26	9	-	11	-	-	-	The expression ...fully competitiveness... is absolutely meaningless. This has a price ... and we must decide whether it is necessary ... and if we want to pay this price (in money and energy).	Sentence will be changed to include "fully economic competitive"
Bernd Wittgens (SINTEF Materials and Chemistry)	TS	26	9	-	11	-	-	-	The expression ...fully competitiveness... is absolutely meaningless. This has a price ... and we must decide whether it is necessary ... and if we want to pay this price (in money and energy).	Sentence will be changed to include "fully economic competitive"
Wolfgang Riecke (Deutscher Wetterdienst)	TS	27	24	-	-	-	-	-	"1580" replace by "1575" ; see chapter 3, table 3.1	to be done
Frank Mastiaux (EON Climate & Renewables)	TS	27	36	-	-	-	-	-	... to show what? Sentence without a clear content	sentence will be removed
Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	TS	27	21	-	-	-	-	-	...and cause unimaginably serious impacts on climate and biosphere!	"for illustrative purpose only" will be added in the sentence
ICHIRO MAEDA (The Federation of Electric Power Companies of Japan)	TS	27	25	27	25	-	-	-	<comment> "consumption rate" may be replaced with "consumption" <reason> The unit of the compared figure is "TWh" indicating the volume, not the rate.	to be done
United Kingdom (Department of Energy and Climate Change)	TS	27	1	31	40	-	-	-	All these introductory sections are quite long and seem to be aimed at a pretty expert audience. Suggest moving detail to annexes.	the introduction will be reduced by a factor of at least 2

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Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	TS	27	-	-	-	-	-	-	An explanation of the meaning of ""direct solar radiation"" as used in the title (meaning, I suppose, other RE are derived like wind, waves and biomass) and the technical definition at line 28 (global = direct + diffuse), which is by far the more widely used meaning. On the whole, it would be better to let simply ""Solar Energy"" in the title.	given by TSU
Wolfgang Riecke (Deutscher Wetterdienst)	TS	27	20	-	-	-	-	-	compare: "10.8 x 10 ⁸ TWh" with chapter 3, section 3.1.2, page 6, line 24 "1.53 x 10 ⁹ TWh"	to be done
Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	TS	27	25	-	-	-	-	-	in ""...consumption rate in 2007..."", ""rate"" is not necessary (and not correct)	to be done
Frank Mastiaux (EON Climate & Renewables)	TS	27	3	27	18	-	-	-	is this really needed? Confusing introduction- does not really fit to the rest of the chapter	this part will be rewritten
Gerrit Hansen (TSU)	TS	27	3	-	18	-	-	-	numbers (e.g. 500 W/m ²) and terms (full sun) are not completely included in the relevant sections of chapter 3, please reconcile. The classification into 4 categories is not consistent with the chapter text which has 5. TSU strongly recommends to harmonize this, considering to take over the TS structure for the chapter as a whole, summing "passive solar" under "solar thermal".	TS will be changed to meet the text of Chapter
Gerrit Hansen (TSU)	TS	27	20	-	-	-	-	-	please reconcile figures for theoretical potential (chapter 3.2.1 and 3.1.2)	to be done
United Kingdom (Department of Energy and Climate Change)	TS	27	13	27	18	-	-	-	The categories and examples would I think be clearer as a bullet point list	to be done
Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	TS	27	8	-	-	-	-	-	The value used by most experts is 1367 W/m ² , see e.g. Eurospan Solar Radiation Atlas.	consistency with literature will be checked
United Kingdom (Department of Energy and Climate Change)	TS	27	7	27	12	-	-	-	These are interesting numbers but what is the point they are being used to make?	this part will be rewritten
Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	TS	27	25	27	27	-	-	-	This is a very bold sentence! It could be true without clouds, but certainly is not in practice for ""all"" countries as stated - e.g. those at high latitudes and/or cloudy climates... unless ""sizable"" and ""substantially"" means just something like ""above 1%"". Needs a more conservative rewriting.	to be rewritten

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Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table	Comments	Consideration by writing team
Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	TS	27	27	27	34	-	-	-	This whole paragraph contains very debatable statements and needs careful rewriting. Ordinary collectors also use direct (beam) radiation. More importantly, there are no 40 years of continuous hourly data for many locales spanning the globe, I can assure as being myself an expert in this field. It could be true for sunshine hours data, but not for radiation data. What we have is irregular measurements of some years of global radiation data, some of it hourly, often daily only, measured on inconsistent periods, and for very unevenly distributed stations. Diffuse and direct data are very scarce. Tilted radiation data, the actually required data, are even more scarce. Satellite data is very important to provide spatial resolution, not simply "supplementary". And it is wrong and naïve to state these measured data can be used directly by "solar designers". Spatial statistical and time series models need always be used. Finally, the state-of-art for active or passive solar analysis is not done with, or yielding, average values as implied in the text; on the contrary, numerical simulations yielding much more information than long-term averages are done, except in the crudest approaches.	to be rewritten
United States (U.S. Department of State)	TS	27	-	38	-	Direct Solar Energy	-	-	"Direct Solar Energy". The use of "Direct" is awkward and not a widely understood term of art. "Solar Energy" should be used throughout, with a footnote at the beginning explaining that "Solar Energy" refers to "direct" use of solar energy use. Define terms.	given by TSU
Janne Halme (Aalto University School of Science and Technology)	TS	28	27	28	29	1	-	-	Presenting how much energy demand can be met by storing is one thing, the efficiency of the storing is another. Presenting only the former does not give the complete picture. Please mention also the efficiency of thermal storage of solar energy corresponding to these figures.	to be done both in TS and in Chapter 3
Janne Halme (Aalto University School of Science and Technology)	TS	28	19	28	19	1	-	-	The technical summary of Direct Solar Energy is excellent reading and language. However, the using line breaks to rhythm the text would make it even better. E.g. at page 28 line 19.	to be done
John Twidell (AMSET Centre)	TS	28	33	-	-	-	-	-	..., LARGE INTERNAL thermal mass, INSULATION OUTSIDE THE THERMAL MASS; the phrase 'thermal mass' means nothing	to be done
Frank Mastiaux (EON Climate & Renewables)	TS	28	-	31	-	-	-	-	a summing up table of information or drawings might make it easier to read and get the key message	this part will be rewritten and cut in half. Add table SPM 1 if possible
John Twidell (AMSET Centre)	TS	28	35	-	-	-	-	-	Add another sentence: 'Passive solar architecture includes methods for cooling, e.g. overhang shading, wind catchers, air ducts, tree planting'.	add taking from the chapter page 15 line 38
Susanne Kadner (Technical Support Unit)	TS	28	-	31	-	-	-	-	Ch 3: The technical detail provided in this section is extensive and should be summarised in a table that makes the information easier accessible.	the technical part cannot be put in a table but this part will be shorten in half. Add table SPM 1 if possible

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Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	TS	28	35	-	-	-	-	-	Comment: For CSP dark hours are no problem because of possible using thermal storage systems.	SPM comment. SPM will be rewritten
United States (U.S. Department of State)	TS	28	31	-	-	-	-	-	Need a separate paragraph for passive solar and more extensive description of what it does and how it performs. It should also include mention of daylighting.	will be added (making sure that it is in the text of the chapter)
Gerrit Hansen (TSU)	TS	28	29	28	31	-	-	-	please rephrase statement "has proven to be very popular"	sentence will be removed
Gerrit Hansen (TSU)	TS	28	27	-	29	-	-	-	statement can not be found in text of chapter 3	to be checked and added in Chapter 3 if necessary
Antoine BONDUELLE (E&E Consultant)	TS	28	5	29	9	-	-	-	The solar thermal section is misleading in its end part. A gain of 40% is mentioned (line 7 p.29) but it is included in a paragraph that develops also ""passive solar"". In fact, 100% coverage is possible through seasonal storage (also mentioned) but mainly also through ""positive energy housing"", where solar thermal is a contribution to a very insulated building. Thus this paragraph should be changed to avoid giving a limitative view of these technologies.	last paragraph from page 28 will be split in two from line 28 and put it together with first paragraph of page 29
Australia (0)	TS	28	-	38	-	-	-	-	The use of the term ...solar thermal... is confusing, as in general use it is often used in the context of electricity generation (as a synonym for concentrating solar power), but in the text refers only to heating. Perhaps ...solar heating... would be a better term to use.	Solar community uses always solar thermal as "solar heating and cooling" and CSP is solar thermal electricity. Any how, we will make sure that "solar thermal" and "CSP" are in the glossary
Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	TS	28	29	-	-	-	-	-	This range seems quite underestimated. For Southern Europe, it is common to design the domestic solar systems for the 50%-80% solar fraction range.	will be cross-checked with chapter 3.3.2 and conciliation will be done
United Kingdom (Department of Energy and Climate Change)	TS	28	18	-	-	-	-	-	This should be a new paragraph and it is more accurate to say solar rays may be concentrated	to be done
Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	TS	28	5	28	22	-	-	-	This whole explanation could be much abbreviated for the TU. Plus, it is out-of-date in many points. It seems to describe essentially the Chinese market, but not e.g. the European market. For instance, modern flat plate collectors do reach temperatures above 60°. And besides flat-plate, only vacuum tubes are mentioned, while CPC and other optics, non-evacuated, exist and are fully commercial and competitive.	The part will be shortened. The part on flat plate collectors will be cross-checked in the chapter and make consistency
Canada (Environment Canada)	TS	28	1	-	-	-	TS 3.3	-	Figure TS 3.3 on pg. 28 is mislabelled - should be 3.1	to be corrected
Frank Mastiaux (EON Climate & Renewables)	TS	28	-	-	-	-	TS 3.3	-	number wrong, should be TS 3.1	to be corrected

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Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table	Comments	Consideration by writing team
Jorge Martínez Chamorro (Agencia Canaria de Desarrollo Sostenible y Cambio Climático)	TS	28	1	28	3	-	TS 3.3	-	Please, state the source of the figure.	to be included
Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	TS	29	7	-	-	-	-	-	...and 100% in milder climates like around Mediterranean Sea.	This part will be rewritten and this comment will be taken into account
United States (U.S. Department of State)	TS	29	22	-	-	-	-	-	Description of PV operation could be improved, including that the creation of the junction and the resulting electric field separates the electron and hole and provides the voltage and drives the current, etc.	Text will be cut and rewritten. Comment will be taken into account
Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	TS	29	10	29	24	-	-	-	One wonders if this explanation should be left out of the TS in the benefit of its length. Some words and a reference to a textbook could be given instead.	Text will be cut and rewritten. Comment will be taken into account
John Twidell (AMSET Centre)	TS	29	19	29	23	-	-	-	PRESENT TEXT 'The contacting of the two layers produces a natural voltage or junction potential across the interface, but in the absence of solar rays, the junction potential cannot deliver electrical power at the leads. However, when the solar photons strike the cell, valence electrons can be promoted to conduction electrons. After crossing the junction, the newly formed conduction electrons can move toward the external electrical leads'. THESE SENTENCES ARE MISLEADING AND ERRONEOUS. Band Theory applies, not single-atom theory. REPLACE BY 'A potential difference (voltage) exists permanently across the interface (junction) between the two doped regions. When a sunlight is absorbed in this region, electrons are excited into the conduction state across the potential difference. If external leads are in place, these electrons form an electrical current to produce power across an external load'. HOWEVER WHY ATTEMPT TO BE A TEXT BOOK? BETTER TO SAY 'When sunlight is incident on a solar cell, direct current electricity is produced. The theory is explained in standard text books'.	Text will be cut and rewritten. Comment will be taken into account
STEPHANE POUFFARY (Energies 2050)	TS	29	10	30	32	-	-	-	PV - Reduce technology description and develop application such as BIPV (allow to reduce also the length of the paragraph)	Text will be cut and rewritten. Comment will be taken into account
Gerrit Hansen (TSU)	TS	29	10	30	32	-	-	-	section needs some editorial work, detail on how a PV cell works could be condensed. Thin-film and non-silicon cell materials are not mentioned.	Text will be cut and rewritten. Comment will be taken into account

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John Twidell (AMSET Centre)	TS	29	11	-	-	-	-	-	Semiconductors contain BOTH (i) valence electrons, which are bounded BOUND tightly to the positive nuclei of the atoms, and (ii) conduction electrons, which are more energetic and free to move throughout the material. {But is such detail of theory needed in an IPCC report? Leave out to save space and keep to the conceptual and applicable facts. Refer to standard text books for details of theory}	Text will be cut and rewritten. Comment will be taken into account
Antoine BONDUELLE (E&E Consultant)	TS	29	8	-	-	-	-	-	The figure 20% is against the existing consumption of buildings. Retrofitted buildings can become much more efficient in the process, the 20% coverage is thus limitative.	This part will be rewritten and this comment will be taken into account
Bernd Rech (Helmholtz-Zentrum Berlin für Materialien und Energie GmbH)	TS	29	10	30	50	-	-	-	thin film technologies (especially non silicon ones are missing) the description only focuses on Si wafer technologies only	Text will be cut and rewritten. Comment will be taken into account
Wim Sinke (Energy research Centre of the Netherlands (ECN))	TS	29	10	30	32	-	-	-	This summary of PV technology gives unnecessary and very arbitrary detail and does not give other, essential, information (if you have 1 page to explain PV, you give other types of info). It has no relation with the main text of Chapter 3. Why only discuss silicon PV? Needs to be completely rewritten.	Text will be cut and rewritten. Comment will be taken into account
STEPHANE POUFFARY (Energies 2050)	TS	29	9	-	-	-	-	-	Underline the importance of high quality equipment and of professional's skills to allow a high level of performance for the system.	This is not for the TS, too detailed
John Twidell (AMSET Centre)	TS	29	-	-	-	-	TS 3.2	-	(c) Equatorial-facing triple-glazed window area the 4 EcoTerra™ demonstration solar house is 9.1% of heated floor area; THIS SENTENCE CANNOT BE UNDERSTOOD. MISSING WORDS? CORRECTION NEEDED	Figure will be removed
Several experts 0 (Ministry of the Industry, Tourism and Trade)	TS	29	-	-	-	-	TS 3.2	-	Delete the reference to: LUZ; "EcoTerra TM"	Figure will be removed
Canada (Environment Canada)	TS	29	-	-	-	-	TS 3.2	-	Figure TS 3.2 doesn't convey a lot of information to the reader and could be removed to shorten.	Figure will be removed
Janne Halme (Aalto University School of Science and Technology)	TS	30	12	30	13	2	-	-	"these concentrating photovoltaic ... are being given high priority". What kind of priority are they given and in what circumstance? In political decision making? In research? In investments? Please clarify or remove this statement.	Text will be cut and rewritten. Comment will be taken into account
Janne Halme (Aalto University School of Science and Technology)	TS	30	-	-	-	3	-	-	Please mention the conversion efficiencies of CSP also (as was done for PV).	Data not available, nowadays efficiencies for CSP are only available for components

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Bernd Rech (Helmholtz-Zentrum Berlin für Materialien und Energie GmbH)	TS	30	5	30	5	-	-	-	a hybride of MONO/SINGLE-CRYSTALLINE Si wafer and amorphous Si layers has efficiency of 23 % (so-called HIT concept)	Text will be cut and rewritten. Comment will be taken into account
Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	TS	30	1	30	22	-	-	-	Again this whole explanation is too lengthy. Plus, it is confuse. It also quotes more or less irrelevant top performance values, always prone to be outdated. What is needed here is some few lines only referring the types of materials, their rank in efficiency, typical efficiency for commercially available modules and prospects for evolution.	Text will be cut and rewritten. Comment will be taken into account
Susanne Kadner (Technical Support Unit)	TS	30	3	-	-	-	-	-	Ch 3: Please remove decimal numbers.	Text will be cut and rewritten. Comment will be taken into account
Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	TS	30	-	31	-	-	-	-	I must point out that the debatable contents and complicated style in subsections 1 and 2 contrast with the excellent text provided in subsections 3 and 4.	Text will be cut and rewritten. Comment will be taken into account
Bernd Rech (Helmholtz-Zentrum Berlin für Materialien und Energie GmbH)	TS	30	22	-	-	-	-	-	Modules have expected (note that guaranty of module suppliers is already usually 25 years) lifetimes of 20 to 30 years. I would just delete the word expected.	Text will be cut and rewritten. Comment will be taken into account
United States (U.S. Department of State)	TS	30	1	30	32	-	-	-	The entire description of PV never once mentions CdTe, CIGS, GaAs, or other material groups, the strategy behind each of these different approaches, comparisons of the trade-offs, or other factors, etc. Provide brief summaries for completeness.	Text will be cut and rewritten. Comment will be taken into account
Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	TS	30	27	30	32	-	-	-	This part is also confuse and with redundant sentences, can certainly be shortened. Note also that it can be misleading as grid-connected systems are said to be ""connected to another energy source"" (!) and ""supplementing the other sources"". On the contrary, as we all know, there are lots of commercial PV power plants, e.g. in the US and Europe, that are full members of utility electric systems.	Text will be cut and rewritten. Comment will be taken into account
United Kingdom (Department of Energy and Climate Change)	TS	30	7	-	-	-	-	-	What about the 20% that is not Si based - if nothing else the CdTe thin film product from First Solar is marketed as being very cheap and their production capacity is growing rapidly	Text will be cut and rewritten. Comment will be taken into account
Gerrit Hansen (TSU)	TS	30	1	-	-	-	-	-	why motor?	Text will be cut and rewritten. Comment will be taken into account
Janne Halme (Aalto University School of Science and Technology)	TS	31	-	-	-	4	-	-	Please mention the conversion efficiencies of solar fuel also (as was done for PV).	No data available in literature
United States (U.S. Department of State)	TS	31	17	31	40	-	-	-	Add text describing photo-electrochemical processes that use a semiconductor in water to catalyze hydrogen production directly. This topic appears to be missing.	Will be mentioned in text in consistency with the chapter (include there add the word "semiconductor").

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Susanne Kadner (Technical Support Unit)	TS	31	41	-	-	-	-	-	Ch 3: Heading "Global and regional status of market and industry deployment" is missing.	The title will be changed to this one
Gerrit Hansen (TSU)	TS	31	7	-	8	-	-	-	cut or rephrase sentence "time will tell..."	Text will be cut and rewritten. Comment will be taken into account
United Kingdom (Department of Energy and Climate Change)	TS	31	42	32	2	-	-	-	Do you have figures to back this assertion up? There a lot of flat plate collectors in the developing world that are not attached to swimming pools. Also the combination of this claim and China taking such a dominant market share for new installations would seem to imply that the Chinese swimming pool market is booming.	Add a sentence saying "this is the only data available, no data is available for other solar thermal technologies". Update data
Gerrit Hansen (TSU)	TS	31	11	-	24	-	-	-	include statements on distributed solar/SHS "top countries" might add value given the SRREN focus on sustainable development and repeated references to solar's contribution to rural electrification	Text will be cut and rewritten. Comment will be taken into account
Gerrit Hansen (TSU)	TS	31	42	32	10	-	-	-	information on passive solar is missing - if no numbers can be supplied due to lacking data/unapplicable statistics, a note should be inserted at least once making this explicit for passive solar.	A note will be included
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	TS	31	15	31	16	-	-	-	Sizes of storage range from 1 hour (achievable now) to 7.5 hours. Delete this following part: "and are either in operation or in the planning stage [3.3.4]." because Andasol 1+2 are already in operation.	Text will be cut and rewritten. Comment will be taken into account
Frank Mastiaux (EON Climate & Renewables)	TS	31	45	-	-	-	-	-	the global market growth? Or totally installed capacity in 2008?	Is the cumulative installed capacity, Add word "cumulative"
United States (U.S. Department of State)	TS	31	1	31	16	-	-	-	There is a mention of thermal storage, but no mention of the relatively low cost and high efficiency of thermal storage compared to battery storage. Also, there should be some discussion of the value of storage to enable dispatch from CSP systems and their use at night, or even for, possibly, baseload power. Also, some mention is needed of CSP oversizing of the collector area in order to charge thermal storage and provide higher capacity factors for the power block than is possible, for example, for CSP systems without storage or PV systems.	Cost and efficiency considerations are developed in the Integration chapter
Janne Halme (Aalto University School of Science and Technology)	TS	32	30	-	-	3	-	-	"only 60%". I think 60% is not "only". Remove the word "only".	to be done
Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.L.)	TS	32	18	-	-	-	-	-	... and in other EU countries as well, e.g. Portugal.	sentence will be rephrased and taken care in Chapter

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United States (U.S. Department of State)	TS	32	38	32	47	-	-	-	A strategic vision for the future of flat plate solar thermal, and under what conditions, is missing. For example, the current constraint on domestic solar hot water (DSHW) is the high cost of the collector, which is typically made of glass and copper. Substantially more rapid market penetration would be likely if such systems could be reduced in cost. This might be done by going to lightweight polymers, but these are currently limited due to their inability to simultaneously handle UV degradation, stagnation temperatures, freezing conditions with water, and water line pressures and transients, etc. These issues point toward future areas of needed attention in research and manufacturing.	Text will be added in the Chapter 3.7.2 if adequate references can be found. Then a sentence acknowledging this will be added in the TS, but in section "prospects..."
Marc Darras (GDF SUEZ)	TS	32	46	-	-	-	-	-	ADD after dominate the market. "Other important production are in Europe, Turkey, Brazil and India." (REN 21 Renewables 2010. Global status report.)	Will be added here and in the Chapter. Check if "europe" should be "European Union"
United States (U.S. Department of State)	TS	32	11	32	24	-	-	-	Discussion of the relative market shares and growth of different types of PV, e.g. mc-SC vs. CdTe, would also be useful.	New statistics will be added here and in the Chapter
United Kingdom (Department of Energy and Climate Change)	TS	32	45	32	47	-	-	-	Has the fact that this is because evacuated tube collectors will still produce hot water when the sun is shining but external ambient temperatures are low been mentioned?	No literature reference provided to support the statement
Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	TS	32	8	-	-	-	-	-	I believe Cyprus is also Europe, at least is EU...	Rewrite. Delete country Cyprus and delete the sentence "in Austria..."
United States (U.S. Department of State)	TS	32	27	-	-	-	-	-	Need to explain the high capacity factors for CSP. Need to explain the role of overbuilding the collector field to charge thermal storage and, thus, enable higher capacity factors for the power block.	This will be dealt in the technology chapter 3.3.4
United States (U.S. Department of State)	TS	32	14	-	-	-	-	-	Review more recent statistics, as the rate of installation should be higher than the range 6.6-7.9 GW.	New statistics will be added here and in the Chapter
United States (U.S. Department of State)	TS	32	25	32	32	-	-	-	Some discussion is needed here of the strategic approaches for different types of CSP. For example, "power towers" have potentially lower costs in central station applications than "troughs" due to their higher operating temperatures and avoiding the use of long Heat Collector Elements (HCEs), but "troughs" have a longer record of performance with the Luz plants and, thus, are lower risk investments for a risk-averse financial sector, etc.	will be included but in page 30 (referring to the chapter). The sentence should be "The performance of the different types of CSP plants is discussed in Chapter 3.3.4"
Italy (Institute for Environmental Protection and Research (ISPRA))	TS	32	30	32	32	-	-	-	The "Archimede" CSP plant in Priolo, Italy, has already come on line on 14 July 2010: the sentence should thus be modified as follows "By 2010, only about 60% of planned capacity was in the U.S., the remaining capacities being in Spain (30%), Abu Dhabi (6%), Algeria, Egypt, Australia, Italy and Morocco".	Italy will be added in the list of countries

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Babacar Sarr (ENERTEC-SARL)	TS	32	27	-	-	3. CSP	-	-	NREL data Solar Tower System CF: 72.9% and Parabolic trough CF: 56.2% (source: October 2003, NREL/SR-550-34440 / NREL - Assessment of Parabolic Trough and Power Tower Solar Technology Cost and Performance Forecasts / Table 4-22).	Reference will be checked and necessary changes will be made
United States (U.S. Department of State)	TS	33	18	-	-	-	-	-	"Production rate of 11 GW" needs to be explained in the context of 6.6-7.9 GW listed on page 32.	it will be reviewed
Netherlands (KNMI (Royal Dutch Meteorological Institute))	TS	33	17	33	29	-	-	-	"Supply chain" also involves inverters, for instance. These are a current limiting factor (just to move readers away from the prejudice/misconception that PV = modules).	to be checked
Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	TS	33	46	-	-	-	-	-	...and a few renewable electricity standards"" is certainly an error. Probably what as intended was ""a few norms, standards and certification schemes (Solar Keymark in EU, etc.)"" or something like it	"renewable electricity standard" will be changed by "renewable portfolio standard"
United States (U.S. Department of State)	TS	33	17	33	29	-	-	-	Again, there is no description anywhere of the role and importance of CdTe, CIGS, GaAs, etc.	The concept is in the text, more details can be found in the Chapter
John Twidell (AMSET Centre)	TS	33	13	-	-	-	-	-	Another feature of passive design is adding INTERNAL mass to the buildings.....[THE MASS SHOULD BE WITHIN AN INSULATED OUTER SKIN. THIS PRINCIPLE MODERATES THE INTERNAL TEMPERATURE FOR BOTH HEATING AND COOLING.	to be done
United Kingdom (Department of Energy and Climate Change)	TS	33	27	33	29	-	-	-	As noted before non-Si PV is also growing rapidly	text will be rewritten, comment will be considered
Susanne Kadner (Technical Support Unit)	TS	33	34	-	-	-	-	-	Ch 3: Remove company names.	company names to be removed (TS and Chapter)
Susanne Kadner (Technical Support Unit)	TS	33	31	-	-	-	-	-	Ch 3: This number does not match with the number provided on page 32, line 26.	to be corrected
United States (U.S. Department of State)	TS	33	46	-	-	-	-	-	Define "soft loans".	Will be added in the Glossary
China (China Meteorological Administration)	TS	33	18	33	20	-	-	-	Delete "Taiwan" and relevant data.	Text modified, changed from "several countries and regions" to "several economies"
United States (U.S. Department of State)	TS	33	30	33	36	-	-	-	Discussion is needed of the role of CSP to provide dispatchable power and the value that this provides utilities, and of certain ongoing initiatives, such as DeserTEC.	Already mentioned in the technology part of the Chapter section 3.3.4 and 3.5.5. Not to be included in this section but yes in the technology description of TS
United Kingdom (Department of Energy and Climate Change)	TS	33	42	33	47	-	-	-	Seem to have missed out that whilst cost is falling rapidly solar is still expensive - which is why FiTs and other subsidies are so important to the sector	FIT is mentioned in page 34 line 1 to 3

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United Kingdom (Department of Energy and Climate Change)	TS	33	4	-	-	-	-	-	The change in topic demands a paragraph break here	to be done
Jorge Martínez Chamorro (Agencia Canaria de Desarrollo Sostenible y Cambio Climático)	TS	33	34	33	34	-	-	-	The only appearance of Florida Power & Light on the text is in Chapter 3, pg 50, line 44 together with Acciona and Iberdrola. Please add all these companies in this line, not only the US company.	company names to be removed (TS and Chapter)
United Kingdom (Department of Energy and Climate Change)	TS	33	9	-	-	-	-	-	Window and glazing are an extremely important part of building design, not just of heating.	Well known statement, no change in text needed
ICHIRO MAEDA (The Federation of Electric Power Companies of Japan)	TS	34	3	34	6	-	-	-	<comment> The sentence "Tax credits..." should be modified. <reason> the policy for the set of tax credits and self loans is independent from the policies to obligate power suppliers to provide a specified fraction of electricity from renewable energies. <reference> pls. refer to 3.4.3	will be done (separate in two sentences)
Wim Sinke (Energy research Centre of the Netherlands (ECN))	TS	34	33	-	-	-	-	-	0.87 jobs per GWh is far too accurate! If you want a figure, 1 job would be better, but it is even more important to note that this is actually a weakness (not a strength) of PV (it implies higher costs). We strive for much lower labour costs by automation and standardisation, etc., the effect of which will fortunately be outweighed by a more rapidly increasing total volume, so that the absolute number of jobs goes up steeply.	Number direct from the reference. Text in Chapter 3.6.2 updated
United States (U.S. Department of State)	TS	34	43	34	47	-	-	-	Add "refrigeration" and "reduced fuel wood consumption".	see previous comment
United States (U.S. Department of State)	TS	34	16	-	-	-	-	-	Add in CdTe and CIGS, which generally have a shorter energy payback time.	to be done
United States (U.S. Department of State)	TS	34	15	-	-	-	-	-	After the word "fuels" add "with current technology."	to be done
United Kingdom (Department of Energy and Climate Change)	TS	34	32	34	35	-	-	-	Can this be supported? For example if you include the agricultural elements of many biofuels would they have a higher jobs per GWh figure?	Reference provided
Wim Sinke (Energy research Centre of the Netherlands (ECN))	TS	34	14	-	-	-	-	-	Carbon footprint: best case is (much) lower; this also applies to energy pay-back time, line 16. Also: explain that this is going down steadily (see also Comment 1 in this sheet).	Based on average not best case. Add sentence acknowledging that it is going down

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Gerrit Hansen (TSU)	TS	34	14	-	-	-	-	-	chapter 3 gives a range of values for PV lifecycle GHG emissions, not clear how and why 32 g are singled out here, please reconcile with chapter 3.6.1	change to the same text as chapter (page 7 line 29). Or put a note "based on Figure 3.24b of Chapter".
United Kingdom (Department of Energy and Climate Change)	TS	34	24	34	27	-	-	-	Emerging designs are already beginning to address this	add "current technology"
United States (U.S. Department of State)	TS	34	32	34	35	-	-	-	Exercise caution with assertions about job creation and place in a proper macroeconomic context about "net" employment effects.	Net employment effects are not yet properly assessed in the literature
United Kingdom (Department of Energy and Climate Change)	TS	34	42	34	47	-	-	-	i.e. Can make a direct contribution to progress towards meeting the MDGs	Add "inter alia" at the sentence. That is: change "The impact of electricity on the local 43 population is shown through a long list of important benefits: the replacement..." by "The impact of electricity on the local 43 population is shown through a long list of important benefits, inter alia, the replacement..."
Frank Mastiaux (EON Climate & Renewables)	TS	34	28	34	31	-	-	-	In the first sentences it is more or less stated, that fossil power plants kill people directly. Is there any proof for this statement? Urban air pollution has many reasons, some of them may be related with using fossil fuels for heating and transport. The environmental laws in some countries put severe restrictions on the gaseous output especially of power plants ... hence the statement should make a clear differentiation.	Substitute sentence by "Indoor smoke from solid fuels is responsible for more than 1.6 million deaths annually and 3.6% of the global burden of disease. The use of solar technology like solar cookers, electricity generation, solar lighting, can reduce this unhealthy exposure." displacement of using fossil fuels

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Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table	Comments	Consideration by writing team
Matt Davison (University of Western Ontario)	TS	34	28	34	38	-	-	-	Overall I found the section on solar the least balanced of all the sections in this report. We all agree that renewables have a place in reducing emissions of carbon as well as of pollutants directly impacting human health, but it is important not to overstate the case. The wind section treads a nice balance, admitting some of the issues and suggesting means for addressing them. The above mentioned paragraph is open to dispute on at least 7 levels, none of which are addressed in the section, and several of which I believe cannot be unambiguously addressed. See the following list. 1) How much urban air pollution is actually caused by automobiles. 2) How much pollution is created by manufacturing and installing solar panels? Even table 5.1 on page 49 suggests that Solar Photovoltaic produces just 3-6x the energy required to produce the panels over their *entire lifetime*. 3)How much additional pollution is generated by running fossil plants less efficiently to cope with the increased non-dispatchability of solar power and other renewables and/or by <100% efficiency storage/release processes, and the cost of implementing these storage technologies? 4) Are other toxins released when solar panels are disposed? What is health effect of these toxins? 5) How linear is the effect? If 10% of air pollution could be removed, do deaths decrease by 10%? 6) Would public health expenditures be reduced? Or are the people killed by pollution already very sick, suggesting that in fact keeping them alive would increase public health expenditures? (note that this is not, of course, meant as an argument for euthanasia, just a point that these conclusions are not forgone). 7) Money spent on x is not money spent on y. Even taking this into account, does solar PV still have the same job creation potential? A similar argument can be made even for the proposed health benefits of solar power. If money is diverted to producing solar cells from funding hospitals or preventative medical care, is mortality/morbidity increased or decreased? My point in making these remarks is not to downplay the wider social benefits of green technology, which of course exist. My issue is more with what I view as the overblown rhetoric of this section.	1. Urban air pollution is not considered in this report. 2. Addressed by LCA and considered in main report. 3. Data not available. 4. This is taken care by waste legislation. 5. See answer 4. 6. See answer 4. 7. Data not available. Section will be rewritten
United States (U.S. Department of State)	TS	34	10	34	11	-	-	-	Regarding "land use impacts", suggest restraint in using sweeping generalizations. For example, when addressing energy life cycles, the land disturbance due to coal mining, after land reclamation, can be negligible. This is particularly the case with regulated surface mining prevalent in the Southwest USA to which this generalization is made. If RE authors are not certain of their facts regarding non-RE technologies, then comparisons should be avoided.	Statement reflect peer-reviewed reference

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United States (U.S. Department of State)	TS	34	23	-	-	-	-	-	Regarding local air as a CSP coolant and the associated "drop in plant efficiency (2%-10%)", more explanation is needed about the high end of this range. Add a footnote, if not more text. For example, a characterization is needed about what system design is envisioned here. Is this the total CSP system, or just the power block, etc. What is the base efficiency, and what would the base efficiency be with this loss. Also, under what conditions would losses be as high as 10%, such as peak losses during the hottest days in the Mojave desert. The average annual loss in efficiency would be less. There are losses of capacity at the hottest times with a pure air cooled condenser. Other options include hybrid wet-dry cooling systems that reduce capital costs, avoid capacity losses during peak temperatures, and cut water use by ~80% compared to a recirculating water cooled system.	already explained in Chapter 3.6.1. Too much detail for TS
Frank Mastiaux (EON Climate & Renewables)	TS	34	35	-	-	-	-	-	source for the jobs per GWh	already in chapter 3.6.2
United States (U.S. Department of State)	TS	34	37	-	-	-	-	-	Strike the word "any". Insert before "visual impacts" the words "high cost, intermittency, impacts to the grid and . . .". Credibility is enhanced when disadvantages are mentioned in context.	Accept. Word "any" deleted. Other impacts do not correspond with social impacts
United States (U.S. Department of State)	TS	34	32	-	-	-	-	-	Strike the word "drastically". Avoid hyperbole. It distracts from the professionalism of the document.	to be deleted
United States (U.S. Department of State)	TS	34	22	-	-	-	-	-	Strike the word "totally," and strike the word "slight". Tone and style of text should be informative, not normative.	to be done
United States (U.S. Department of State)	TS	34	26	-	-	-	-	-	Strike the word "very".	to be done
United States (U.S. Department of State)	TS	34	41	-	-	-	-	-	Strike the words "economically favorable".	Change "PV-powered community grids can provide economically favourable electricity to many areas" by "PV-powered community grids provide electricity to many areas"
United Kingdom (Department of Energy and Climate Change)	TS	34	15	34	18	-	-	-	The insolation level assumed for this calculation needs to be stated, has this sum been done for a 'sunny location'? which will put it towards the best case end of the spectrum	add in the brackets "for Southern European radiation conditions"
United States (U.S. Department of State)	TS	34	28	34	29	-	-	-	This is an overstatement compared to current practice in fossil fuels today. Suggest rephrasing to strike "over fossil fuels", and replace with "compared to the average of existing stock of 'grandfathered' fossil fuel technology". Note that new FE plants are highly regulated, with low emissions of criteria air pollutants.	to be rewritten

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France (MEEDDM (Ministry of Ecology, Energy, Sustainable Development and the Sea))	TS	34	-	37	-	-	-	-	To reduce the production costs is a high priority, before a more massive deployment. Proposal : The text could express this priority.	Learning curves show that cost reduction are based on market volume and not purely on technology progress. See line 25 page 37
France (MEEDDM (Ministry of Ecology, Energy, Sustainable Development and the Sea))	TS	34	15	34	16	-	-	-	When PV panels are produced in a country with high GHG emissions (China for example) and are used in a country with an electrical energy mix having low GHG emissions (France for example), the PV electricity replaces nuclear electricity ; in this example, the enregy payback may still be good (2 to 2.5 year) but the CO2 budget of the whole operation may be « bad ».	Not relevant for the text
United Kingdom (Department of Energy and Climate Change)	TS	34	8	34	27	-	-	-	Would a reference to Desertec be a distraction here?	Yes, it is a distraction
Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	TS	35	8	-	-	-	-	-	a more clear, rigorous and elegant statement would be like ""...Solar Building, on average, covers all its energy demand for water heating and space conditioning.""	to be changed
Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	TS	35	42	36	4	-	-	-	A short mention should be done also to advances in heat storage (molten salt deposits, hot concrete...)	to be added here and in Chapter 3.7.4
United Kingdom (Department of Energy and Climate Change)	TS	35	26	36	4	-	-	-	Again non Si PV seems to have been overlooked, and in terms of emerging technology nothing has been said about the even longer term prospects of dye sensitised or organic systems or III-V materials in CSP	to be changed
United States (U.S. Department of State)	TS	35	49	-	-	-	-	-	Clarify meaning of "peak efficiencies of 35%". Is this referring to power block? Total integrated system from sun over collector area to power out? What?	to be clarified
United Kingdom (Department of Energy and Climate Change)	TS	35	12	35	14	-	-	-	Do they mean higher external ambient temperatures, or that the system will produce hotter water?	to be clarified
United States (U.S. Department of State)	TS	35	16	-	-	-	-	-	Glazing is rarely evacuated, but gas-filled (e.g., argon). Reconsider reference to "evacuated glazing".	No need
Wim Sinke (Energy research Centre of the Netherlands (ECN))	TS	35	39	-	-	-	-	-	I am really alert on significance of numbers and digits. Here is another one. I assume it should not read "by up to" (compared to what?), but "up to", but apart from that: 66% makes no sense for such a broad range of conversion concepts. "Over 60%" (for lab devices) or something like that would be acceptable.	to be changed
United States (U.S. Department of State)	TS	35	44	-	-	-	-	-	Is 37% the current or future heat-engine efficiency? Clarify.	to be clarified

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France (MEEDDM (Ministry of Ecology, Energy, Sustainable Development and the Sea))	TS	35	26	-	-	-	-	-	Is PV a relatively mature technology or not ? The production costs are still decreasing (and this is necessary) by some 10% a year. Proposal : do not give a judgment about « mature » or « not mature ».	to be changed
Janne Halme (Aalto University School of Science and Technology)	TS	35	34	35	35	-	-	-	It is not clear from the text what kind of "risk" the text refers to? Environmental risk? Likely not, but economic risk related to R&D investments. Please check the frasing from the original Chapter 3 and make this clear.	to be changed
United Kingdom (Department of Energy and Climate Change)	TS	35	18	35	25	-	-	-	Need to add something about the interplay between solar heating and cooling and improvements in building insulation etc.	dealt in Chapter text
United States (U.S. Department of State)	TS	35	19	-	-	-	-	-	Please explain "cool roof" for general audience.	to be done
United States (U.S. Department of State)	TS	35	39	-	-	-	-	-	Quantum dot technology has higher potential than 66%. Numbers should be stated simply as 'efficiency', and not as maxima, as in "increase the maximum efficiency by up to 66%".	to be changed
Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	TS	35	2	35	12	-	-	-	these sentences are somewhat biased towards Europe, they should be slightly rewritten, still pointing European examples but with a more global viewpoint	The only available literature comes from Europe and extrapolation is not possible
United States (U.S. Department of State)	TS	35	2	35	6	-	-	-	Too assertive. Cannot declare that buildings "will" be of this vision. Suggest replacement of the word "will" with "could" throughout (for instances).	to be changed
Wim Sinke (Energy research Centre of the Netherlands (ECN))	TS	35	26	35	28	-	-	-	What an opening sentence that is... The glass is half empty here. You can say exactly the same and create a totally different atmosphere. For example: some technologies are already close to perfect and (almost) 20% efficient modules are commerciale available. The box with technology options is very well filled and still we ain't seen nothing yet. Costs and prices have been reduced dramatically (of modules and of turn-key systems) and grid parity on retail price level is within close reach in several countries. Etc., etc. Why only say "steady improvement are expected in the future"? Nothing less than a revolution is already going on!	to be changed

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Wim Sinke (Energy research Centre of the Netherlands (ECN))	TS	36	-	-	-	2	-	-	The discussion is rather simplistic, in several aspects. We need to distinguish between cost and prices clearly (turn-key system price translates to generation costs from the perspective of the owner). The "life of the panel" (line 33) is the lesat of our problems. Where is the inverter (BoS) lifetime, where is O&M costs, etc.? I do NOT think that prices per W enable a useful comparison between PV and CSP. Many economic and technical parameters are fundamentally different and therefore the translation from \$/W to \$/kWh is also very different. Why don't we cite major roadmaps (e.g. the new IEA PV (and CSP) Roadmap) here to give a "consensus picture"?	to be modified with new references available now
ICHIRO MAEDA (The Federation of Electric Power Companies of Japan)	TS	36	19	36	19	-	-	-	<comment> "from the 5 to 17" should be replaced with "from 5 to 16". <reference> pls refer to 3.8.2	to be done
Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	TS	36	29	36	43	-	-	-	again it is confusing to talk a lot about USD/W for various countries and then close with a USD/kWh datum for just USA (and as we know there are lots of data for other regions, check e.g. websites of European PV associations or IEA materials).	The other data is not peer-reviewed and cannot be used here
Susanne Kadner (Technical Support Unit)	TS	36	-	-	-	-	-	-	Ch 3: All cost numbers need to be converted to US\$ for the year 2005.	to be changed here and in Chapter
Antoine BONDUELLE (E&E Consultant)	TS	36	14	-	-	-	-	-	General remark on PV. P36 or generally in the TS, no mention is made of possible (probable?) break even of PV electric production with fossil resources, at least at the point of use. Although announced by authors such as Hohmeyer as far as 1988, this possible breakthrough looks now fairly likely in the near future and has been described in the industry press extensively. This has many implications on the competing energies, the grid, etc.. This information does not appear in the TS nor in the SPM. The SPM (figure SPM7) shows a comparison of present costs with PV well outside other sources.. but no prospects.	to be considered
United States (U.S. Department of State)	TS	36	18	-	-	-	-	-	Insert after "operating", the words "and maintenance", when referring to costs.	to be done
Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	TS	36	14	36	28	-	-	-	it is a bit confusing to quote a lot of European data and then close the paragraph with an Australian datum, and plus without comparison with a similar datum for Europe	Move Australian reference to line 18
United States (U.S. Department of State)	TS	36	13	36	47	-	-	-	Need a table showing costs over time compared to competition. Also need an explanation of the role of PV and CSP in grid integrated systems, vis-à-vis peak loads, being dispatchable (CSP with storage) or not, etc.	table to be developed including available data

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Gerrit Hansen (TSU)	TS	36	6	-	-	-	-	-	please adjust to SI units	Internationally accepted unit
Gerrit Hansen (TSU)	TS	36	14	-	28	-	-	-	please include cost information on passive solar.	No references available
Australia (0)	TS	36	41	36	43	-	-	-	The statement, "By 2015 the US DoE projects the price of PV-generated electricity to range from 5 to 10c US per KWh, depending on the end-user. In 3.8.3 this is listed as a 'goal' not a projection.	to be changed
Steffen Schlömer (IPCC WGIII)	TS	36	13	-	47	Solar Cost Trends	-	-	The core cost information should be compiled into a table (please ask TSU whether standard format available or not). Description of cost concepts and methods should be cut out. Cost concepts and methods will be discussed more extensively in the Annex on methodology and, if appropriate, in the glossary. Technology specific cost components, e.g. the individual components of the cost of installing a ready-to-use power generating device, should be discussed in each chapter. This discussion should only be summarized in the TS, but should neither be fully included in the TS nor should it be omitted in the main chapter. In general, the discussion of costs should be based on the concept of "levelized costs" as described in the annex on methodology. A discussion of the most important individual cost components, e.g. the costs of PV modules, BOS costs etc., should be included as far as cost trends in those particular technical areas are important. It should be made clear by cross-references to the definitions in the glossary how the discussion of specific cost components relates to the more general distinction of costs concepts, such as the cost of installation or capital costs (for further synonyms see glossary and TSU presentation on costs at LA4, Mexico), and how specific cost components affect the resulting LCOE.	table to be developed including available data
Steffen Schlömer (IPCC WGIII)	TS	36	40	-	-	Solar Cost Trends	-	-	The figure does not correspond to the one presented in the main chapter, p.76, l. 16. 7.6 cents vs. 7.9cents	to be checked
Wim Sinke (Energy research Centre of the Netherlands (ECN))	TS	37	12	-	-	-	-	-	IEA Blue Map is now not the most recent "high" IEA scenario anymore, see IEA PV Roadmap: it is the "Vision scenario", with 3000 GWp in 2050.	to be modified with new references available now
Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	TS	37	-	-	-	-	-	-	The initial explanation is too lengthy. Also the rest is partly redundant with previous consideration in the TS. All the text in this page could be much abbreviated in the interest of the overall TS length.	Text will be cut and rewritten. Comment will be taken into account
Richard Taylor (International Hydropower Association)	TS	38	-	38	-	-	-	-	Comment: A section on ""Key Messages and Policy Recommendations"" for direct solar energy comparable to that for the bioenergy sub-section would be of great use.	Already provided in Executive Summary

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Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table	Comments	Consideration by writing team
Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	TS	38	9	38	11	-	-	-	Note that the text applies to developed countries only - perhaps even only to Europe where the housing sector is not growing fast.	Not the case
United States (U.S. Department of State)	TS	38	6	-	-	-	-	-	Strike "and energy efficiency measures". It is not clear why EE is selectively used here as a trailing modifier. It is not introduced in the preceding line of argumentation. Alternatively, include a range of EE and other technologies that would more completely address potential synergies with RE, and explain.	to be considered
United Kingdom (Department of Energy and Climate Change)	TS	38	7	38	13	-	-	-	This point could usefully have been made earlier	The authors wanted it as a concluding remark
Wim Sinke (Energy research Centre of the Netherlands (ECN))	TS	38	-	-	-	-	TS 3.3	-	I don't see the relevance of this figure in this part of the text. Apart from that a focus on system prices instead of module-only prices would be more relevant here.	Figure will be removed
Bernd Rech (Helmholtz-Zentrum Berlin für Materialien und Energie GmbH)	TS	38	-	-	-	-	TS 3.3	-	This figure may be misleading. Hoffmann et al. already mentioned that the ASP in \$/W reached around 2 \$,(€)/W in 2009 and the graph is also existing including the data point for 2009 and corresponding higher accumulated MW. This is important because it shows that the costs of PV modules still follow the learning curve. Fig. 3.3 in the current form may give the wrong impression that the ASP is stagnating. I strongly recommend to change or modify the Fig. according to the information given in the cited paper of Hoffmann et al.	Figure will be removed
Susanne Kadner (Technical Support Unit)	TS	39	18	-	-	-	-	-	Ch 4: There is no definition of 'theoretical' potential in the SRREN.	Theoretical potential will be deleted.
United States (U.S. Department of State)	TS	39	6	-	-	-	-	-	Delete the differentiation of "geothermal energy" from "ground source heat". The assertion that ground source heat is from stored solar energy is not true. Heat pumps, for example, draw their heat from sources radiating from below. Summer and winter heat variations transfer heat in and out of surface levels at only shallow depths.	Sentence will be deleted.
Ladislav Rybach (Geowatt AG Zurich (company))	TS	39	6	-	7	-	-	-	Delete the sentence 'It originates within the Earth and differs from ground source heat that is stored solar energy in soils and ground water'. 'Ground source heat' is by no means stored solar energy. Ground source heat is nowadays harvested from depths up to 400 meters; solar influence is absent below a depth of 10-20 m (see also remark to Annex I/Glossary).	Sentence will be deleted.
Kyung-Jin Boo (Korea Energy Economics Institute)	TS	39	10	14	-	-	-	-	How about volcanic geothermal? Is it included or excluded in the category of geothermal? If included, the technical potential would be way bigger than presented in the graph.	Yes, we included the technically recoverable volcanic geothermal contribution.

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Gerrit Hansen (TSU)	TS	39	2	-	26	-	-	-	the fact that theoretical potential for geothermal describes a stock, but all other potentials discussed by the SRREN are flows (e.g. EJ/a) is irritating and confusing to the reader and should be avoided. The origin and relation between energy contained in the earth mantle, (renewable) heat flows and possibly extractable heat flows (theoretical potential) should be described in a concise manner in the chapter itself, and then portrayed in the TS. In any case, the "stock/flow" issue needs to be discussed or referenced when stating the theoretical potential in its current form.	The term Theoretical potential will be avoided and the paragraph will be re-phrased.
Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	TS	39	25	39	26	-	-	-	The sentence is a bit misleading for a common reader, as it is not just a question of market per se... As we know, it has to do also with distance of geothermal installation to buildings that can use the heat, and the amount of heating needs of these buildings.	Sentence will be re-phrased including the distance in addition of market conditions.
Susanne Kadner (Technical Support Unit)	TS	39	-	47	-	Geothermal	-	-	Ch 4: order of subsections in the TS needs to correspond to that of the full report - needs to be changed!	All the technical parts of the TSU follow the same order.
Steffen Schlömer (IPCC WGIII)	TS	39	-	47	-	Geothermal	-	-	Revise according to chapter comments	It will be done.
ICHIRO MAEDA (The Federation of Electric Power Companies of Japan)	TS	40	15	40	17	-	-	-	<comment> "it can be dispatched and used to meet peak demand" should be deleted. <reason> Such a sentence is not written in the 4.1 (incl. Executive Summary) of the chapter 4. As mentioned at the next phrase, electricity from geothermal energy is normally used as a base-load power source. <reference> pls. refer to 4.1	It is written in 4.1 subsection, and it is important to mention.
United States (U.S. Department of State)	TS	40	11	-	-	-	-	-	Broaden potential uses to be more inclusive. Suggest text change to "circulating water at the surface, where the heat can be used indirectly to produce electric energy in a power unit, and/or in a direct way in a range of applications requiring heat.	The next sentence express the same idea.
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	TS	40	8	40	11	-	-	-	In this section no need to explain EGS, erase the sentence, reference to 4.3.4 - 4.3.7.	It is important for non-tech readers to keep this definition in the TS.
United States (U.S. Department of State)	TS	40	25	-	-	-	-	-	Technical summary p. 40, line 25: replace "in" with "on".	It will be done.
China (China Meteorological Administration)	TS	40	-	40	-	-	-	TS 4.1	China and India fall into the same "developing Asia". It is suggested to merge China and India into the "developing Asia".	TSU agreed to use the IEA regions.
China (China Meteorological Administration)	TS	41	9	41	9	-	-	-	Add "bathing" after "greenhouses". As mentioned in section 4.4.3, bathing is one of the major direct utilizations of geothermal resources.	It will be done.

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Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table	Comments	Consideration by writing team
Ladislav Rybach (Geowatt AG Zurich (company))	TS	41	4	-	-	-	-	-	Aftera few MWe in capacity.... a new sentence should follow: ...The lowest fluid temperature currently operating a geothermal binary plant is 74 °C...	It will be done.
United States (U.S. Department of State)	TS	41	27	-	-	-	-	-	Caution should be applied to the use of the term "hot springs" here and elsewhere. There can be a variety of surface manifestations beyond hot springs indicating the potential presence of a good hydrothermal resource.	It will be used "thermal manifestations" instead.
Susanne Kadner (Technical Support Unit)	TS	41	31	-	-	-	-	-	Ch 4: plastic?	Ductile will be used instead of plastic. And unstable will be included.
United States (U.S. Department of State)	TS	41	16	-	-	-	-	-	Replace "successful" with "greater", and strike "will mean" and substitute with "requires".	Paragraph will be re-phrased.
United States (U.S. Department of State)	TS	41	17	-	-	-	-	-	Strike "widespread availability of" and replace with "accessibility to".	It will be done.
Ingvar Fridleifsson (United Nations University Geothermal Training Programme)	TS	41	6	-	-	-	-	-	Suggest changing to: ... 130-260 °C	Partially accepted: the paragraph will be re-phrased avoiding to use number limits.
United States (U.S. Department of State)	TS	41	1	-	-	-	-	-	Technical summary p. 41, line 1: replace "steam" with "geothermal fluid".	It will be done.
United States (U.S. Department of State)	TS	41	37	-	-	-	-	-	Technical summary p. 41, line 37: change "need" to "needs".	It will be done.
United States (U.S. Department of State)	TS	41	6	-	-	-	-	-	Technical summary p. 41, line 6: replace "200" with "90".	Partially accepted: the paragraph will be re-phrased avoiding to use number limits.
Ladislav Rybach (Geowatt AG Zurich (company))	TS	41	2	-	-	-	-	-	The sentence should be continued:to another working fluid, boiling at low temperature.... Thereafter a new sentence should follow: ...Direct steam power plants have capacities of a few 10s to over 100 MWe [4.3.4]....	It will be done.
Susanne Kadner (Technical Support Unit)	TS	42	12	42	17	-	-	-	Ch 4: Check Chapter 6 for coverage of hydrothermal vents.	Chapter 6 accepted hydrothermal vents are included in chapter 4.
United States (U.S. Department of State)	TS	42	5	42	11	-	-	-	Need to use less jargon (e.g., reliable stimulation) and explain EGS more clearly.	The paragraph was re-phrased to reflect the new re-wording of chapter 4.
Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	TS	42	15	42	17	-	-	-	Problems with the huge depth of work should also be mentioned.	Depth seems not to be a problem, since there are resources at less than 200 m depth.
United States (U.S. Department of State)	TS	42	28	-	-	-	-	-	Spell out "CF", meaning "capacity factor".	It will be done.

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China (China Meteorological Administration)	TS	42	12	41	17	-	-	-	Submarine geothermal fluids are unlikely to be used in a large scale in the foreseeable future, so may be deleted.	Submarine resources are mentioned as a potential resource than can be used in the foreseeable future, as explained in subsection 4.6.4 of the chapter.
Ladislav Rybach (Geowatt AG Zurich (company))	TS	42	7	-	-	-	-	-	The text needs to be expanded:with sufficient volumes and well distributed heat exchange surfaces to sustain long term.....	The paragraph was re-phrased to reflect the new re-wording of chapter 4.
United States (U.S. Department of State)	TS	42	20	-	-	-	-	-	What is meaning of "one century of commercial experience". Was the first commercial use of geothermal energy in a specific site in 1910? Explain. Could it be more that 100 years; less?	First commercial geothermal installation started in 1913.
China (China Meteorological Administration)	TS	42	-	42	-	-	TS 4.2	-	Geothermal installed capacity is 28.18MWe in China. Reference: Zhao Ping. Geothermal Tibetan overview of resources and power generation. Geothermal Resource Council Bulletin, 2000, 29(4): 137-141.	See previous comment: the most recent reference (Bertani, 2010) states 24 MW.
Ladislav Rybach (Geowatt AG Zurich (company))	TS	43	8	-	-	-	-	-	Delete the words ...one commissioned.... (The EGS power plant in Soultz-sous-Fôrets, France is delivering power to the grid since January 2010.)	It will be done.
United States (U.S. Department of State)	TS	43	37	43	41	-	-	-	Explain or replace the phrase "to low", used twice on line 37 and 41. Is the meant to be "lower by"?	It will be rephrased.
United States (U.S. Department of State)	TS	43	21	-	-	-	-	-	Line 21 asserts that "high capital costs" are "mainly due to the cost of drilling wells". But lines 27-28 say that the drilling is 20-35% of capital costs, and that above ground power plants are 40-80% of capital costs. Statements are contradictory.	It will be rephrased to make congruent both paragraphs.
United States (U.S. Department of State)	TS	43	25	-	-	-	-	-	Strike the word "cost", replace with "expenditures". Follow the phrase (capex) with ". . . , or capital cost, . . .".	It will be done.
John Twidell (AMSET Centre)	TS	43	13	43	14	-	-	-	Text refers to Table 4.2. This is set several pages later and so difficult for the reader to find. Poor page setting; move Table 4.2 to page 15.	It will be done.
Steffen Schlömer (IPCC WGIII)	TS	43	-	44	-	Geothermal Costs	-	-	Clean up according to changes in the text required. State cost of installed capital (at least ranges), insert break after part on O&M or include in paragraph on cost of installed capital, replace figure according to changes in main text, include gaps in knowledge wrt learning rates, briefly outline difficulties in deriving learning rates for geothermal if appropriate	Chapter 4 changes in the cost trends section will be reflected in the TS.
United States (U.S. Department of State)	TS	44	18	-	-	-	-	-	For perspective, add comparative reference to the average CO2 emissions (g/kWhe) for the existing fleet of coal-fired power plants.	Comparisons have to be avoided in technical chapters.
Ladislav Rybach (Geowatt AG Zurich (company))	TS	44	4	-	10	-	-	-	In this paragraph also the cost of geothermal heat pump systems (by far the fastest growing branch in geothermal direct use) need to be mentioned (938-3751 US\$/kWh, [4.7.5]).	It will be done.

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Frank Mastiaux (EON Climate & Renewables)	TS	44	12	44	17	-	-	-	Looking for geothermal sources in Stauffen (Germany) caused severe damages to several buildings, due to strong ground movements.	The incident reflected poor drilling practices and was not related to geothermal exploration.
Kyung-Jin Boo (Korea Energy Economics Institute)	TS	44	11	-	-	-	-	-	Presenting only an optimistic point of view, it doesn't properly address the environmental impact and resulting social issues of installing and operating geothermal energy system.	Section was re-structured in chapter 4, and then TS needs to reflect these changes.
John Twidell (AMSET Centre)	TS	44	15	-	-	-	-	-	text has '....sustainable for the long term'. This is too vague. '...sustainable for many decades at least and perhaps indefinitely'.	"for the long term" will be deleted.
Italy (Institute for Environmental Protection and Research (ISPRA))	TS	44	18	44	23	-	-	-	The sentence quantifies CO2 emissions from geothermal systems, without mentioning that these emissions are not additional to natural ones and therefore no net emissions should not be considered in the UNFCCC framework. The following sentences could be added "These emissions are of the same order of magnitude of natural ones and therefore no net emissions from geothermal systems should not be considered in the inventories prepared in the UNFCCC framework. Steam from major geothermal fields also contains traces of other non-condensable gases, such as H2S, NH3, CH4, N2 and H2 (International Geothermal Association - IGA, Submission to CSD 9, 2001; Barbier E.,2002, 'Geothermal energy technology and current status: an overview', Renewable and Sustainable Energy Reviews 6, 36).	Section was re-structured in chapter 4, and then TS needs to reflect these changes, including this observation.
United States (U.S. Department of State)	TS	44	15	44	17	-	-	-	This sentence (line 15-17) is confusing in the context of this paragraph. Delete or rephrase as, "Geothermal systems contain gases and dissolved minerals in the subsurface, some of which naturally flow to the surface through hot springs, fumaroles, and geysers."	Paragraph will be re-phrased.
United States (U.S. Department of State)	TS	45	1	-	-	-	-	-	Add to the Matsukawa reference mention of Mammoth Hot Springs, California.	It will be done.
Ingvar Fridleifsson (United Nations University Geothermal Training Programme)	TS	45	17	45	18	-	-	-	Delete the whole sentence.	It will be done.
Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	TS	45	9	45	12	-	-	-	Job creation value is overstated in these sentences, as these jobs are mostly temporary only.	There are many examples where long-term jobs have been created by geothermal, like in developing countries.
Ladislav Rybach (Geowatt AG Zurich (company))	TS	45	26	-	-	-	-	-	Line 26 should read ...demand of heating/cooling....	It will be re-phrased to "demand from heating and cooling".
Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	TS	45	19	45	38	-	-	-	Note the possible incoherence with the previous section on Solar; there the authors explicitly say their role is not to develop scenarios, only to quote them; here in contrast the authors seem to do so, although it is not really clear (and should be).	In this part of TS, chapter 4 mentions projections, not scenarios.

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Ingvar Fridleifsson (United Nations University Geothermal Training Programme)	TS	45	17	-	-	-	-	-	Please add the following sentence: Geothermal district heating is expanding fast (about 10% annually) in several large cities in China where geothermal water is replacing coal as a heat source. This may reduce CO2 emissions significantly in the future.	It will be done.
Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	TS	45	20	45	24	-	-	-	The data is inconsistent, some for 2007, others for 2008, must be made coherent.	"2007" will be deleted.
United States (U.S. Department of State)	TS	46	18	-	-	-	-	-	Change "results" to "is".	It will be done.
United States (U.S. Department of State)	TS	46	20	-	-	-	-	-	Clarify confusing text.	It is already fixed in the chapter, so it will be reflected in the TSU.
United States (U.S. Department of State)	TS	46	17	46	19	-	-	-	Clarify sentence, lines 17-19. The meaning of the current sentence is indecipherable.	It is already fixed in the chapter, so it will be reflected in the TSU.
Gerrit Hansen (TSU)	TS	46	9	-	25	-	-	-	Please specify more clearly that you are reporting on modeling results of mitigation scenarios from chapter 10 in the beginning.	It is already fixed in the chapter, so it will be reflected in the TSU.
United States (U.S. Department of State)	TS	46	25	-	-	-	-	-	Replace "in" with "on".	It will be done.
China (China Meteorological Administration)	TS	46	-	46	-	-	-	TS 4.2	(1) Geothermal installed capacity is 28.18MWe in China. Reference: Zhao Ping. Geothermal Tibet AR - an overview of resources and power generation. Geothermal Resource Council Bulletin, 2000, 29(4):137-141. (2) China and India are parts of "developing Asia". It is suggested to merge China and India into the "developing Asia".	The most recent reference (2010) states 24 MW for China.
Richard Taylor (International Hydropower Association)	TS	47	-	47	-	-	-	-	Comment:A section on ""Key Messages and Policy Recommendations"" for geothermal comparable to that for the bioenergy sub-section would be of great use.	Not part of the TS structure.
Kyung-Jin Boo (Korea Energy Economics Institute)	TS	48	24	-	-	-	-	-	? What is A1B scenario? Brief explanation or reference need to be provided in the parenthesis.	Accepted
United States (U.S. Department of State)	TS	48	5	-	-	-	-	-	Explain the basis for "technically feasible" potential for hydro. How was it determined, etc.	the source does not explain this - beyond scope of TS
United States (U.S. Department of State)	TS	48	3	48	14	-	-	-	Explain why, for Africa, technical potential (1750 TWh/Yr) is two times current annual generation, whereas capacity potential (399 GW) is twenty times greater than installed capacity. See similar comment on Table TS 5.1.	the discrepancy does not exist

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Stephan Klasen (University of Göttingen)	TS	48	1	56	35	-	-	-	In the hydropower section, it would be important to clearly whether the future direction could be in better managed, run of river plants (maybe with smaller ponds) to reduce social and environmental impacts, and whether the best direction is towards smaller projects rather than large dams. The report should also explicitly refer to the World Commissions on Dams Report which was quite critical of large dam projects. In particular, it should take issue with the claim there that the emissions of hydropower dams are very high; also it should emphasize that the process of constructing dams is really critical (as emphasized by the WCD report).	the comment ask for policy prescriptive answers
John Twidell (AMSET Centre)	TS	49	20	-	-	-	-	-	' power plant is 40 to 80 years for mechanical and electrical components, and may be centuries for civil works'. Add the time of all aspects in a single sentence sentence; as now, the word 'plant' is vague. Next sentence therefore not needed.	Accepted
ICHIRO MAEDA (The Federation of Electric Power Companies of Japan)	TS	49	5	49	6	-	-	-	<comment> ...(i.e. the vertical height of water above the turbine)" should be replace with "(i.e. the height difference between the intake water level and the discharge one)" <reason> the definition of the word is not correct.	Accepted
United States (U.S. Department of State)	TS	49	21	-	-	-	-	-	change "30-40" to "30-50"	comment is addressed in 340/32
Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	TS	49	11	49	15	-	-	-	In addition the loss of sediments reaching the coast sometimes causes beach erosion (e.g. Iberian Peninsula west coast)	see 464/12
Oyvind Christophersen (Climate and Pollution Agency)	TS	49	13	-	-	-	-	-	It's written "increased flood risk due to sedimentation" - this is compared to the power system as new, and I guess not compared to flood risk prior of the plant.	see 464/12
Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	TS	49	3	49	4	-	-	-	Maybe this could be reinforced: ""Pumped storage is the only form of large capacity grid-energy storage available nowadays.""	not relevant
United States (U.S. Department of State)	TS	49	32	-	-	-	-	-	There are also significant opportunities to enhance the environmental performance of hydropower plants during replacement and modernization of existing equipment, such as using newer, fish-friendly turbines.	Accepted

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Oluf Ulseth (Statkraft AS)	TS	49	11	49	19	-	-	-	This passage on sedimentation is too specific to be part of the overall summary and should be deleted from this section. Sedimentation is very site-specific and does only occur in areas with sandy/earthy ground and inadequate vegetation cover. In countries with mainly hard rock underground like Norway and Canada, this is not an issue at all. Including such site-specific considerations at this rather general level would be rather inappropriate and provide an unbalanced overall picture compared to the other issues which are also explained in more details in chapter 5. Since there seems to be a need to cut down the length of the document, here could be an opportunity to save 8 lines.	Accepted
Oluf Ulseth (Statkraft AS)	TS	49	2	-	-	-	-	-	To specify the difference of storage hydro compared to run-of-river project which are dependent on hydrologic variations, it should be added one more sentence after (...) irrigation, like: "Their water storage capacity constitutes a water management safeguard which supports efforts of adapting to climate change and its increasingly varying precipitation patterns."	concept will be reflected in the text but wording may be different
Kyung-Jin Boo (Korea Energy Economics Institute)	TS	49	-	-	-	-	TS 5.1	-	? What is the definition of energy pay back ratio? A more general terminology is payback period. Explain the big difference between those of solar PVs, biomass plantation and those of hydropower.	definition of pay back transferred to glossary - CLA follow up
Jänicke Martin (Environmental Policy Research Centre)	TS	49	-	-	-	-	TS 5.1	-	Please add the unit!	a ratio has no unit
Taishi Sugiyama (Central Research Institute of Electric Power Industry (CRIEPI))	TS	49	-	-	-	-	TS 5.1	-	This graph conveys very important information and it should appear in SPM. The readers want this kind of information. Include more information - there are a lot of LCA studies - , for example (Imamura, Eiichi et al., Evaluation of Life Cycle CO2 Emissions of Power Generation Technologies, CRIEPI report, ISBN 978-4-7983-0339-0, available from src-rr-ml@criepi.denken.or.jp).	will propose figure in SPM - the LCA ref to be included in ch 5 after checking
China (China Meteorological Administration)	TS	50	13	50	14	-	-	-	"A significant portion of these projects are based in China (67%), India (9%) and Brazil (6%)" can not be found in 5.4.5 or in the whole chapter 5. In fact, those hydropower CDM projects are largely subject to multi-factors and often fluctuate a lot, therefore, it is suggested to weaken such descriptions and delete the country percentage in the bracket.	Accepted
John Twidell (AMSET Centre)	TS	50	33	-	-	-	-	-	Add reference to Table TS5.1 [however, the text is somewhat repeating itself here].	Accepted
Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	TS	50	42	51	3	-	-	-	France is a special case but various other countries (also in Europe) have similar schemes. The explanation should be made more general and the numbers quoted should reflect not just France. EU documents exist that compare the situation across the region.	this is meant as an illustration and not an exhaustive discussion

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Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table	Comments	Consideration by writing team
Gerrit Hansen (TSU)	TS	50	42	51	3	-	-	-	para contains too much detail	to be shortened p 50 line 46 to 51 line 3
United States (U.S. Department of State)	TS	50	42	-	-	-	-	-	Recent experience with certifying environmentally compatible hydropower in the U.S. (i.e., Low Impact Hydropower Institute) has confirmed that project size, measured in capacity, is not a good predictor of environmental impacts. There are some large projects that are clean, and some small projects that have significant adverse impacts. Future policies that identify preferred or qualified hydropower should be based on better criteria than just size.	incorporate the idea of th ecomment in the para
Richard Taylor (International Hydropower Association)	TS	50	44	40	44	-	-	-	Reword as follows: ""but fewer incentives are usually available for large scale hydro"".	insert: ",but few, if any incentives are available for large scale hydropower"
Gerrit Hansen (TSU)	TS	50	37	-	39	-	-	-	sentence not clear	Accepted
Canada (Environment Canada)	TS	50	43	-	-	-	-	-	The process of obtaining approval for small hydro development in Canada is a barrier and places a significant burden on small developers. Similar issues exist in the EU and the US. Refer to: http://canmetenergy-canmetenergie.nrcan-rncan.gc.ca/eng/renewables/small_hydropower/publications.html?2009_Hydro_02 http://www.small-hydro.com/view/library/cd/2008/whatson/index.htm	barriers to small scale neds to be incorporated
Australia (0)	TS	50	34	50	35	-	-	-	The statement, "the development of more appropriate financing models is a major challenge for the hydropower sector, with optimum roles for the public and private sectors", is true for all RE technologies and not just hydropwer.	very important point for hydro and a main barrier
Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	TS	50	11	50	41	-	-	-	The two first paragraphs (11-26) would be better at the end of the other two. In the interest of reducing TS lenght this text could certainly be less detailed.	Accepted
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	TS	51	13	51	13	-	-	-	<comment> If necessary, "the hydropower plant" should be replaced with "the reservoir-based or pumped-storage hydropower plant" <reason> the ROR HPP cannot control its output to meet the demand and is normally used as a base-load power source.	change also 5.5.1
Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	TS	51	22	-	-	-	-	-	At least in Portugal and Spain also, better put it ""Western Europe"" instead of ""England""	England is an example
United States (U.S. Department of State)	TS	51	33	-	-	-	-	-	Change phrase, "have up and down sides" to "have advantages and disadvantages".	Accepted

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Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table	Comments	Consideration by writing team
Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	TS	51	14	51	19	-	-	-	These sentences have various redundances, can be abbreviated.	Accepted
Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	TS	52	1	52	7	-	-	-	As regards biodiversity, on the negative side, it seems missing the destruction of unique habitats, with endemic species. On the positive side... well, it is missing, but I can point out: enhanced water availability through dry summers and droughts, both at the dam and at the river downstream; also a dam often enables new agriculture that offers feeding grounds for small mammals, birds, etc; and a water reservoir is often important for fighting wildfires and thus preserving habitats.	Accepted
Susanne Kadner (Technical Support Unit)	TS	52	31	52	35	-	-	-	Ch 5: Needs to be re-worded.	comment not understood - CLA will check with TSU
Gerrit Hansen (TSU)	TS	52	28	-	30	-	-	-	statement needs to be justified in chapter text	will be elaborated in main text
Taishi Sugiyama (Central Research Institute of Electric Power Industry (CRIEPI))	TS	52	24	52	30	-	-	-	The role of hydropower in development is very important fact - put this paragraph in SPM.	to be included in the SPM in a shortened form - will be checked
United States (U.S. Department of State)	TS	52	8	-	-	-	-	-	While it is true that hydropower creates no direct air pollutants or waste from its operations, there are some indirect sources. These are generated by construction and materials and, significantly, by bio-degradation of organic matter in ponded sediment.	replace "no" with "very low" - edit also 5.5.6 p 40 line 34
Oluf Ulseth (Statkraft AS)	TS	52	-	-	-	-	-	TS 5.2	Here is an other opportunity to save some space. Portraying such kind of detailed technical data is not relevant at the summary level. In addition, this table is in general of limited value as it is only presenting the gross GHG emissions values which are not relevant for an accurate assessment of the GHG footprint. It is the net data which have to be established as the text is correctly mentioning.	fig to be deleted
ICHIRO MAEDA (The Federation of Electric Power Companies of Japan)	TS	53	22	53	22	-	-	-	<comment> "two decades" should be replaced with "three decades". <reason> In the 5.7 of the chapter 5, "three decades" is used for the same sentence. <reference> pls refer to 5.7 (page54)	Accepted
Susanne Kadner (Technical Support Unit)	TS	53	36	53	37	-	-	-	Ch 5: Re-word	comment not understood - CLA will check with TSU

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Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table	Comments	Consideration by writing team
United States (U.S. Department of State)	TS	53	16	53	23	-	-	-	This paragraph misses the opportunity to talk about improvements that can be made in environmental performance. The first sentence would be better said as: "Although hydropower is a mature technology, there are substantial opportunities to increase both the energy and environmental performance of existing and new power plants." Add to the end of the second sentence ", when operation is at its Best Efficiency Point (BEP)." There are multiple reasons that existing plants do not operate at BEP all of the time, including limitations in water availability and peak demand periods when energy values are high and power plants are pushed beyond their design limits. Add to the end of the paragraph: "When plant equipment is replaced or modernized, there are important opportunities to improve environmental performance as well as energy and water-use efficiencies." Demonstration of these types of environmental improvements can be an important way to reduce barriers to new-project development.	paragraph will be reworded according to intent in comment
Steffen Schlömer (IPCC WGIII)	TS	53	43	-	-	Hydropower Costs	-	-	Insert break before "The load factor..."	Accepted
Steffen Schlömer (IPCC WGIII)	TS	53	39	-	-	Hydropower Costs	-	-	Insert break before investment costs	Accepted
Steffen Schlömer (IPCC WGIII)	TS	53	-	54	-	Hydropower Costs	-	-	Revise according to chapter comments. Generally better structured than main cost section. Could be used as rough guideline.	Accepted
Gerrit Hansen (TSU)	TS	54	6	-	7	-	-	-	"assumed economic potential" is not defined nor assigned to be derived by technology chapters in the SRREN. The presented figure (9000 TWh/yr) is not properly justified within chapter 5	harmonize between the glossary and 5.8.1 and 5.8.2, also harmonise within ca 5
ICHIRO MAEDA (The Federation of Electric Power Companies of Japan)	TS	54	13	54	14	-	-	-	<comment> "kWh" in the line 13 and 14 should be "kW". <reason> the use of "kWh" is not correct in the sentence.	Accepted
Susanne Kadner (Technical Support Unit)	TS	54	9	54	10	-	-	-	Ch 5: Remove sentence.	Accepted
Susanne Kadner (Technical Support Unit)	TS	54	20	-	-	-	-	-	Ch 5: Roads? Should probably read "building of roads and infrastructure".	dams often used as bridges

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Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table	Comments	Consideration by writing team
Gerrit Hansen (TSU)	TS	54	25	55	32	-	-	-	clear reference to and discussion of mitigation scenarios (ch.10) results is missing.	reference to mitigation scenarios in ch 10 to be further elaborated (see ch 5 p 70 line 21 as so forth and fig 10.3.1 in ch 10) remember that ch 5 is the basis for ch 10 not vice versa)
Taishi Sugiyama (Central Research Institute of Electric Power Industry (CRIEPI))	TS	54	24	54	33	-	-	-	The role of hydropower for WEHAB and CC adaptation is very important fact - put this paragraph in SPM.	the message will be conveyed to the SPM
United States (U.S. Department of State)	TS	54	11	54	15	-	-	-	This paragraph should also explain that there are significant economies of scale that operate in hydropower, that make smaller hydro more expensive in terms of \$/kW. Small project (<5 MW) costs can be 2-3 times greater than larger (>20 MW), making small projects less cost competitive in some cases. This is an important area where R&D should be applied, to drive down development costs of small projects.	need to be reflected also in ch 5
Susanne Kadner (Technical Support Unit)	TS	55	6	55	8	-	-	-	Ch 5: Numbers for 2050 seem odd and were not found in full report in section 5.9.2 - remove	ref fig 5.30 -
Susanne Kadner (Technical Support Unit)	TS	55	34	55	43	-	-	-	Ch 5: Paragraph redundant with previous page 54, line 25-33.	will be addressed
Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	TS	55	9	55	12	-	-	-	The figures given for Europe seem inconsistent with those at the opening of the section (wherein undeveloped potential is quoted as 70%)!	no figures are given - sentence is ok
Gerrit Hansen (TSU)	TS	55	1	-	2	-	-	-	The presented figure (9000 TWh/yr) is not properly justified within chapter 5	see comment 389/306
Taishi Sugiyama (Central Research Institute of Electric Power Industry (CRIEPI))	TS	55	33	55	40	-	-	-	The role of hydropower for WEHAB and CC adaptation is very important fact - put this paragraph in SPM.	he message will be conveyed to the SPM
Canada (Environment Canada)	TS	55	14	56	15	-	-	-	The TS states "Canada (and also United States of America) is likely to continue to develop their [hydroelectric] potential considering national laws on RES". Please consider revising to: "Canada is likely to continue to develop their [hydroelectric] potential through national renewable energy targets"	change to "--national .. As proposed
Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	TS	55	35	-	-	-	-	-	use ""effective"" instead of ""practical""	Accepted
Richard Taylor (International Hydropower Association)	TS	56	-	56	-	-	-	-	Comment: A section on ""Key Messages and Policy Recommendations"" for hydropower comparable to that for the bioenergy sub-section would be of great use.	key messages may be added but not policy recommendations

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United States (U.S. Department of State)	TS	56	17	-	-	-	-	-	there are many more than 2500 dams in U.S. that do not have hydropower plants, so this sentence is confusing and probably inaccurate. See new comments in the Hydro Chapter.	sited study looked at 2500 dams - propose to delete "the" before 2500 and a parenthetical remark saying "(of a substantial larger number)" and change the ch acc (ref is US National Inventory of dams, US Army Corps of Engineers)
Oyvind Christophersen (Climate and Pollution Agency)	TS	57	8	-	-	-	-	-	32000TWh per year?	Accepted
Finn Gunnar Nielsen (Statoil)	TS	57	8	-	-	-	-	-	32000TWh per year??	Accepted
Oyvind Christophersen (Climate and Pollution Agency)	TS	57	18	-	-	-	-	-	7000 MW installed power capacity or 7000MWh produced energy per year?	See above
Finn Gunnar Nielsen (Statoil)	TS	57	18	-	-	-	-	-	7000 MW installed power capacity or 7000MWh produced energy per year?	Will change to energy TWh/year
Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	TS	57	-	-	-	-	-	-	an effort must be made to state all energy data consistently in TWh or there is no way to compare e.g. tidal rise and fall with OTEC, etc.	Accepted above
Netherlands (KNMI (Royal Dutch Meteorological Institute))	TS	57	17	-	-	-	-	-	As per comment on chapter 6, check this 48TWh number, seems to be derived but the capacity factor looks to be much too big	Need to check reference for 48 TWh/yr
Netherlands (KNMI (Royal Dutch Meteorological Institute))	TS	57	37	-	-	-	-	-	base load claim for wave power is unsupported in chapter 6 and is unlikely to be true, strongly suggest delete.	Delete 'waves'
Susanne Kadner (Technical Support Unit)	TS	57	23	57	26	-	-	-	Ch 6: Check Chapter 4 for coverage of hydrothermal vents.	Check text to remove 'centres'. Add reference to Ch 4 and cross-reference to Ch 6
United Kingdom (Department of Energy and Climate Change)	TS	57	9	57	14	-	-	-	European waters have also been extensively studied	Covered by the existing text
Netherlands (KNMI (Royal Dutch Meteorological Institute))	TS	57	2	-	-	-	-	-	I think in this section it is important to define which potentials are being presented, theoretical? technically feasible? Cost feasible? etc etc I also think that common methods of defining potential could be useful, some are presented in terms of energy (TWh) while others are in capacity (MW). Finally I think, as per comments on Chapter 6, that some more references could be used for the potentials rather than the single references currently provided. for example from REN21 2008 "GLOBAL POTENTIAL OF RENEWABLE ENERGY SOURCES: A LITERATURE ASSESSMENT"	Difficult to find peer-reviewed information; will review REN21 document; need to check the use of TWh and MW to get consistency - see Ryan Wisner meeting

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Netherlands (KNMI (Royal Dutch Meteorological Institute))	TS	57	25	57	26	-	-	-	New information, not in chapter 6, suggest remove or discuss in Chapter 6	Delete
Netherlands (KNMI (Royal Dutch Meteorological Institute))	TS	57	32	-	-	-	-	-	Not sure the global distribution of ocean currents is supported in the chapter, only some are fast flowing and many are very far from the shore?	Add figure references to maps in this section
John Twidell (AMSET Centre)	TS	57	8	-	-	-	-	-	now 'wave energy resource is 32,000 TWh'. UNIT WRONG '.per year?'. Better to have generating capacity as in the other technologies described below.	See Ryan Wiser meeting
John Twidell (AMSET Centre)	TS	57	24	-	-	-	-	-	now'...global resource is 30,000 to 90,000 TWh'. As above UNIT WRONG. '.per year?'. Better to have generating capacity as in the other technologies.	Add TWh/year
Netherlands (KNMI (Royal Dutch Meteorological Institute))	TS	57	31	-	-	-	-	-	only some forms of ocean energy make sense with water production, should be clarified?	Esp. OTEC and some wave energy technologies
Frank Mastiaux (EON Climate & Renewables)	TS	57	-	64	-	-	-	-	overall graph of coverage of total global energy demand by different RES (e.g. wind energy covers 1.8%)	Team could not see validity of this point
United Kingdom (Department of Energy and Climate Change)	TS	57	1	64	22	-	-	-	Overall this is, by some distance, the weakest of the technology summary sections that I have read.	This review should lead to improvement
Gerrit Hansen (TSU)	TS	57	9	-	14	-	-	-	please give corresponding number in EJ/y for theoretical potential. Information on existing and planned project's capacity might be better placed in the following section, and consider to include information on actual energy supplied.	Move text on technologies to next section
Gerrit Hansen (TSU)	TS	57	23	-	26	-	-	-	please report numbers given in TWh also in EJ, and give the corresponding time (30-90000 TWh per year?)	Add TWh/year
Gerrit Hansen (TSU)	TS	57	7	-	8	-	-	-	please report numbers given in TWh also in EJ, and give the corresponding time (32.000 TWh per year?)	Will change to TWh/year and add a reference
Gerrit Hansen (TSU)	TS	57	27	-	29	-	-	-	please report numbers given in TWh also in EJ. Is this technical potential (or theretical)?	Add TWh/year
Gerrit Hansen (TSU)	TS	57	15	-	22	-	-	-	please specify if the numbers relate to technical potential? MW doesn't indicate energy, but power. Installed capacity (25 GW) is not very informative without further specifications regarding to judge actual energy produced.	Will need to assume a cap factor to convert to energy
Frank Mastiaux (EON Climate & Renewables)	TS	57	-	64	-	-	-	-	quite long chapter without a really clear message, a lot of general listings	To be reviewed when all text changes have been made - what are the messages from Ch 6
Steffen Schlömer (IPCC WGIII)	TS	57	-	64	-	-	-	-	Revise according to chapter comments	Will review comments in Ch 6

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Netherlands (KNMI (Royal Dutch Meteorological Institute))	TS	57	35	-	-	-	-	-	See comment on main chapter regarding lack of consistency for wave resource bands, should be checked	Change to 30 - 60 deg; need to change in Exec Summary
Netherlands (KNMI (Royal Dutch Meteorological Institute))	TS	57	10	-	-	-	-	-	See comments on the specific chapter, 1-3TW is for all tidal energy and other estimates differ from this.	Check Charlier and Justus reference to confirm and revise text as
Netherlands (KNMI (Royal Dutch Meteorological Institute))	TS	57	20	-	-	-	-	-	See comments on the specific chapter, this list neglects some excellent countries such as Canada and should be checked for references/fact	Add Canada to the list; check SPM to ensure that Canada is covered
chris campbell (Ocean Renewable Energy Group)	TS	57	-	-	-	-	-	-	should this section establish some energy characteristics - power densities for wave and tidal, tidal ranges that might work for rise and fall and the delta T for OTEC? In the tech and Apps section, does the one para for each create an impression that all are equal?? I keep coming back to the thought that tidal rise and fall is likely to be a small number of sites worldwide and will be permit limited, OTEC is likely to be megaproject funding limited , in addition to being site limited, ocmosis has so far to go to even proof of concept, yet instream and wave are on track for dramatic experience growth and cost reduction through this decade. If I am from outside the field/policy leader, I do not see any clear picture of this.	Will address this in looking at messages
Canada (Environment Canada)	TS	57	19	57	22	-	-	-	Sites with significant tidal power potential have also been identified in Canada. In particular, Karsten et al. (2008) estimate a maximum potential of 7 GW for Minas Passage in the Bay of Fundy. Refer to: Karsten, R.H., J.M. McMillan, M.J. Lickley & R.D. Haynes (2008) Assessment of tidal current energy in the Minas Passage, Bay of Fundy. Proc. IMechE Part A: J. Power and Energy, vol. 222, 493-507.	Will add into Ch 6 and transfer info to TS
Netherlands (KNMI (Royal Dutch Meteorological Institute))	TS	57	18	-	-	-	-	-	suggest 7GW rather than 7,000MW	Use GW
Netherlands (KNMI (Royal Dutch Meteorological Institute))	TS	57	11	57	14	-	-	-	suggest delete, this section is only for resource. Also no reference is given in the chapter for the 21GW claim	Move text on technologies to next section; need to add table to Ch 6
China (China Meteorological Administration)	TS	57	18	57	19	-	-	-	The wording "In China it has been estimated that 7,000 MW of tidal current energy are available." should read: "In China, it has been estimated that 13965 MW of tidal current energy are available."	Need reference to support change - Mr. You will attempt to provide with figure of 13965 MW; also need to convert units to TWh/year
Netherlands (KNMI (Royal Dutch Meteorological Institute))	TS	57	34	57	35	-	-	-	This 0-35 seems to be a new statement, moreover it is contradicted by Charlier and Justus which is one of the chapter references. Should be a much narrower band.	Will review Charlier and Justus; add into text of Ch 6.

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Netherlands (KNMI (Royal Dutch Meteorological Institute))	TS	57	8	-	-	-	-	-	this should be "per year"	Accepted
John Twidell (AMSET Centre)	TS	57	9	57	14	-	-	-	Tidal rise and fall. It is essential to include 'The distance of rise and fall, the tidal range, is greatly increased in certain estuaries by resonance of the tidal period with the estuarine characteristic'. Indeed, the vital importance of the shape of estuaries and coastlines for tidal range and total current power needs to be emphasized much more. Thus the present Figures TS6.1 b) and d) are irrelevant for practical tidal power. Better to have a global map with arrows to the key tidal range estuaries and coastlines.	Scale of maps does not enable identification of specific locations but will add comment into para lines , page 57; lines 9-14; define locations by country
John Twidell (AMSET Centre)	TS	57	29	-	-	-	-	-	UNIT WRONG. '..per year?'. Better to have generating capacity as in the other technologies.	Add TWh/year
Frank Mastiaux (EON Climate & Renewables)	TS	57	-	64	-	-	-	-	very restrictive use of breaks in the text in general makes it difficult to read	As previous point
chris campbell (Ocean Renewable Energy Group)	TS	57	16	-	17	-	-	-	What about Canada's published 190 sites and 40,000MW?	What is reference to 40 GW - JH to call Chris Campbell
United States (U.S. Department of State)	TS	57	7	57	8	-	-	-	Within Resource Potential, Wave Energy (lines 7-8), replace the existing paragraph with the following: There is tremendous energy in the ocean's waves. The total power of waves breaking on the world's coastlines is estimated at 2-3 million megawatts. While only a very small amount of this energy could be realistically captured and converted into electrical energy, it still represents a vast resource. For example, the total potential off the coast of the United States is about 2,100 TWh a year. If 15% of this resource energy is converted to electrical energy at 90% efficiency and with a plant availability of 90%, the yearly electrical energy generated is about 250 TWh per year, which is about 7% of the United States' electricity consumption in 2004. (DOE EIA). The west coasts of the United States and Europe and the coasts of Japan and New Zealand have been identified as leading sites for harnessing wave energy."	Proposed text does not have a reference and is largely related to the US. Not valid
ICHIRO MAEDA (The Federation of Electric Power Companies of Japan)	TS	58	4	58	6	-	-	-	<comment> Change from "botht he" to "both the". <reason> Typological mistake	Typo

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Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table	Comments	Consideration by writing team
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	TS	58	16	58	18	-	-	-	Also coastally attached lagoons. These are likely to have lower effects on coastal processes.	coastally attached and stand-alone offshore'
Netherlands (KNMI (Royal Dutch Meteorological Institute))	TS	58	22	-	-	-	-	-	delete the word 'ocean'. There are no ocean current devices at this stage.	Ocean current devices have not yet been developed
Netherlands (KNMI (Royal Dutch Meteorological Institute))	TS	58	19	58	20	-	-	-	I think better to call these concepts rather than advances. None exist yet?	Change 'advances' to 'concepts'
chris campbell (Ocean Renewable Energy Group)	TS	58	16	-	17	-	-	-	I think this sentence could be made a little clearer to ensure that the uninformed understand the concept	adaptation of principles'
John Twidell (AMSET Centre)	TS	58	16	-	-	-	-	-	now '...Tidal rise and fall energy can be harnessed by the adaptation of river-based hydroelectric dams to 17 estuarine situations'. BETTER AS '..Tidal rise and fall energy can be harnessed in the relatively few river estuaries that have the geometrical shape for the tidal rhythm to resonate with the estuarine characteristic oscillation, e.g. the Seven Estuary in the UK with its 9.8 m mean range. This property of resonance enhancement is essential for practical realisation of tidal-range power'.	Adopting this change would contradict 914 but will talk about level of tidal range; need to add into Ch 6
John Twidell (AMSET Centre)	TS	58	4	-	-	-	-	-	now '...both he..', should be '..both the....'	Typo
Netherlands (KNMI (Royal Dutch Meteorological Institute))	TS	58	4	7	-	-	-	-	Poor phrasing, the very different resource types *demand* different technologies. The nature of this ocean energy chapter (describing many different resources under one heading) should be discussed as the reason why one wouldn't expect to see any convergence. This paragraph feels clumsy.	JH to review; more positive comment required
Finn Gunnar Nielsen (Statoil)	TS	58	4	-	-	-	-	-	replace ""both he"" by ""both the""	Typo
Oyvind Christophersen (Climate and Pollution Agency)	TS	58	4	-	-	-	-	-	replace "both he" by "both the"	Typo
Netherlands (KNMI (Royal Dutch Meteorological Institute))	TS	58	1	-	-	-	-	-	should say "b) global tidal energy"	Correct table 1 caption "global tidal rise and fall energy"
Netherlands (KNMI (Royal Dutch Meteorological Institute))	TS	58	13	-	-	-	-	-	suggest delete "different"	delete 'different mass' from which 'motions'
Netherlands (KNMI (Royal Dutch Meteorological Institute))	TS	58	21	-	-	-	-	-	Suggest delete "rivers". This is new and not discussed in chapter 6	Delete 'from rivers'; cross reference to Ch 4 on Ch 6, page 15, line 4

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Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table	Comments	Consideration by writing team
Netherlands (KNMI (Royal Dutch Meteorological Institute))	TS	58	23	-	-	-	-	-	suggest delete 'mature', not required	Similar design'
Netherlands (KNMI (Royal Dutch Meteorological Institute))	TS	58	19	-	-	-	-	-	suggest replace "continuous" with "more consistent" (continuous is not supported in the chapter)	"Almost continuously"
United Kingdom (Department of Energy and Climate Change)	TS	58	8	58	15	-	-	-	There are a number of devices that do not fit this taxonomy (e.g. the Pelamis device that was the first wave device to deliver electricity to a commercial grid)	two or more floating or submerged bodies'
Kristie Ebi (Department of Global Ecology)	TS	58	41	58	44	-	-	-	There should be explicit mention that multiple demands on scarce water resources may be exacerbated with climate change.	Comment is in the wrong place
United Kingdom (Department of Energy and Climate Change)	TS	58	4	58	7	-	-	-	This comment will interest the proponents of HAWTs, Darrieus rotors, two bladed machines.....	Add 'predominant'
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	TS	58	0	-	-	-	-	-	Worth mentioning somewhere in the Ocean Energy section that there have been 1.2 GW of wave and tidal stream agreement for leases signed for the Pentland Firth waters?	Will add note on licences into Ch 6; add into markets/policy section
Netherlands (KNMI (Royal Dutch Meteorological Institute))	TS	59	43	-	-	-	-	-	As per comments in chapter 6, I'm not sure that RE testing centres are so unusual?	As above
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	TS	59	2	59	4	-	-	-	Could delete sentence to reduce length - pretty much a repeat of previous.	Will delete sentence
United States (U.S. Department of State)	TS	59	2	-	-	-	-	-	Delete "The main difference", and begin the sentence with "River"	As above
United Kingdom (Department of Energy and Climate Change)	TS	59	21	59	25	-	-	-	How does the author account for the fact that "there is no commercial market" with well over 100 devices being under development? Overall the text throughout this section seems to be understating the state of development of technologies within Europe.	Need to review this paragraph in line with text in Ch 6
Netherlands (KNMI (Royal Dutch Meteorological Institute))	TS	59	22	59	23	-	-	-	Important to say that these precommercial ones are wave and tidal current, otherwise tells the reader little	As above
United States (U.S. Department of State)	TS	59	10	-	-	-	-	-	Insert "(typically ammonia)" after "working fluid"	Change 'volatile' and 'most commonly ammonia'
United Kingdom (Department of Energy and Climate Change)	TS	59	43	60	2	-	-	-	It is nice that EMEC gets such a positive mention, but how is its role so different from what places like Riso played in the wind sector or NREL for solar?	Remove 'unusual' and 'loose network'

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Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table	Comments	Consideration by writing team
United States (U.S. Department of State)	TS	59	21	59	25	-	-	-	Ocean energy technologies are more technologically evolved than described in this section. Numerous developers have conducted scale-model, at-sea trials (representing full-scale operation) of their technologies. This represents a higher level of technology readiness than what is represented in this section.	Devices have been tested in full-scale at sea but not sold commercially
Finn Gunnar Nielsen (Statoil)	TS	59	19	-	-	-	-	-	replace ""..in salt concentration."" by "" ..in concentration..""	Delete 'salt'
Oyvind Christophersen (Climate and Pollution Agency)	TS	59	19	-	-	-	-	-	replace ""..in salt concentration.."" by "" ..in concentration..""	Delete 'salt'
chris campbell (Ocean Renewable Energy Group)	TS	59	17	59	18	-	-	-	same point as above ""naturally occurring osmosis"" point is that modern membrane technology may allow....	Change to 'utilizes the concept of naturally occurring osmosis'; edit TS and Ch 6 too
chris campbell (Ocean Renewable Energy Group)	TS	59	43	-	-	-	-	-	sentence structure?? ""Unusual feature"" not a useful phrase - recognising the unique permitting and project development challenges for projects in the ocean, many of the lead countries are developing pre-permitted development centres complete with grid interconnection infrastructure.(Emec best example??)	As above
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	TS	59	21	60	7	-	-	-	Some confusion with tidal range technology. This is stated as mature, with planned schemes, but then 'no market'. Suggestion to be clear when referring to status of wave and tidal stream rather than tidal range.	Revisit para as in 932 and 933
Netherlands (KNMI (Royal Dutch Meteorological Institute))	TS	59	19	-	-	-	-	-	suggest delete "of salt"	Delete 'salt'
Netherlands (KNMI (Royal Dutch Meteorological Institute))	TS	59	2	59	4	-	-	-	suggest delete this sentence, repetition with the sentence before	As above
Netherlands (KNMI (Royal Dutch Meteorological Institute))	TS	59	11	-	-	-	-	-	this claim about performance is not supported or referenced in chapter 6	Closed cycle systems'; need to add comment in Ch 6 regarding 6.3.4)
Netherlands (KNMI (Royal Dutch Meteorological Institute))	TS	59	38	59	39	-	-	-	this is a new claim that is not referenced or supported in chapter 6	Need to include reference in Ch 6; need to change to 6.4.1.2 from 6.4.2.1.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	TS	59	26	59	27	-	-	-	this is a new claim that is not referenced or supported in chapter 6	Need to make sure it's in Ch 6
Netherlands (KNMI (Royal Dutch Meteorological Institute))	TS	59	29	59	30	-	-	-	this is a new claim that is not referenced or supported in the body of chapter 6, except in the Exec Summary	As above

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Netherlands (KNMI (Royal Dutch Meteorological Institute))	TS	59	31	59	32	-	-	-	Which governments? Not all are supportive?	Need to review para with Governments in Ch 6
chris campbell (Ocean Renewable Energy Group)	TS	59	8	-	-	-	-	-	why emphasise depth? It is the temperature difference that is important and shallow would actually be better! Authors - this is an example of emphasis misdirecting the uninformed reader - it is likely all true, but does not necessarily inform	Not true - will de-emphasise depth
Netherlands (KNMI (Royal Dutch Meteorological Institute))	TS	60	11	-	-	-	-	-	I think an introduction is required to say that at this stage very little is known due to the early stage of development of ocean energy technologies.	Need a sentence regarding limited deployments and uncertainty of effects
Kristie Ebi (Department of Global Ecology)	TS	60	32	60	38	-	-	-	Not all people in developing countries use firewood; this should be made more precise. Also, it is unclear what the last sentence has to do with health. There is no discussion of possible adverse health impacts of bioenergy.	Not relevant
chris campbell (Ocean Renewable Energy Group)	TS	60	12	-	-	-	-	-	surely it would be better to lead with the line 16/17 sentence? - this para should surely draw out the concerns that can genuinely and uniquely be raised by OE projects of existing knowledge and activity	Move to start of para
Netherlands (KNMI (Royal Dutch Meteorological Institute))	TS	60	7	-	-	-	-	-	This claim of direct benefit is not substantiated in chapter 6	Need a reference to FREDS or something else
Netherlands (KNMI (Royal Dutch Meteorological Institute))	TS	60	2	-	-	-	-	-	this is a new claim that is not referenced or supported in chapter 6.	Need to ensure this is cited in Ch 6
Netherlands (KNMI (Royal Dutch Meteorological Institute))	TS	60	11	-	-	-	-	-	Wave energy has been neglected from this section for some reason	Need a sentence on wave energy - see 6.5.2
Netherlands (KNMI (Royal Dutch Meteorological Institute))	TS	61	13	61	14	-	-	-	"passive nature" is unclear language	Will modify as part of 952
Oyvind Christophersen (Climate and Pollution Agency)	TS	61	36	61	41	-	-	-	Add that design for survivability during extreme weather conditions must have more attention to improve reliability.	Add in sentence on survivability & add introductory section as section 6.6
Finn Gunnar Nielsen (Statoil)	TS	61	36	61	41	-	-	-	Add that design for survivability during extreme weather conditions must have more attention to improve reliability.	As above
United Kingdom (Department of Energy and Climate Change)	TS	61	36	62	25	-	-	-	After an at times overly broad discussion of the environment and social issues the authors come across as much more authoritative when they start discussing engineering challenges.	Need more environmental references

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chris campbell (Ocean Renewable Energy Group)	TS	61	36	-	-	-	-	-	back to a key point - yes the technology developers need this but more importantly, utilities, financiers, manufactures and regulators need this - did I say before ""not a science experiment""	The ocean energy industry; remove 'technology'
Netherlands (KNMI (Royal Dutch Meteorological Institute))	TS	61	45	61	46	-	-	-	comment on control strategies is a new claim that is not referenced or supported in chapter 6.	Need to add sentence on control strategies in Ch 6
chris campbell (Ocean Renewable Energy Group)	TS	61	15	61	19	-	-	-	could probably be a simple statement that similar concerns to tidal, but maybe larger scale, though less biol active sites??/	Environmental effects are site-specific; need a linking statement between open ocean currents and tidal currents
United Kingdom (Department of Energy and Climate Change)	TS	61	15	61	19	-	-	-	Does MCT's operation (and monitoring) of the Seagen project in Northern Ireland not count?	MCT's device is not an open ocean current device
Netherlands (KNMI (Royal Dutch Meteorological Institute))	TS	61	16	61	18	-	-	-	Feels too broad and generic for a technology that doesn't exist in hardware form, suggest delete	Better to have the comment included

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United States (U.S. Department of State)	TS	61	10	61	34	-	-	-	<p>For lines 10-34: replace the original and insert the following which includes minor editing/wordsmithing: removed. Wave energy devices constructed on the coast also face this challenge of reversibility (6.5.1). A key concern with tidal current technologies is that they have moving parts (e.g., rotor blades), which may strike marine life. To date there have been few studies of blade strike, but harm to marine life from such devices may be small due to slow rotational speeds (relative to escape abilities of the marine fauna) and the passive nature of the rotating device. Full-scale commercial deployments of open-ocean current electric generating systems could present certain environmental risks. These can be grouped into four broad categories: the physical environment (the ocean itself), benthic (ocean-bottom) plant and animal communities, pelagic marine life (in the water column), and commerce. None of these has been fully evaluated, since no prototype ocean current devices have yet been deployed (6.5.4.2). The principal environmental impacts of ocean energy thermal conversion (OTEC) plants will be the transfer of large volumes of deep, cold water (OTEC) to the surface (6.5.1). Other social and environmental impacts from OTEC include: entrainment and impingement of marine animals, chemical pollution (biocides, working fluid leaks, corrosion), structural effects (on artificial reef, nesting/migration), and social effects (6.5.5). Similarly, the principal environmental impact of osmotic power will be the mixing of freshwater and seawater at the power plant, which are likely to be built at large river mouths, with sufficient volumes of freshwater. However, the volume of mixed brackish water produced by osmotic power</p> <p>Line 27: plants will be considerably smaller than the natural mixing that occurs at river mouths (6.5.6). The social benefits of ocean energy are potentially high, rejuvenating shipping and fishing industries, supplying electricity and/or drinking water to remote communities at small-scale or utility-scale deployments with transmission grid connections to displace aging fossil fuel generation plants. Social benefits may be national ζ the creation of new industries and the redirection of resources from declining industries; regional ζ industry rejuvenation, developments of business clusters, and individual - new employment opportunities, training for new skills and development of new capabilities (6.5.1).</p>	Need to check that this is an improvement on existing text and adopt accordingly

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Netherlands (KNMI (Royal Dutch Meteorological Institute))	TS	61	28	61	34	-	-	-	Neglects to mention construction, deployment, environmental monitoring, some examples of jobs etc could be useful as well as the idea of direct, indirect and induced employment.	Will cover
Netherlands (KNMI (Royal Dutch Meteorological Institute))	TS	61	23	-	-	-	-	-	nesting/migration is a new concept, not in chapter 6.	Need to add in to Ch 6
chris campbell (Ocean Renewable Energy Group)	TS	61	30	-	-	-	-	-	not just ""aging""	Delete 'aging' and 'plant'
chris campbell (Ocean Renewable Energy Group)	TS	61	44	-	-	-	-	-	noyt totally convinced, in any case, just tidal or what about wave? Are we ever talking about power plant project size here??	Section deals with technology development, not project development
Netherlands (KNMI (Royal Dutch Meteorological Institute))	TS	61	44	-	-	-	-	-	ocean current rotors cannot really increase in size as they don't exist yet. Pedantic but good to be precise	Rotor 'designs'
chris campbell (Ocean Renewable Energy Group)	TS	61	28	-	-	-	-	-	of ocean energy"" DEVELOPMENT	Add in 'Development'
chris campbell (Ocean Renewable Energy Group)	TS	61	24	61	27	-	-	-	One sentence can do this	We have expanded this para
chris campbell (Ocean Renewable Energy Group)	TS	61	20	61	23	-	-	-	perhaps should be ""unlike other OE , OTEC wiil require more complex idustrial system with greeater reliance on chemicals etc etc	Ch 6 team disagrees with emphasis of chemical effects/ remove 'social' effects
United Kingdom (Department of Energy and Climate Change)	TS	61	20	61	23	-	-	-	Same 4 letters seem to be being used for two different acronyms in one sentence!	OTEC typo
Netherlands (KNMI (Royal Dutch Meteorological Institute))	TS	61	5	61	7	-	-	-	See comments from Chapter 6, this needs a more balanced literature review.	As above
Netherlands (KNMI (Royal Dutch Meteorological Institute))	TS	61	37	61	38	-	-	-	See comments on Chapter 6, deployment and intervention methodologies are also key and should probably be mentioned	This is included in following sentence
Netherlands (KNMI (Royal Dutch Meteorological Institute))	TS	61	33	-	-	-	-	-	See comments on chapter 6, don't believe that social benefits can be individual.	Change 'individual' to 'human' or 'personal'
Netherlands (KNMI (Royal Dutch Meteorological Institute))	TS	61	23	-	-	-	-	-	social effects is very broad, such as?	Reference deleted
Netherlands (KNMI (Royal Dutch Meteorological Institute))	TS	61	37	-	-	-	-	-	suggest delete 'development'	We have removed 'technology' from line 36
Netherlands (KNMI (Royal Dutch Meteorological Institute))	TS	61	22	-	-	-	-	-	suggest that it should read "OTEC may include"	Add 'may' include

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Netherlands (KNMI (Royal Dutch Meteorological Institute))	TS	61	8	-	-	-	-	-	The comment on Sihwa is a new claim that is not referenced or supported in chapter 6.	As above
United Kingdom (Department of Energy and Climate Change)	TS	61	24	61	27	-	-	-	The mixing is taking place in a different place hence there will be an impact	Need to add this into Ch 6 and TS
Netherlands (KNMI (Royal Dutch Meteorological Institute))	TS	61	28	61	30	-	-	-	these are new claims that are not referenced or supported in chapter 6.	Text will be rewritten but there are references in Ch 6
United Kingdom (Department of Energy and Climate Change)	TS	61	4	61	10	-	-	-	These comments don't come across as being made by an independent commentator	Need to tone down language and check detail with Sihwa Lake in Ch 6
Netherlands (KNMI (Royal Dutch Meteorological Institute))	TS	61	26	61	27	-	-	-	this is a new claim that is not referenced or supported in chapter 6.	Add this idea into Ch 6
United Kingdom (Department of Energy and Climate Change)	TS	61	28	61	34	-	-	-	This text is quite simply trite and simplistic	Need an introductory sentence to lighten tone
Netherlands (KNMI (Royal Dutch Meteorological Institute))	TS	61	44	-	-	-	-	-	Wave power is neglected here again.	Need to add sentence on wave technology
chris campbell (Ocean Renewable Energy Group)	TS	61	33	-	-	-	-	-	what does ""complementary"" distribution mean	Misplaced
chris campbell (Ocean Renewable Energy Group)	TS	61	11	-	-	-	-	-	Why not lead with sentence 2 and finish with something saying that until more experience is developed there is likely to be a focus on whether marine life will avoid contact	Ch 6 team prefer the original order
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	TS	62	8	62	12	-	-	-	Also efficient over-pumping, and coastally attached lagoons.	Add pumped storage to bullet 2
chris campbell (Ocean Renewable Energy Group)	TS	62	27	62	41	-	-	-	Authors, I encourage you to look at this again after you finalise the OE chapter - focus on the launch of learning for modular wave and tidal this decade - scope for rapid rate of change, contrast the others	Recognize difference of wave and tidal developments than other technologies; reject for lack of actual supporting data
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	TS	62	13	62	15	-	-	-	Could delete sentence to reduce length - pretty much a repeat of previous.	Not repetition
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	TS	62	39	62	41	-	-	-	Detailed costings of barrages and lagoons have been prepared as part of the 2009/10 Severn Tidal Feasibility study in the UK.	Need to look at these references and adopt comments
chris campbell (Ocean Renewable Energy Group)	TS	62	2	-	3	-	-	-	even in smaller sites? Are we ready to conclude this? I am not.	Sentence has been removed
Netherlands (KNMI (Royal Dutch Meteorological Institute))	TS	62	38	-	-	-	-	-	I think be clear that you mean for future generation. Reliable estimates for current prototypes are plentiful, with every developer.	Take text from 6.7.1

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Netherlands (KNMI (Royal Dutch Meteorological Institute))	TS	62	16	62	21	-	-	-	I think it is important to give discuss the relative focus on various technologies. It is not clear to the reader that relatively little research is happening on OTEC compared to say wave or tidal stream	Agree with comment; will incorporate into discussion of markets; see section Ch 6; section 6.4.1
Netherlands (KNMI (Royal Dutch Meteorological Institute))	TS	62	8	-	-	-	-	-	lost its meaning from chapter 6, should be lagoons? Please check	Replace 'offshore facilities' with 'tidal lagoons'
Oyvind Christophersen (Climate and Pollution Agency)	TS	62	32	-	-	-	-	-	Model tests and prototype data will give good indications on energy capture	As above
Finn Gunnar Nielsen (Statoil)	TS	62	32	-	-	-	-	-	Model tests and prototype data will give good indications on energy capture	Would be misleading to add this comment
United Kingdom (Department of Energy and Climate Change)	TS	62	5	62	6	-	-	-	Mostly low head - which the preceding hydro section seems to imply is an area of focus for innovation at present.	Add in 'low head' in bullet point 3; add in Ch 6 and cross-reference Ch 5
chris campbell (Ocean Renewable Energy Group)	TS	62	5	62	15	-	-	-	over emphasised given the rate of incremental improvement????	Typo in TS page
Netherlands (KNMI (Royal Dutch Meteorological Institute))	TS	62	13	62	15	-	-	-	see comment in chapter 6, suggest delete	Not repetition
Netherlands (KNMI (Royal Dutch Meteorological Institute))	TS	62	20	-	-	-	-	-	suggest change "production is being" to "production could be"	Need a reference to support; change to 'can be' and remove 'easily'
Netherlands (KNMI (Royal Dutch Meteorological Institute))	TS	62	22	-	-	-	-	-	suggest change "will mainly" to " is likely to"	Remove 'mainly'
Netherlands (KNMI (Royal Dutch Meteorological Institute))	TS	62	3	63	5	-	-	-	suggest delete, this is only one report and the numbers do not match with those given in chapter 6	Need to make numbers to tie costs with Ch 6 wave and tidal costs
Netherlands (KNMI (Royal Dutch Meteorological Institute))	TS	62	2	62	4	-	-	-	these are new claims that are not referenced or supported in chapter 6. suggest delete	Remove sentence on advantages of axial flow tidal devices; add sentence on bi-directional flow; remove reference to 6.6.2; check order of sentences to match Ch 6 text; add into Ch 6.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	TS	62	34	-	-	-	-	-	this is a new claim that is not referenced or supported in chapter 6.	Accepted and delete sentence from TS
chris campbell (Ocean Renewable Energy Group)	TS	63	6	-	-	-	-	-	Authors, I encourage you to look at this again after you finalise the OE chapter	Full correlation between TS and Ch 6
Susanne Kadner (Technical Support Unit)	TS	63	11	63	16	-	-	-	Ch 6: Which types of tidal power plants are these - barrage?	Not relevant as section will be rewritten

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Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	TS	63	3	63	5	-	-	-	Give date, seems optimistic.	Para has been deleted
Netherlands (KNMI (Royal Dutch Meteorological Institute))	TS	63	7	63	10	-	-	-	these are new claims that are not referenced or supported in chapter 6.	Invert sentences in section in TS; need to revisit distribution between Potential Deployment in TS to be consistent in Ch 6
Netherlands (KNMI (Royal Dutch Meteorological Institute))	TS	63	13	63	16	-	-	-	these are new claims that are not referenced or supported in chapter 6.	Not relevant as section will be rewritten
United Kingdom (Department of Energy and Climate Change)	TS	63	3	63	6	-	-	-	This 2006 report also contained equivalent figures for wave	Para has been deleted
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	TS	64	1	64	1	-	-	-	"...other..."? What is meant by "large"?	Not relevant as section will be rewritten
Richard Taylor (International Hydropower Association)	TS	64	-	64	-	-	-	-	Comment: A section on ""Key Messages and Policy Recommendations"" for ocean energy comparable to that for the bioenergy sub-section would be of great use.	Not relevant as section will be rewritten
United Kingdom (Department of Energy and Climate Change)	TS	64	9	64	15	-	-	-	Distance to grid connections may also be an issue	Not relevant as section will be rewritten
Jorge Martínez Chamorro (Agencia Canaria de Desarrollo Sostenible y Cambio Climático)	TS	64	9	64	22	-	-	-	Please, review the references to subchapter (6.8.4), line 15, and (6.8.5), line 22, because they dont exist in chapter 6.	Not relevant as section will be rewritten
United Kingdom (Department of Energy and Climate Change)	TS	64	5	64	6	-	-	-	resource in wales should read(Anglessey, Pembrokeshire, Severn Estuary)	Not relevant as section will be rewritten
Gerrit Hansen (TSU)	TS	64	9	-	19	-	-	-	sentence not clear	Not relevant as section will be rewritten

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Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table	Comments	Consideration by writing team
United States (U.S. Department of State)	TS	64	9	64	15	-	-	-	<p>There are many significant technological advances realized by the global offshore oil drilling and production industry that can be readily applied to OTEC. These advances and improved capabilities include:</p> <ul style="list-style-type: none"> - OTEC operating depths are well within the capabilities and experience of today's offshore industry - Today's computing capabilities allow for the development of analytic tools for modeling and prediction of complex coupled dynamic responses of the OTEC system and the environment - Proven materials and methods have resulted from the progression to deep water operations - Dynamic and static power cables developed and proven at OTEC compatible ratings (depths and voltages) - New Production Systems Including Spars and Tension Leg Platforms Have Been Developed for Deepwater in the Last 20 years - Mooring Ship Shaped Production Systems in Deepwater is now Common - Off-shore Testing facilities with depths of 40 m allow testing an OTEC System at a large scale (1:30). Such facilities are available in The Netherlands, Brazil and China. <p style="text-align: right;">These many advances can be directly applied to the advancement, demonstration and commercialization of OTEC.</p>	Not relevant as section will be rewritten
Netherlands (KNMI (Royal Dutch Meteorological Institute))	TS	64	1	64	22	-	-	-	these are all new claims/statements that are not referenced or supported in chapter 6.	Not relevant as section will be rewritten
Kyung-Jin Boo (Korea Energy Economics Institute)	TS	65	3	65	11	-	-	-	? Add some texts to explain the weaknesses or demerits of off-shore wind as compared to on-shore wind. (for example: non-uniformly distributed wind resources, difficulties of construction, long-distance transmission of electricity, and higher risk due to natural disasters such as typhoon, hurricane).	New text in the suggested location would not be appropriate. Moreover, the TS and full text already describe the challenges of offshore vis a vis cost, technical maturity, marine ecosystems, etc.
Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	TS	65	25	-	-	-	-	-	in the other RE sections, the economics are not considered when discussing the resource itself - lines 39-44 already account for economics	Accepted

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Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	TS	65	29	65	33	-	-	-	it is curious that while energy figures in other RE sections are depicted as some multiple of Wh, (even solar thermal!) wind energy uses J (correct, but maybe not practical to convey meaning to non-specialists)	We will insert TWh/y here in parentheses, as we do in the chapter itself, but also note that as per IPCC TSU agreements, we will remain focused on EJ as the primary unit, unless the TSU provides instructions otherwise. All chapters previously agreed to focus on EJ to ensure a level of standardization. As such, other chapters should be revised according to the early commitments.
Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	TS	65	27	-	-	-	-	-	maybe more cautiously, ""current electricity demand"", as the context is very long term	Accepted
China (China Meteorological Administration)	TS	65	3	65	22	-	-	-	Not only "on- or off-shore", wind energy can also be used at inland regions with rich wind resources.	We use on-shore wind to mean all aspects on on-land projects. This will be clarified in the glossary and otherwise.
John Twidell (AMSET Centre)	TS	65	4	-	-	-	-	-	now ..on a commercial scale, however, began in earnest only in the 1970s'. THIS IS IU JUST TO EARLY PIONEERS. Replace by ' ..on a commercial scale, became viable only in the 1970s with governmental support mechanisms and modern engineering techniques'.	Accepted
Finn Gunnar Nielsen (Statoil)	TS	65	20	-	-	-	-	-	replace ""..measures are required.."" by ""..measures are presently required..""	Accepted
Oyvind Christophersen (Climate and Pollution Agency)	TS	65	20	-	-	-	-	-	replace ""..measures are required.."" by ""..measures are presently required..""	Accepted
Oyvind Christophersen (Climate and Pollution Agency)	TS	65	29	65	38	-	-	-	The offshore wind resources are highly sensitive to assumptions of maximum distance from shore and maximum water depth. These limits are continuously changed. The assumptions made for the present estimates should therefore be stated.	We will note that the estimates are sensitive to such factors, but do not believe the TS is the place for details on the exact approaches used to estimate the resource
Finn Gunnar Nielsen (Statoil)	TS	65	29	65	38	-	-	-	The offshore wind resources are highly sensitive to assumptions of maximum distance from shore and maximum water depth. These limits are continuously changed. The assumptions made for the present estimates should therefore be stated.	We will note that the estimates are sensitive to such factors, but do not believe the TS is the place for details on the exact approaches used to estimate the resource

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United Kingdom (Department of Energy and Climate Change)	TS	65	29	65	33	-	-	-	The other sections seem to express this as TWh/year.	We will insert TWh/y here in parentheses, as we do in the chapter itself, but also note that as per IPCC TSU agreements, we will remain focused on EJ as the primary unit, unless the TSU provides instructions otherwise. All chapters previously agreed to focus on EJ to ensure a level of standardization. As such, other chapters should be revised according to the early commitments.
Oyvind Christophersen (Climate and Pollution Agency)	TS	66	2	65	4	-	-	-	Distribution of energy: this statement is valid for all renewables (as well as non-renewables)	True, but still an important statement in our view in that it then links to the next sentence.
Finn Gunnar Nielsen (Statoil)	TS	66	2	65	4	-	-	-	Distribution of energy: this statement is valid for all renewables (as well as non-renewables)	True, but still an important statement in our view in that it then links to the next sentence.
United Kingdom (Department of Energy and Climate Change)	TS	66	26	66	28	-	-	-	It is more accurate to say that current commercially available machines are 3-bladed upwind machines	Accepted
United Kingdom (Department of Energy and Climate Change)	TS	66	24	66	34	-	-	-	Worth noting that in the UK at least on shore capacity is often set by planning consents setting a maximum tip height and it is this that is one of the main caps onshore turbine capacity.	Siting issues are addressed elsewhere in Chapter 7 and, as noted by the reviewer, are of great importance to wind; details on the regulations of individual countries and their impact on wind technology, however, are not appropriate for the TS.
Oyvind Christophersen (Climate and Pollution Agency)	TS	66	-	-	-	-	TS 7.1	-	Does this figure add any essential information? May be omitted.	We will delete the old resource map, but we believe the new one should remain as a visual representation of the global nature of the wind resource.
Finn Gunnar Nielsen (Statoil)	TS	66	-	-	-	-	TS 7.1	-	Does this figure add any essential information? May be omitted.	We will delete the old resource map, but we believe the new one should remain as a visual representation of the global nature of the wind resource.

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Oyvind Christophersen (Climate and Pollution Agency)	TS	67	3	65	4	-	-	-	"..considerable interest exist" should be updated with more specific data, e.g. UK has ambitions of 25 GW installed offshore wind power within 2020.	Specific data on individual country-level targets are not appropriate for the TS, and are continuously being updated. Moreover, we are not aware of any global estimates of offshore wind "plans." As such, we prefer to leave this as a somewhat vague statement in the TS.
Finn Gunnar Nielsen (Statoil)	TS	67	3	65	4	-	-	-	"..considerable interest exist" should be updated with more specific data, e.g. UK has ambitions of 25 GW installed offshore wind power within 2020.	Specific data on individual country-level targets are not appropriate for the TS, and are continuously being updated. Moreover, we are not aware of any global estimates of offshore wind "plans." As such, we prefer to leave this as a somewhat vague statement in the TS.
Susanne Kadner (Technical Support Unit)	TS	67	20	-	-	-	-	-	Ch 7: Could this term "intrinsic inertial response" be explained?	Accepted
United States (U.S. Department of State)	TS	67	7	-	-	-	-	-	Change "controversial" to "controversies".	Accepted
John Twidell (AMSET Centre)	TS	67	19	67	20	-	-	-	now '...but no intrinsic inertial response'. EXPLAIN BRIEFLY, AS IS MEANS NOTHING. How about ' ..but no intrinsic dynamic damping, as with the response of large inertia thermal and hydro plant.'	Accepted
Netherlands (KNMI (Royal Dutch Meteorological Institute))	TS	67	5	67	6	-	-	-	Remove: "a potential reduction in long-distance, land-based transmission". See comment nr. 21 above. Add "land-based spatial constraints", this is also an important reason for interest in offshore wind development. See comment nr. 20 above.	The list of possible advantages already includes "mitigation of siting controversies," which we will broaden to say "land use and siting controversies associated with on-shore wind projects especially those located in populated areas." This addresses the land-based spatial constraints. We will retain the transmission motivation, as this is a key motivation at least in the US and China, if not in Europe, and is somewhat of a separate issue than land use concerns (e.g., it involves resource availability as well).
United Kingdom (Department of Energy and Climate Change)	TS	67	3	67	11	-	-	-	Worth noting that such machines are currently in development? - indeed some are being demonstrated at present	This level of detail is not needed in the TS in our view, given space constraints.
China (China Meteorological Administration)	TS	68	31	68	34	-	-	-	Add "in Europe and U.S.".	Accepted

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United Kingdom (Department of Energy and Climate Change)	TS	68	24	68	25	-	-	-	and direct subsidies!	Accepted
United Kingdom (Department of Energy and Climate Change)	TS	68	1	68	10	-	-	-	Getting a bit repetitious on rapid capacity growth by this point?	The data reported in this paragraph, including wind as a proportion of capacity additions and wind as a percentage of country load, are important metrics for understanding the scale of wind deployment on a regional basis, and we therefore believe that these data should be retained.
John Twidell (AMSET Centre)	TS	68	21	-	-	-	-	-	now'...compared to fossil-fuel generation options;...', ADD PHRASE '...compared to fossil-fuel generation options; failure to charge fossil-fuels for the full external costs of their pollution;...[otherwise the comparison with fossil-fuels is false]	It is not the domain of the wind chapter to address externalities in the comparison with fossil generation, and the text will be altered to avoid such comparisons.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	TS	68	28	68	29	-	-	-	Should read: "...increased so have concerns about the integration of this energy into electric systems."	Accepted
Oyvind Christophersen (Climate and Pollution Agency)	TS	68	27	71	22	-	-	-	Text may be shortened	The TS of chapter 7 is within the limits established by the IPCC, so no text shortening is necessary. Moreover, the issues covered in these two sections represent key issues in the use of wind energy that that chapter authors feel deserve full treatment in the TS.
Finn Gunnar Nielsen (Statoil)	TS	68	27	71	22	-	-	-	Text may be shortened	The TS of chapter 7 is within the limits established by the IPCC, so no text shortening is necessary. Moreover, the issues covered in these two sections represent key issues in the use of wind energy that that chapter authors feel deserve full treatment in the TS.

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Finn Gunnar Nielsen (Statoil)	TS	68	21	68	22	-	-	-	The problem of intermittency are common to many renewables (sun, wind, waves...). May be moved to a more general discussion on renewables.	The purpose of this section is to discuss barriers to wind deployment, and concerns about variability are prevalent and can reduce deployment. While the concerns are somewhat similar for solar, it would be inappropriate for the wind chapter to not discuss this barrier at some length, especially as much of the literature on renewable energy integration has so far focused exclusively on wind. Agreements between the integration chapter of the SRREN and the technology chapters have confirmed a split responsibility whereby the wind chapter addresses integration, but with a focus on technical issues, studies, and experiences with wind specifically.
Kyung-Jin Boo (Korea Energy Economics Institute)	TS	69	39	69	43	-	-	-	? Explain more in detail why whole sale electricity prices tend to decline as wind electricity penetration grows,	We cannot offer a detailed discussion of this in the TS, but we will add a small amount of text here, and then perhaps a sentence on this issue in the full chapter.
ICHIRO MAEDA (The Federation of Electric Power Companies of Japan)	TS	69	30	69	32	-	-	-	<comment> "Some of this generation capacity will ... away from "baseload" resources." should be deleted or more detail explanation is necessary. <reason> More explanation regarding detail environmental and economic analysis should be necessary to conclude conventional generation will shift towards peaking resources and away from baseload resources.	Some additional clarifying text will be offered, however, the existing literature is very clear on this point, and is referenced and described in the full report. Under an economically rational decision making framework, power systems will tend towards plants that operate less frequently.

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United Kingdom (Department of Energy and Climate Change)	TS	69	1	69	2	-	-	-	1. Plus the extent to which regional or national grids can trade with each other. 2. As get a wider geographical spread of machines become less exposed to the impact of local weather conditions	We will broaden the language somewhat here, but remain vague on the details given space constraints and because we list such solutions later in this TS section. But, we will try to make clear that additional penetration is not simply dependent on other technology solutions, but also institutional solutions as well. Later in the same section we already mention increased coordination and interconnection as one solution at higher penetration. For the earlier text referred to by the reviewer, we will simply change "additional flexibility options" to "additional technological and institutional options to increase flexibility and maintain..."
United Kingdom (Department of Energy and Climate Change)	TS	69	34	69	35	-	-	-	Can also add that the emergence of 'responsive demand' would also help	We entirely agree, and mention this on the following page as "demand side management, energy storage technologies, and..." That is the proper location to mention responsive demand. We will consider changing the verbiage from "demand side management" (which is sometimes used to mean energy efficiency) to "responsive demand" to clarify the point.
United Kingdom (Department of Energy and Climate Change)	TS	69	36	70	16	-	-	-	Integration is a key issue for wind, but in comparison to discussion in other sections this discussion may be too detailed for this level in the overall report. In this context one would have expected to see more discussion of things like the emergence of low wind speed machines, direct drive technology, and advances in blade design and manufacture in this section	We feel that the text is reasonably well balanced at present.

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John Twidell (AMSET Centre)	TS	69	34	-	-	-	-	-	REQUEST FOR EXPLANATION OF CAPACITY CREDIT. 'As more turbines and windfarms are connected across a country, so it becomes more likely that windpower will be operating; consequently windpower is included statistically as a contribution to 'firm capacity' and so less other plant margin capacity is needed. The reduction in capacity of conventional marginal capacity due to the wind turbines is defined as the capacity credit of windpower. For example, the maximum capacity credit for a UK wind capacity of ~30% of total national capacity, will be about 7 GW. Thus in calculating firm capacity for, say, 22 GW of installed wind power, the UK grid operators will add 7GW to the firm capacity of all other generators because of the windpower. Note that this is not zero as often implied by those opposed to windpower [reference J. W. Twidell, 2010, Wind Engineering, pp 335-350, see Appendix 'Backup for windpower'].	We will add some additional explanation of capacity credit, as also suggested by the TSU. We will also be more clear in the text that the growth in total capacity need includes the added capacity of wind. As such, we are not saying that wind has no capacity value, but only that it is relatively lower than an equivalent amount of energy from a baseload or peaking fossil resource. This will be clarified in the text.
China (China Meteorological Administration)	TS	70	17	70	22	-	-	-	"Impact of wind power farms on the local climate" should be added in this section.	On page 71, line 6, we will add text something as follows "Research is also underway on the potential impact of wind power plants on the local climate."
Kyung-Jin Boo (Korea Energy Economics Institute)	TS	70	8	70	16	-	-	-	? Add some texts to explain the impact on grid of 30% rise of the generation cost of wind energy	We are not certain what is meant by this comment. We report the cost of wind elsewhere in the TS, and here are simply saying that additional transmission and integration costs could add as much as 30% to that figure. That cost increase has no impact on the grid per se, though it would of course impact those who pay the cost of electricity supply.
ICHIRO MAEDA (The Federation of Electric Power Companies of Japan)	TS	70	5	70	7	-	-	-	<comment> "reliably" should be deleted. <reason> reliability criterion is different from one country to another. Percentage of wind integration is changed depends on the reliability criterion.	We will remove the term reliability, and replace it with successfully.

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ICHIRO MAEDA (The Federation of Electric Power Companies of Japan)	TS	70	28	70	29	-	-	-	<p><comment> Change from "will typically" to "may typically".</p> <p><reason> Even though in the short-run, wind is not always displace existing fossil plants due to reliability.</p>	A wind kWh must displace another kWh, and that kWh will typically come from an existing fossil plant in the short run. The existing language reflects this physical reality, and notes clearly that wind will typically "displace the OPERATIONS"; we do not state that wind will fully displace the CAPACITY of those plants. The current text is therefore factually accurate and need not be revised.
ICHIRO MAEDA (The Federation of Electric Power Companies of Japan)	TS	70	11	70	15	-	-	-	<p><comment> Insert "It should be noted that cost for transmission construction is different from national/regional circumstances." after this sentence.</p> <p><reason> Existing generation assets, their operation and flexibility, projected electricity demand, and resource availability are different from national/regional circumstances.</p>	We will add language indicating that most studies have so far focused on the US and Europe, and that regional characteristics can impact study findings.
Finn Gunnar Nielsen (Statoil)	TS	70	34	-	-	-	-	-	A table showing estimates of life cycle of CO2 emissions per kWh electricity for the various technologies would be very useful. Estimates may be found in e.g. Jacobsen, Mark Z. "Review of solutions to global warming, air pollution, and energy security", Energy & Environ. Sci. 2009, 2, 148 - 173	Though a fine and useful comment, it is not the place of the wind chapter to offer such a table. The sustainable development chapter or mitigation chapter would be the appropriate locations for such cross-technology comparisons.
Oyvind Christophersen (Climate and Pollution Agency)	TS	70	34	-	-	-	-	-	A table showing estimates of life cycle of CO2 emissions per kWh electricity for the various technologies would be very useful. Estimates may be found in e.g. Jacobsen, Mark Z. "Review of solutions to global warming, air pollution, and energy security", Energy & Environ. Sci. 2009, 2, 148 - 173	Though a fine and useful comment, it is not the place of the wind chapter to offer such a table. The sustainable development chapter or mitigation chapter would be the appropriate locations for such cross-technology comparisons.
China (China Meteorological Administration)	TS	70	12	70	15	-	-	-	Add "in Europe and U.S."	On page 71, line 6, we will add text something as follows "Research is also underway on the potential impact of wind power plants on the local climate."
China (China Meteorological Administration)	TS	70	10	70	11	-	-	-	Add "in Europe and U.S."	We will add language indicating that most studies have so far focused on the US and Europe, and that regional characteristics can impact study findings.

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Italy (Institute for Environmental Protection and Research (ISPRA))	TS	70	37	70	47	-	-	-	Add the following sentence in line 47 "However, the number of bird fatalities at wind power plants is orders of magnitude lower than other anthropogenic causes of bird deaths (e.g., vehicles, buildings and windows, transmission lines, communications towers, house cats, pollution and other contaminants) [7.6.2, quoting Erickson et al., 2005; NRC, 2007].	Accepted
United States (U.S. Department of State)	TS	70	42	70	46	-	-	-	It would be helpful to the reader if these fatality rates were to be placed within a broader context of other human-caused bird deaths, such as buildings, vehicles, power lines, cell phone towers, etc.	Accepted
Oyvind Christophersen (Climate and Pollution Agency)	TS	70	40	70	48	-	-	-	The importance of the fatality rates are hard to understand unless compared to other sources of fatality	Accepted
Finn Gunnar Nielsen (Statoil)	TS	70	40	70	48	-	-	-	The importance of the fatality rates are hard to understand unless compared to other sources of fatality	Accepted
United Kingdom (Department of Energy and Climate Change)	TS	70	47	70	48	-	-	-	Worth noting that developing wind farms in agricultural areas only removes a very small land area from productive use?	Though this issue is discussed in the full chapter, it is more closely associated with human impacts than with environmental impacts (though both are of importance). That said, human impacts come not so much from physical land use, but concerns about the visual impact of that use. As such, rather than adding more text to a TS that is already close to being too long, we choose to leave these issues for the full chapter.
ICHIRO MAEDA (The Federation of Electric Power Companies of Japan)	TS	71	1	71	3	-	-	-	<comment> "electromagnetic fields" should be delited. <reason> Effect of electromagnetic fields to living body is not proven.	Mentioned here are "potential negative impacts", and concerns over the potential impact of EM fields on marine wildlife have been raised. While the physical basis of these concerns may not be proven beyond all doubt, there any a number of studies that have identified negative impacts of EM fields and certain marine life. What is less clear is whether these impacts extend to the lower level of EM fields caused by wind plants and transmission associated with those plants, and further work in that area is underway.

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ICHIRO MAEDA (The Federation of Electric Power Companies of Japan)	TS	71	12	71	13	-	-	-	<p><comment> I recommend to change the description from "health" to "health (e.g. low-frequency sound)".</p> <p><reason> In Japan, the problem caused by low-frequency has become a widening issue and Japan's Ministry of Environment recently began to research.</p> <p><reference> Ministry of Environment, Japan; 2010/3/29 press release(Japanese only) http://www.env.go.jp/press/press.php?serial=12319 Yomiuri News; 2010/7/31 news(English) http://www.yomiuri.co.jp/dy/national/T100730005513.htm</p>	This level of detail is not needed in the TS in our view. In addition, the scientific literature on low frequency noise and wind turbines has not conclusively found any impact. Instead, most research seems to suggest that wind projects create noise-related annoyance, but not direct health impacts per se. Already mentioned are noise impacts, and we do not feel the literature is strong enough to suggest that low-frequency noise is of particular concern relative to noise alone.
Oyvind Christophersen (Climate and Pollution Agency)	TS	71	40	71	45	-	-	-	Add a statement on the importance of weight reduction of the turbines. Lighter turbines will significantly contribute to lighter towers and foundations as well as simpler installations. This will result in significant cost reductions, in particular for offshore wind power.	We will improve the language in section 7.7 of the full text; whether we are able to place that revised text into the TS remains to be seen, and will depend in part on space constraints.
Finn Gunnar Nielsen (Statoil)	TS	71	40	71	45	-	-	-	Add a statement on the importance of weight reduction of the turbines. Lighter turbines will significantly contribute to lighter towers and foundations as well as simpler installations. This will result in significant cost reductions, in particular for offshore wind power.	We will improve the language in section 7.7 of the full text; whether we are able to place that revised text into the TS remains to be seen, and will depend in part on space constraints.
Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	TS	71	17	-	-	-	-	-	and it can get worse as wind turbines grow in size	True, but the opposite is also true: smaller numbers of large turbines may be of lesser visual concern than larger numbers of smaller one. As such, we choose not to make a change here.
United Kingdom (Department of Energy and Climate Change)	TS	71	46	71	47	-	-	-	Noting that down-time and hence consequent loss is greater for onshore machines compared to onshore ones	Accepted
Kyung-Jin Boo (Korea Energy Economics Institute)	TS	72	7	-	-	-	-	-	? Add some texts to show a technological trend of new generation wind such as high altitude wind.	As mentioned at the beginning of the TS, high-altitude wind is treated somewhat lightly, but is addressed, in chapter 7. The TS does not have the space to cover this concept, as well as the several other emerging possible applications for wind energy that would also then rightly need to be discussed at some length..

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Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	TS	72	26	72	28	-	-	-	probably a redundant paragraph, informatin already conveyed in previous RE sections	Perhaps correct, but chapter 7 addresses all of these factors whereas, in the TS, we have only had the space to cover a subset. Listing the full set allows the reader to go to chapter 7 for additional detail on some factors not otherwise addressed in the TS.
France (MEEDDM (Ministry of Ecology, Energy, Sustainable Development and the Sea))	TS	72	22	-	-	-	-	-	The text says « policy measures are required to make wind energy economically attractive ». This is true ; however the cost of wind electricity is almost at the level of the market-price ; thus, in comparison, the policy measures needed to support wind energy are cheaper than poolicy measures needed to support other RE.	This may be true, but then requires very specific comparisons of the cost of wind relative to other low-carbon options, as well as to fossil options, and those comparisons are by IPCC-design, outside the scope of the wind chapter per se. Such comparisons are offered, to some degree, in other parts of the SRREN.
United Kingdom (Department of Energy and Climate Change)	TS	72	26	72	28	-	-	-	This is true but in recent years we have also seen significant price changes associated with variations in exchange rates and an imbalance between supply and demand	Absolutely, these have impacted installed costs, and these issues are specifically already addressed in the paragraph that follows.
Oyvind Christophersen (Climate and Pollution Agency)	TS	73	26	73	28	-	-	-	Is the cost referred to 2010 US\$? This fairly modest cost reduction seems to assume extrapolation of current technology. However, with the present innovation rate related to offshore solutions, one may expect significant (step) changes in technology which may alter these numbers. (The changes will come in: Special turbine designs for offshore application, cheaper, mass produced foundations, new and less weather sensitive installation procedures, new O&M vessels with higher efficiency and less weather restrictions)	Cost is in 2005\$, as agreed by SRREN authors; full IPCC chapter should be clear on this point. Chapter 7 authors reviewed the available literature, and developed % cost reductions based on that available literature. Were other literature available that suggested still-greater cost percentage reductions, that literature would also have been considered and used. As an IPCC report, only available literature can be used for such purposes, even if there is reason to believe that that literature may be conservative. We will however review the literature once more.

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Finn Gunnar Nielsen (Statoil)	TS	73	26	73	28	-	-	-	Is the cost referred to 2010 US\$? This fairly modest cost reduction seems to assume extrapolation of current technology. However, with the present innovation rate related to offshore solutions, one may expect significant (step) changes in technology which may alter these numbers. (The changes will come in: Special turbine designs for offshore application, cheaper, mass produced foundations, new and less weather sensitive installation procedures, new O&M vessels with higher efficiency and less weather restrictions)	Cost is in 2005\$, as agreed by SRREN authors; full IPCC chapter should be clear on this point. Chapter 7 authors reviewed the available literature, and developed % cost reductions based on that available literature. Were other literature available that suggested still-greater cost percentage reductions, that literature would also have been considered and used. As an IPCC report, only available literature can be used for such purposes, even if there is reason to believe that that literature may be conservative. We will, however, review the available literature one more time.
Taishi Sugiyama (Central Research Institute of Electric Power Industry (CRIEPI))	TS	73	-	-	-	-	TS 7.5	-	The double-sided arrows indicating European offshore should appear close to blue lines in the middle of diagram, instead of bottom of diagram.	Accepted
United Kingdom (Department of Energy and Climate Change)	TS	74	4	74	5	-	-	-	(In)consistency of units again?	IPCC SRREN authors agreed to focus on EJ. However, we will add TWh information in brackets as well.
Taishi Sugiyama (Central Research Institute of Electric Power Industry (CRIEPI))	TS	74	-	-	-	-	TS 7.6	-	This diagram is highly misleading. Remove the error bars and error boxes. This diagram misleads the readers that the box bars show the conclusion by the report and error bars are not important. However, the frequency of the reports are nothing to do with the probability. To avoid such confusion, just show the range by lines and shadows to show the range of reports, remove boxes and bars that look like probability range.	This figure was delivered to us by Chapter 10, and Chapter 7 does not control its design or formatting. If Chapter 10 delivers to us a revised Figure as per this comment, Chapter 7 will happily rely upon that updated figure as we are in some agreement with the comment that the present figure is somewhat misleading.

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ICHIRO MAEDA (The Federation of Electric Power Companies of Japan)	TS	75	21	75	22	-	-	-	<p><comment> This sentence should be displaced by one like "Increase of RE market share is one of the choices out of some countermeasures on supply side and demand side." <reason> There are some countermeasures other than RE integration for achieving GHG atmospheric concentration stabilisation as follows. 1. Supply side: "Promotion of nuclear power generation based on the premise safety assurance", "Further improvement of thermal efficiency of thermal power plants", "Clean coal technology, CO2 capture and storage technologies", and "Reduction of transmission and distribution loss."(related to page5 of SPM) 2. Demand side: "Electrification promotion, energy conservation and expansion of high efficiency electric equipment", "Utilization of untapped energy source", "Load leveling promotion such as heat pump & thermal storage systems", and "Facilitation of EVs or PHEVs installation."(related to page6 of SPM) <reference> The Federation of Electric Power Companies of Japan, http://www.fepc.or.jp/english/environment/global_warming/suppress_co2/index.html</p>	Accepted

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ICHIRO MAEDA (The Federation of Electric Power Companies of Japan)	TS	75	21	75	22	-	-	-	<p><comment> This sentence should be displaced by one like "Increase of RE market share is one of the choices out of some countermeasures on supply side and demand side." <reason> There are some countermeasures other than RE integration for achieving GHG atmospheric concentration stabilisation as follows. 1. Supply side: "Promotion of nuclear power generation based on the premise safety assurance", "Further improvement of thermal efficiency of thermal power plants", "Clean coal technology, CO2 capture and storage technologies", and "Reduction of transmission and distribution loss."(related to page5 of SPM) 2. Demand side: "Electrification promotion, energy conservation and expansion of high efficiency electric equipment", "Utilization of untapped energy source", "Load leveling promotion such as heat pump & thermal storage systems", and "Facilitation of EVs or PHEVs installation."(related to page6 of SPM) <reference> The Federation of Electric Power Companies of Japan, http://www.fepec.or.jp/english/environment/global_warming/suppress_co2/index.html</p>	Lines 20-25 to reflect the role of other low carbon technologies
Richard Taylor (International Hydropower Association)	TS	75	-	92	-	-	-	-	Comment: Hydropower plays a fundamental role for RES integration into electric power systems, as it is ideal for backing up, storing the energy of (pumped storage) and regulating the variable and base load RES. This section has missed this point.	Accepted
Taishi Sugiyama (Central Research Institute of Electric Power Industry (CRIEPI))	TS	75	21	75	25	-	-	-	Delete this paragraph - it is untrue. You can develop nuclear and CCS instead of RE. .	Accepted
Taishi Sugiyama (Central Research Institute of Electric Power Industry (CRIEPI))	TS	75	21	75	25	-	-	-	Delete this paragraph - it is untrue. You can develop nuclear and CCS instead of RE. .	Text revised
Australia (0)	TS	75	1	92	16	-	-	-	points that could be included here are: RE supply variability; storage or buffering technologies; grid design changes to enable RE e.g. smart grids; and high voltage/long distance transmission lines.	Accepted
Australia (0)	TS	75	1	92	16	-	-	-	points that could be included here are: RE supply variability; storage or buffering technologies; grid design changes to enable RE e.g. smart grids; and high voltage/long distance transmission lines.	Revised to de-emphasize electricity

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Italy (Institute for Environmental Protection and Research (ISPRA))	TS	75	15	75	19	-	-	-	The current text only emphasizes the role of electricity grids, whereas other integration options are not even mentioned. At the end of the text in line 19, add "In higher latitude countries, district heating networks can facilitate the use of low-cost, and/or low grade, RE heat sources, as well as of waste heat from CHP generation or industrial processes" [8.2.2]	Accepted
Italy (Institute for Environmental Protection and Research (ISPRA))	TS	75	15	75	19	-	-	-	The current text only emphasizes the role of electricity grids, whereas other integration options are not even mentioned. At the end of the text in line 19, add "In higher latitude countries, district heating networks can facilitate the use of low-cost, and/or low grade, RE heat sources, as well as of waste heat from CHP generation or industrial processes" [8.2.2]	Lines 20-25 revised to accomodate this comment
Australia (0)	TS	75	25	-	-	-	-	-	The projection of 3.0 EJ/yr would have more meaning to non technical person if present day level of deployment was provided in numeric terms.	Accepted
Australia (0)	TS	75	25	-	-	-	-	-	The projection of 3.0 EJ/yr would have more meaning to non technical person if present day level of deployment was provided in numeric terms.	Doubled from around 1.5 EJ so not needed
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	TS	77	21	77	23	-	-	-	<comment> Insert a phrase "; to what extent to be flexible has to be studied carefully based on customers' allowance and cost-effectiveness especially on demand side." after "flexible generation and demand." <reason> Some field tests of flexible demand have just begun in some specific areas, on the other hand, flexible generation is likely to be achieved by extension of pre-existing technologies. Then flexible demand should be mentioned together with the description of customers' allowance problem and unclear cost-effectiveness.	Accepted
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	TS	77	26	77	27	-	-	-	<comment> Insert a phrase "though the situation are greatly subject to geological and geographical conditions, and then it is not applicable in all cases." after "economically beneficial." <reason> High levels of wind penetration are economically disadvantageous in some areas where wind resource is highly limited and where wind resources are much far from demand.	Accepted
China (China Meteorological Administration)	TS	77	26	77	27	-	-	-	Add "in Europe and U.S.".	Accepted

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Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table	Comments	Consideration by writing team
Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	TS	77	-	80	-	-	-	-	although ""smart grids"" in general is mentioned, the relationship of flexible storage for RE needs and electric mobility should deserve a specific mention.	Accepted
Gerrit Hansen (TSU)	TS	77	18	-	-	-	-	-	categorization of small and RoR hydro as non-dispatchable is not justified. Please also reconcile with chapter 5	Accepted
Susanne Kadner (Technical Support Unit)	TS	77	19	77	21	-	-	-	Ch 8: How does this number compare to the 20% of low to medium levels of wind electricity penetration as given on page 68, lines 31-34? If above 30% is large, what happens between 20-30% integration of variable resources (see also page 79 line 27)?	Accepted
Kyung-Jin Boo (Korea Energy Economics Institute)	TS	77	8	-	-	-	-	-	It should be resolved what terminology to be used for unreliable characteristics of Res, variability or intermittency. Generally, intermittency is more popular in most literature. However, if variability is consistently used throughout the report, it's OK sticking to the original one, variability Other terminologies: filling station vs refueling station, transport sector vs transportation sector, rail vs railroad, In particular, conversion technology is generally used for fusion or integration purpose while it is sometimes used for transformation from primary energy into final energy (ex. conversion efficiency).	Accepted
United States (U.S. Department of State)	TS	77	16	77	25	-	-	-	It would be fair to note that, while solar (without storage) is not dispatchable "supply", it does have a high coincidence of peak supply with peak load in many regions. As a countervailing consideration, dispatchable "demand" can be an important contributor to achieving high penetration of variable renewables on the grid.	Accepted
Australia (0)	TS	77	16	77	19	-	-	-	The TS introduces the (non-) dispatchable concept. TS 7 page 7, line 17 addresses 'variability'. It would be useful to clarify whether these are same/different concepts and to align terminology.	Accepted
Taishi Sugiyama (Central Research Institute of Electric Power Industry (CRIEPI))	TS	77	8	77	15	-	-	-	The variability is very important and it should appear on SPM.	Accepted
Taishi Sugiyama (Central Research Institute of Electric Power Industry (CRIEPI))	TS	77	8	77	15	-	-	-	The variability is very important and it should appear on SPM.	Too detailed for SPM but variability covered in text
Taishi Sugiyama (Central Research Institute of Electric Power Industry (CRIEPI))	TS	77	-	-	-	-	TS 8.3	-	This diagram is very important and it should appear on SPM. Add nuclear and fossil fuel for comparison. Make distinction between the role of large hydro and small hydro.	Accepted
Kyung-Jin Boo (Korea Energy Economics Institute)	TS	78	41	88	13	-	-	-	? Which one is preferable, intelligent grid or smart grid? Smart grid is nowadays accepted as an officially appropriate terminology for it	Accepted

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Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table	Comments	Consideration by writing team
ICHIRO MAEDA (The Federation of Electric Power Companies of Japan)	TS	78	14	78	16	-	-	-	<p><comment> Change the description as follows; "The benefits of aggregation that this permits are obtained on condition that a strong network of transmission/distribution lines, electricity storage systems and/or back-up generation plants and a communication infrastructure that allows for the transfer of power and coordination throughout the network are achieved." <reason> -Preparation of electricity storage systems and/or back-up generation plants is essential for mass-introduction of RE, of which output fluctuation varies substantially. -The benefits of aggregation are not secured without the above situation is acquired.</p>	Accepted
ICHIRO MAEDA (The Federation of Electric Power Companies of Japan)	TS	78	16	78	18	-	-	-	<p><comment> Displace "voltage" for "frequency." <reason> Not voltage but frequency can be influenced by imbalance of supply and demand.</p>	Accepted
ICHIRO MAEDA (The Federation of Electric Power Companies of Japan)	TS	78	46	79	1	-	-	-	<p><comment> Insert "and the worsened capacity factor" between "power market" and "can be a constraint." <reason> When wind generators join regulation market, for instance, they have to reduce normal power output in order to offer up-direction regulation. It makes generation cost higher in addition to installation of equipment for ancillary service offering.</p>	Accepted
ICHIRO MAEDA (The Federation of Electric Power Companies of Japan)	TS	78	39	78	41	-	-	-	<p><comment> Please change from "new challenges that could be resolved by better controls, smart meters and intelligent grids" to "new challenges that are expected to be resolved by better controls, smart meters and intelligent grids, though it has not been completely confirmed and the cost-effectiveness has not been adequately justified by field tests so far." <reason> Some field tests have just begun to check the results of better control, smart meters and intelligent grids including their cost-effectiveness. Then it is too early to mention "could be resolved."</p>	Accepted
Taishi Sugiyama (Central Research Institute of Electric Power Industry (CRIEPI))	TS	78	45	78	46	-	-	-	It narrows slightly, but RE is intrinsically intermittent. Do not be over-optimistic.	Accepted

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Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table	Comments	Consideration by writing team
Kristie Ebi (Department of Global Ecology)	TS	78	42	78	47	-	-	-	One of the largest benefits of electrification is increasing access to safe water and improved sanitation.	Rejected.
ICHIRO MAEDA (The Federation of Electric Power Companies of Japan)	TS	79	24	79	26	-	-	-	<comment> Delete this sentence. <reason> Photovoltaic has much more output fluctuation. It can not generate after dark and output is highly dependent on weather.	Accepted
ICHIRO MAEDA (The Federation of Electric Power Companies of Japan)	TS	79	22	79	23	-	-	-	<comment> Displace "can help reduce impacts" for "are expected to help reduce impacts." <reason> Some field tests have just begun to check the results of better control, smart meters and intelligent grids including their cost-effectiveness. Then it is too early to mention "can help reduce impacts."	Accepted
Ichiro Maeda (Federation of Electric Power Companies, Japan)	TS	79	30	80	4	-	-	-	Add bullet point: economic burdens, such as solar energy costs exceeding market energy prices, resulting in unsustainable government subsidies. See file (Ch.2.III.1-2; Ch.4.II): SRREN_Draft2_Review_Maeda_Ichiro_VanErp091006GabrielCalzadaReport_02.pdf	Accepted
ICHIRO MAEDA (The Federation of Electric Power Companies of Japan)	TS	79	-	-	-	-	TS 8.4	-	<comment> Change the description from "Hydro/thermal efficiency" to "Energy conversion efficiency". <reason> I'm wondering why you don't refer to energy conversion efficiency of wind power at all. You should bear in mind that even REs have energy conversion losses.	Accepted
ICHIRO MAEDA (The Federation of Electric Power Companies of Japan)	TS	80	26	80	27	-	-	-	<comment> Delete "systematic and coherent institutional decision-making can facilitate the integration of high-levels of RE generation", or displaced by "systematic and coherent institutional decision-making is required for policy-making as for what are to be chosen out of many options to facilitate low-carbon society." <reason> The end of assessing effectiveness at high levels of RE penetration is not the facilitation of high-levels of RE generation but the decision-making as for whether high-levels of RE generation should be facilitated or not.	Accepted

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Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table	Comments	Consideration by writing team
ICHIRO MAEDA (The Federation of Electric Power Companies of Japan)	TS	80	14	80	15	-	-	-	<p><comment> Displace "as a response to" for "as responses simply to Time of Use rate or to variations in RE generation." <reason> Time of Use rate can contribute to time-shifting and requires less installation cost than responding to variations in RE generation. Time of Use rate might be enough to offset supply/demand imbalance due to surplus wind generation at night by shifting peak demand to night.</p>	Accepted
Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	TS	80	5	80	20	-	-	-	maybe the issues of long-range transportation (very high DC) and vector conversion (H2/electricity) could be mentioned also	Accepted
ICHIRO MAEDA (The Federation of Electric Power Companies of Japan)	TS	81	25	81	29	-	-	-	<p><comment> As a footnote, "In order to reduce the costs of integrating a high share of intermittent renewable energy into the grid, heat pumps with thermal storage can be helpful as a form of energy storage." should be mentioned. <reason> The function where heat pumps with thermal storage can help reduce the cost of integrating a high share of intermittent renewable energy into the grid is very important, which leads to the promotion of introduction of not only intermittent renewable energy like photovoltaic, wind and renewable energy like ambient air etc. <reference> -Energy Technology Perspective 2010(IEA, 2010.7)</p>	Accepted
ICHIRO MAEDA (The Federation of Electric Power Companies of Japan)	TS	81	25	81	29	-	-	-	<p><comment> As a footnote, "In order to reduce the costs of integrating a high share of intermittent renewable energy into the grid, heat pumps with thermal storage can be helpful as a form of energy storage." should be mentioned. <reason> The function where heat pumps with thermal storage can help reduce the cost of integrating a high share of intermittent renewable energy into the grid is very important, which leads to the promotion of introduction of not only intermittent renewable energy like photovoltaic, wind and renewable energy like ambient air etc. <reference> -Energy Technology Perspective 2010(IEA, 2010.7)</p>	The comment is already covered on lines 40-43 in the TS SOD
Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	TS	81	26	82	29	-	-	-	a mention could be made to the increasing urbanization rate, to continue in many regions the future, and how this facilitates DHC projects	Urbanisation is now mentioned in the the second to last paragraph

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Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table	Comments	Consideration by writing team
Susanne Kadner (Technical Support Unit)	TS	81	44	82	2	-	-	-	Ch 8: Unclear, please re-word.	Slightly simplified by removing reference to temperatures
Kyung-Jin Boo (Korea Energy Economics Institute)	TS	82	44	-	-	-	-	-	Or used in gas engines or turbines to produce heat and electricity ? or used in gas engines (or gas boilers) or turbines to produce heat and electricity	Text added: "(or gas boilers"
Kyung-Jin Boo (Korea Energy Economics Institute)	TS	83	24	-	-	-	-	-	? ---The construction of pure hydrogen pipeline would require different steels to reduce leakage ? -----require different materials for the lining of pipeline-----	See above
Klaus Bonhoff (NOW GmbH National Organization Hydrogen and Fuel Cell Technology)	TS	83	24	83	25	-	-	-	[...] while the construction of pure hydrogen pipelines becomes an option once larger quantities need to be distributed."" (leakage is not an issue)	"reduce leakage" changed to "avoid embrittlement"
Kyung-Jin Boo (Korea Energy Economics Institute)	TS	83	14	-	-	-	-	-	And additional products from the gas stream ? ----- from the gas flow.	Stream is correct terminology
Klaus Bonhoff (NOW GmbH National Organization Hydrogen and Fuel Cell Technology)	TS	83	27	-	-	-	-	-	Please add: ""Large scale storage of RE may however require hydrogen. Hydrogen will also be required in large volumes as a fuel in the transportation sector once the anticipated market introduction of fuel cell vehicles starts to ramp-up after 2015.""	There are no conclusive studies that show the H2 is the preferred option for RE storage. Please provide reference that prove otherwise.
Kyung-Jin Boo (Korea Energy Economics Institute)	TS	85	37	85	40	-	-	-	? Corresponding or respective year must be provided for the figures	Year 2007
Kyung-Jin Boo (Korea Energy Economics Institute)	TS	85	18	-	-	-	-	-	? Millions of LDVs ? Millions light duty vehicles (LDVs)	Could not find text on this line
Susanne Kadner (Technical Support Unit)	TS	85	37	85	38	-	-	-	Ch 8: per year?	See above
Susanne Kadner (Technical Support Unit)	TS	85	31	-	-	-	-	-	Ch 8: Should read Figure 8.2.1.	Counl not find the figure
Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	TS	85	32	85	35	-	-	-	this paragraph conveys little information, in fact could be left out of the text	Need this paragraph to introduce text below
ICHIRO MAEDA (The Federation of Electric Power Companies of Japan)	TS	86	-	-	-	-	TS 8.7	-	<comment>Need to check the detail in whole. <reason>For example,H2 is made with natural gas or coal, but is not made "with" nuclear, solar, wind etc.Electricity is also generated by oil thermal plants. As for connection between "Energy Carrier" and "Vehicle", we cannot understand why you separate to the use solid line and the dotted line.	Figure improved. Comments incorporated.

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Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table	Comments	Consideration by writing team
ICHIRO MAEDA (The Federation of Electric Power Companies of Japan)	TS	87	-	-	-	-	-	TS 8.1	<comment> Correct the following description: "Fuel cost per km competes, if biofuel price per unit energy ? gasoline price per unit energy." ("Biofuels" "Cost") <reason> ambiguity of expression	Table edited accordingly
ICHIRO MAEDA (The Federation of Electric Power Companies of Japan)	TS	87	-	-	-	-	-	TS 8.1	<comment> Delete "nuclear" written in the row of "Hydrogen" and the column of "Existing and potential primary resources". <reason> Hydrogen is not made "with" nuclear. DME (dimethyl ether) or high-temperature steam is material when nuclear energy is used for making hydrogen.	TSU has instructed to compare with other low carbon options
Oyvind Christophersen (Climate and Pollution Agency)	TS	88	17	88	18	-	-	-	Fundamentally, producing hydrogen from renewable electricity is costly because it has a low technical efficiency. It is unlikely that the efficiency of electrolysis + fuel cell can be improved enough to be competitive with alternative technologies. So fundamentally this is a technical issue and not just one of costs.	Technical Efficiency (or max. Theoretical efficiency) is not related to practical feasibility. If the costs are sufficiently low, it is quite conceivable to install these kind of systems
Klaus Bonhoff (NOW GmbH National Organization Hydrogen and Fuel Cell Technology)	TS	88	26	-	-	-	-	-	Please add. ""In Germany the initiative 'H2 Mobility' was set up by large motor and energy companies together with the Government in 2009 developing a business plan for the nationwide roll-out of hydrogen fillings stations starting 2015.""	New sentence added.
Klaus Bonhoff (NOW GmbH National Organization Hydrogen and Fuel Cell Technology)	TS	88	20	-	-	-	-	-	Please add: ""Hydrogen can also be produced directly from biomass.""	New sentence on bio-H2 added
United States (U.S. Department of State)	TS	88	17	-	-	-	-	-	Strike the word "near-term". Cost barriers for hydrogen are significant and do not evidence only near-term cost barriers.	"Near-term" deleted; Sentence specified to apply only to "electrolytic hydrogen"
Finland (Finnish Meteorological Institute)	TS	88	9	88	9	-	-	-	The lack of biomethane distribution networks is over-emphasized. Gaseous fuels are widely used in many countries, and the existing natural gas network can be utilised where available.	Sentence deleted.
ICHIRO MAEDA (The Federation of Electric Power Companies of Japan)	TS	89	17	89	19	-	-	-	<comment> Air source heat pumps and water source heat pumps should be added. <reason> Description should coincide with familiar rules' definition, for instance, EU DIRECTIVE. <reference> EU DIRECTIVE	"ground source" has been deleted so not to exclude other HP options

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Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table	Comments	Consideration by writing team
Susanne Kadner (Technical Support Unit)	TS	89	25	90	4	-	-	-	Ch 8: Issues are covered on a rather general level - is there not more specific information in the underlying chapter sections?	Correct, there is more detail in the chapter
Susanne Kadner (Technical Support Unit)	TS	89	40	-	-	-	-	-	Ch 8: please include section number in brackets [8.2.2.2]	Accepted
United States (U.S. Department of State)	TS	89	12	-	-	-	-	-	Need to clarify terms here. The U.S. used about 40 EJ of primary energy for buildings, so the value 116 EJ needs to be described in terms of primary, as well as in terms of delivered energy.	Discussion concerns final energy use
Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	TS	89	27	89	29	-	-	-	not clear for a non-expert: must be explained that fast penetration of RE can not rely on new buildings	Several chapter authors think it is clear
Gerrit Hansen (TSU)	TS	89	12	-	13	-	-	-	please reconcile figures with those portrayed in Fig. 8.2, resulting final energy demand does not coincide.	40+76=116 EJ
United States (U.S. Department of State)	TS	89	36	89	37	-	-	-	Question the use of the phrase "non-rational use." In some settings, behavior may be "non-rational" from one perspective, but absolutely necessary and, therefore, "rational" from another.	Replaced with "unsustainable"
Kyung-Jin Boo (Korea Energy Economics Institute)	TS	90	40	-	-	-	-	-	? Non-energy intensive industries ? Energy efficient industries (?)	Changed into "Other industries"
Susanne Kadner (Technical Support Unit)	TS	90	25	-	-	-	-	-	Ch 8: Remove bullet point before paragraph.	Accepted
ICHIRO MAEDA (The Federation of Electric Power Companies of Japan)	TS	91	43	91	45	-	-	-	<comment> You use the wording "enhance system reliability", but system reliability is not secured without the measures for overcoming the Challenges you mentioned page79 of 135 in Technical Summary. Unless you explain this point carefully, please delete "enhance system reliability". <reason> RE partly impose worse influences on system reliability than conventional generations due to the fact that some types of RE are intermittent or that failure may lead to many DC/AC converters tripping, followed by supply/demand imbalance .etc.	deleted
United States (U.S. Department of State)	TS	91	35	91	37	-	-	-	An objective assessment of RE prospects indicates that there remain significant technical and related economic and institutional barriers to large-scale deployment of RE. This sentence, asserting as worded that there are few, if any, technical limits to RE, does not reflect the tenor and scope of the discussions of the technology chapters.	Statement is correct. It concerns level of penetration in the long term
Susanne Kadner (Technical Support Unit)	TS	91	35	91	37	-	-	-	Ch 8: Is this really the case?	Yes, true for the long term
Susanne Kadner (Technical Support Unit)	TS	91	43	-	-	-	-	-	Ch 8: What are higher shares, what about the 20-30% limit given before?	Higher shares mean higher than present.Reference to 20-30% limit likely to be removed

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Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table	Comments	Consideration by writing team
Taishi Sugiyama (Central Research Institute of Electric Power Industry (CRIEPI))	TS	91	33	91	34	-	-	-	Delete this paragraph. 100% RE is very rare case and nothing to do with the future of global scale energy supply. It does not worth mentioning.	deleted
Japan (the Japanese Ministry of Foreign Affairs)	TS	91	15	-	17	-	-	-	In countries or regions that rely on greenhouses, agriculture can be a high-energy consuming sector.	Very specific case. NL may be one example
Finland (Finniah Meteorological Institute)	TS	91	14	91	31	-	-	-	The role of agriculture as producer of biomass should be considered also.	This issue is covered in Ch 2
United States (U.S. Department of State)	TS	91	34	91	35	-	-	-	While 100% RE may be achievable in some particular settings, it should not appear here as a sweeping generalization or major conclusion of this section of the report. The assertion is too strong, not reflective of a realistic world view of global civilization, and if left to stand, will be a focal point of criticism and detractors.	deleted
John Twidell (AMSET Centre)	TS	92	17	-	-	-	-	-	[Additional final paragraph suggested to put future developments into a perspective.] 'We must remember that present established energy supply systems are themselves relatively new in human history; internal combustion engines ~ 100 years, national grid electricity ~ 70 years; global oil industry ~ 60 years; global gas industry ~ 40 years: solid state electronic conditioning ~ 30 years. Moreover, within these periods, each technology is continuously changing. Therefore proposals that renewable energy systems can become prominent on a global scale within the next 20 to 30 years is thoroughly believable from historical precedent. The global potential of renewable energy resources is vaste, most of the technologies for harnessing these resources are already proven in the market place, with recognised benefits for energy security and pollution abatement, so the future prominence of renewables is also believable technically and economically.	Some text added
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	TS	101	13	101	16	-	-	-	<comment>Iinsert "partially" after "mature alternatives to non-renewable technologies". <reason>It is a little inapprpriate that "RE technologies" is equal to "alternatives to non-renewable technologies". You should weaken the expression. RE has a talent for environment safeguards. However, to deploy RE largely, it is necessary to pay enormous cost to stabilize power system on account of the fluctuation of output. When thinking about the whole energy supply, you should not only pay attention to environment safeguards, but also take energy security and economy into account at the same time. <reference>IEA World Energy Outlook 2009	text is already clear

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Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table	Comments	Consideration by writing team
United States (U.S. Department of State)	TS	101	27	-	31	-	-	-	Clarify the treatment of CO2, CO2-eq, and the inclusion or exclusion of other sources (e.g., non-CO2 greenhouse gases) of radiative forcing.	will be clarified
United States (U.S. Department of State)	TS	102	1	102	4	-	-	-	Figure TS 10.1 is not called out in the text.	cross reference error
Gerrit Hansen (TSU)	TS	102	10	-	32	-	-	-	statement on hydro cannot be justified, median levels of deployment in similar ranges as wind power (compare Fig. TS 10.2)	will be clarified
Taishi Sugiyama (Central Research Institute of Electric Power Industry (CRIEPI))	TS	102	-	-	-	-	TS 10.1	-	This diagram is highly misleading. Remove the error bars and error boxes. This diagram misleads the readers that the box bars show the conclusion by the report and error bars are not important. However, the frequency of the reports are nothing to do with the probability. To avoid such confusion, just show the range by lines and shadows to show the range of reports, remove boxes and bars that look like probability range.	authors disagree, error bar are a common tool to describe uncertainties, most of the other comments highlight that the composition of the figure is appropriate to deal with uncertainties
Taishi Sugiyama (Central Research Institute of Electric Power Industry (CRIEPI))	TS	103	-	-	-	-	TS 10.2	-	This diagram is highly misleading. Remove the error bars and error boxes. This diagram misleads the readers that the box bars show the conclusion by the report and error bars are not important. However, the frequency of the reports are nothing to do with the probability. To avoid such confusion, just show the range by lines and shadows to show the range of reports, remove boxes and bars that look like probability range.	authors disagree, error bar are a common tool to describe uncertainties, most of the other comments highlight that the composition of the figure is appropriate to deal with uncertainties
United States (U.S. Department of State)	TS	104	41	-	-	-	-	-	After the word "four", insert the word "mitigation". It is helpful to remind the reader that we are addressing mitigation scenarios.	they are not all mitigation scenarios
Gerrit Hansen (TSU)	TS	104	45	-	47	-	-	-	chapter 3 also reports on solar fuels	solar fuels are not include in these scenarios
United States (U.S. Department of State)	TS	104	36	104	38	-	-	-	Clarify or delete. Confusing. Does this imply that technical potentials are incorrect or meaningless?	text is clear enough from authors point of view
United States (U.S. Department of State)	TS	104	13	-	-	-	-	-	On line 13 before "nature", insert "geopolitical".	this issue will be addressed
Gerrit Hansen (TSU)	TS	104	35	-	36	-	-	-	which ReMind scenario is used?. Please also give clear sources.	will be clarified
Nico Bauer (Potsdam Institute for Climate Impact Research)	TS	104	9	104	12	-	-	-	Why not? As all these technologies are low carbon the boost to competitiveness is the same; the point is that it helps the not yet competitive ones to finally 'lift them over the edge' of competitiveness	paragraph will be rewritten
United States (U.S. Department of State)	TS	106	6	-	-	-	-	-	After the word "four", insert "mitigation".	they are not all mitigation scenarios
Susanne Kadner (Technical Support Unit)	TS	106	23	-	-	-	-	-	Ch 10: But not so in the Technical Summary.	will be rewritten
Susanne Kadner (Technical Support Unit)	TS	106	23	108	9	-	-	-	Ch 10: Native speaker should re-write these paragraphs as meaning is quite often not clear.	will be rewritten
Susanne Kadner (Technical Support Unit)	TS	106	23	106	26	-	-	-	Ch 10: Unclear, re-word.	has to be reworded

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Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table	Comments	Consideration by writing team
Kyung-Jin Boo (Korea Energy Economics Institute)	TS	107	2	107	37	-	-	-	? Terminology must be made consistent. Supply curves vs abatement curves, abatement cost curves.	will be rewritten
Susanne Kadner (Technical Support Unit)	TS	107	2	107	4	-	-	-	Ch 10: Unclear, re-word.	will be rewritten
United States (U.S. Department of State)	TS	107	30	-	-	-	-	-	Delete the word "in".	will be rewritten
United States (U.S. Department of State)	TS	107	46	108	3	-	-	-	Garbled sentence. Rewrite.	will be rewritten
Japan (the Japanese Ministry of Foreign Affairs)	TS	107	29	-	31	-	-	-	The sentence does not make sense.	will be rewritten
Taishi Sugiyama (Central Research Institute of Electric Power Industry (CRIEPI))	TS	109	-	-	-	-	TS 0.2	-	Add Japanese estimate here (SRREN_Draft2_Review_Sugiyama_Taishi_Material_12)	Noted.
ICHIRO MAEDA (The Federation of Electric Power Companies of Japan)	TS	114	6	114	8	-	-	-	<comment> Insert "partially" after "mature alternatives to fossil fuel technologies". <reason> It is a little inappropriate that "RE technologies" is equal to "alternatives to non-renewable technologies". You should weaken the expression. RE has a talent for environment safeguards. However, to deploy RE largely, it is necessary to pay enormous cost to stabilize power system on account of the fluctuation of output. When thinking about the whole energy supply, you should not only pay attention to environment safeguards, but also take energy security and economy into account at the same time. <reference>IEA World Energy Outlook 2009	text will be rewritten
ICHIRO MAEDA (The Federation of Electric Power Companies of Japan)	TS	114	36	114	37	-	-	-	<comment>Change from "are able to" to "might be able to". <reason> At the first sentence, you describe a generality about a correlation between technological innovations and expenses incurred, whereas, at the second sentence, you use the phrase "might be able to" which has lighter meaning than "be able to". As for a related part, you use the data about the recover of the upfront investment in Germany on page 115 and 116, but I think it is hard to prove the description by showing a certain area's data. Therefore, you should also weaken the expression at the first sentence, and check the senses between the both lines.	text is clear enough from authors point of view
Susanne Kadner (Technical Support Unit)	TS	114	5	114	8	-	-	-	Ch 10: On page 104 lines 9-10 it is stated that only wind and hydro are considered mature technologies in scenarios.	will be added on page 104

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Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table	Comments	Consideration by writing team
Bernd Rech (Helmholtz-Zentrum Berlin für Materialien und Energie GmbH)	TS	114	16	40	-	-	TS 10.6	-	This figure may be again misleading in case of PV. As discussed in comment No 4, the PV module prices have strongly declined in 2009 and are back on the learning curve for a cumulative capacity of 10000 GW. Certainly appropriate floor costs have to be considered, however, the PV example in Fig. 10.6 can be explained by an overheated market. As in comment 4 I strongly suggest to show/include recent data.	figure will be deleted
Taishi Sugiyama (Central Research Institute of Electric Power Industry (CRIEPI))	TS	114	-	-	-	-	TS 3.3	-	The "guide to the eye" line reminds me of notorious hockey stick diagram of so-called IPCC scandal. To me, the costs look saturating after 2000. I recommend you put two lines in the diagram to accommodate two different views - one line as it stands, and the other line which bends in 2000 and remains flat afterward up to 2008.	figure will be deleted
Jänicke Martin (Environmental Policy Research Centre)	TS	115	17	-	19	-	-	-	(...no global scenario is able to deliver the fossil fuel costs...a clear knowledge gap). This a very important argument! The German study should therefore be better explained.	text will be deleted due to lack of space
ICHIRO MAEDA (The Federation of Electric Power Companies of Japan)	TS	116	9	116	11	-	-	-	<comment>Add the sentence "(except for nuclear)" as below; "Most of the time RE sources have clearly lower external costs than non-RE (except for nuclear), even when assessed on a lifecycle basis <reason>External costs of nuclear is lower than PV as Fig10.6.3.	will be revised to be consistent with chapter 9
ICHIRO MAEDA (The Federation of Electric Power Companies of Japan)	TS	116	13	116	14	-	-	-	<comment>Delete "typically". Insert the sentence "However, also negative cost relevant effects can emerge. According to the results of some economic model studies, a forced increase of RE can raise the price level of energy and slightly slow economic growth in certain situations." <reason>In Chapter 10[page.6-89], the sentence which refers the same contents does not include the word "typically." And, the sentence above is quotation from Chapter 10[page.6-89]. It also need to be described in Technical Summary.	text will be revised

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Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table	Comments	Consideration by writing team
ICHIRO MAEDA (The Federation of Electric Power Companies of Japan)	TS	116	14	116	16	-	-	-	<p><comment>Amend as the sentence below; "The increase of RE may decrease for instance society's dependency on fluctuating prices and depleting resources of fossil fuels and it can improve the access to energy depending on the situation." <reason>First, as for "decreasing society's dependency on fluctuation prices", for example, in the case that FIT is introduced, if the method that the cost of electric power companies add to the electricity price, the larger the deployment of RE is advanced, the sharper the fluctuation prices are through a rise of electricity prices. Second, as for "depleting resources of fossil fuels", if RE generation's output decreases, the necessity of additional combustion of fossil fuels as one of the measures to stabilize power system can occur. At the end, as for "improving the access to energy", you must pay attention to a precondition that the measure of power system must be carried out.</p>	text will be revised
Jänicke Martin (Environmental Policy Research Centre)	TS	116	-	-	-	-	TS 10.8	-	Add the country (Germany)	figure will be deleted
ICHIRO MAEDA (The Federation of Electric Power Companies of Japan)	TS	117	43	118	1	-	-	-	<p><comment> Delete the word "clean" in the sentence below; "There is now clear evidence of success, on the local, regional and national levels, demonstrating that the right policies have a substantial impact on the uptake of RE and enhanced access to clean energy." <reason> "Clean energy" is not defined in this report, and not the all RE is clean or low-emitting.</p>	we should make sure to do this in Ch. 11 as well.
ICHIRO MAEDA (The Federation of Electric Power Companies of Japan)	TS	117	34	117	35	-	-	-	<p><comment> Amend "RE" to "society", as follows; "RE policies have a critical role to play in the transition to an energy future based on low-CO2 society." <reason> It is not only RE that an energy future based on low-CO2 consist of. <reference> IEA and NEA, Technology Roadmap - Nuclear Energy, 2010?David JC MacKay, Sustainable Energy - without the hot air, Cambridge, 2009?SPM P5L28</p>	will consider as we revise text. (note that other reviewers request use of "low/zero-GHG" rather than "low/zero-CO2")

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Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table	Comments	Consideration by writing team
STEPHANE POUFFARY (Energies 2050)	TS	117	40	118	29	-	-	-	Add few lines on the EU Climate Energy Package with the 3x20% objectives (20 % RES by 2020 at EU-27 level). This is a unique set of legislation with compulsory targets. This is also truth for the financing part with significant funds allocated through EU-funded programs (7th FP among others).	will consider as we revise text.
Susanne Kadner (Technical Support Unit)	TS	117	8	117	30	-	-	-	Ch 11: Key messages should be moved to end of Chapter 11 section in TS.	Accepted
Susanne Kadner (Technical Support Unit)	TS	117	35	-	-	-	-	-	Ch 11: No other chapter in SRREN has used term low-CO2 RE - needs clarification.	Accepted
Susanne Kadner (Technical Support Unit)	TS	117	40	118	29	-	-	-	Ch 11: Remove, text needs to follow structure of underlying chapter in the full report.	Accepted
Canada (Environment Canada)	TS	117	8	117	32	-	-	-	List of "key findings" at beginning of section is inconsistent with the format of other sections of the TS.	Accepted
Jänicke Martin (Environmental Policy Research Centre)	TS	117	16	-	-	-	-	-	Please add: "this can have a positive impact on the policy process, encouraging policymakers to introduce stricter targets".	will consider as we revise text.
United States (U.S. Department of State)	TS	117	43	118	1	-	-	-	The word "success" can have many meanings. Here it is narrowly defined. A less normative sentence might read, "evidence based on the uptake of RE indicates that local, regional, and national policies that are appropriately designed can have substantial impact on RE deployment."	we should make sure to do this in Ch. 11 as well.
Susanne Kadner (Technical Support Unit)	TS	117	-	135	-	Policy	-	-	Ch 11: All subheadings need to correspond to headings in underlying chapter in the full report!	Accepted
Seth Dunn (GE)	TS	117	-	135	-	Policy	-	-	See comment 2. I did not see a similar overview of RE policy criteria.	Accepted
ICHIRO MAEDA (The Federation of Electric Power Companies of Japan)	TS	118	24	118	25	-	-	-	<comment> Add the sentence "as well as nuclear," as below; "The RE growth seen to date must be accelerated on a global scale for RE to play a major role in mitigating climate change as well as nuclear." <reason> An energy future based on low-CO2 consist of not only RE but also nuclear and so on. <reference> IEA and NEA, Technology Roadmap - Nuclear Energy, 2010?David JC MacKay, Sustainable Energy - without the hot air, Cambridge, 2009?SPM P5L28	The chapter looks at RE specific policies and the proposed sentence does not make sense.
Susanne Kadner (Technical Support Unit)	TS	118	35	-	-	-	-	-	Ch 11: Terminology odd - use 'deployment' instead of 'implementation' (policies are implemented)	Accepted

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Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table	Comments	Consideration by writing team
Susanne Kadner (Technical Support Unit)	TS	118	26	118	29	-	-	-	Ch 11: Terminology odd - use 'deployment' instead of 'implementation' (policies are implemented); also, check Chapter 8.2.2 regarding growth of renewable heating and cooling!!	Accepted
United States (U.S. Department of State)	TS	118	23	-	-	-	-	-	Clarify the meaning of, or drop altogether, the phrase "structural shift". To most economists, this phrase refers to the changing composition of macro-economic activity. It appears to be used here as an over-dramatization of the point that technologies will change over time.	Accepted
United States (U.S. Department of State)	TS	118	33	-	-	-	-	-	Delete "almost entirely".	Accepted
United States (U.S. Department of State)	TS	118	36	-	-	-	-	-	Delete "by a rapid".	Accepted
United States (U.S. Department of State)	TS	118	4	118	5	-	-	-	Delete sentence starting with "Simply". The distinction between effective policies and supporting mechanisms is not clear.	Accepted
United States (U.S. Department of State)	TS	118	37	118	38	-	-	-	Delete the last sentence.	Accepted
United States (U.S. Department of State)	TS	118	28	-	-	-	-	-	Delete the word "enormous". The text of this chapter suffers from pervasive hyperbole and use of normative terms. Unless changed, it will not advance the cause of RE, but serve only to undermine the credibility of the IPCC.	Accepted
United States (U.S. Department of State)	TS	118	32	-	-	-	-	-	Delete the word "rapidly".	Accepted
United States (U.S. Department of State)	TS	118	1	118	2	-	-	-	Give examples of communities and regions that have made a transition to 100% RE. Delete the word "quite".	Accepted
United States (U.S. Department of State)	TS	118	8	-	-	-	-	-	Insert after "long-term" the word "policy".	Accepted
United States (U.S. Department of State)	TS	118	6	-	-	-	-	-	Replace the word "required" with "effective".	Accepted
United States (U.S. Department of State)	TS	118	24	-	-	-	-	-	Why selectively call out only "energy efficiency" when there are advantageous synergies with many non-RE technologies and policy approaches? Its exclusivity here suggests bias.	refer to chapter 1 which will discuss synergies between energy efficiency and RE
STEPHANE POUFFARY (Energies 2050)	TS	122	21	-	-	-	-	-	Change ""2005-early 20106"" by ""2005-early 2010""	Accepted
United States (U.S. Department of State)	TS	122	2	-	-	-	-	-	Delete "rapid".	Accepted
Taishi Sugiyama (Central Research Institute of Electric Power Industry (CRIEPI))	TS	123	-	-	-	-	TS 11.2	-	Include large hydro.	We have been unable to obtain data for large hydro but will keep trying

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Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table	Comments	Consideration by writing team
Rainer Walz (Fraunhofer Systems and Innovation Research)	TS	124	33	124	33	-	-	-	add year of publication for Moore and Wüstenhagen (2004); see also comment to chapter 11	Accepted
ICHIRO MAEDA (The Federation of Electric Power Companies of Japan)	TS	125	21	125	-	-	-	-	<comment> Delete the sentence below; "Improving security of energy supply and use." <reason> While RE might be key drivers in some countries, this should not be generalized world-wide. The advantages of RE vary depending on countries. In addition, advance of RE requires significant time and cost to maintain the operational back-up generation plants. <reference> ?FrondeI, Manuel (at.al), 2009, 'Economic Impacts from the Promotion of Renewable Energy Technologies - The German Experience' in Ruhr Economic Paper, no.156 (November 2009)???? http://www.rwi-essen.de/media/content/pages/publikationen/ruhr-economic-papers/REP_09_156.pdf	Accepted
Susanne Kadner (Technical Support Unit)	TS	125	33	-	-	-	-	-	Ch 11: The following aspects are not barriers to putting RE policies into place but rather barriers to deploying RE.	We need to be sure that 11.4 is consistent with these changes made in TS.
United States (U.S. Department of State)	TS	125	29	-	-	-	-	-	Delete "failures and". If it is desired to introduce the word "failures" then a discussion of market failures, distinct from non-technical barriers, needs to be developed and introduced here.	Accepted
United States (U.S. Department of State)	TS	125	33	-	-	-	-	-	Delete last hanging phrase beginning with the word "barriers".	Accepted
United States (U.S. Department of State)	TS	125	26	126	26	-	-	-	Is the "high cost" of RE regarded as a barrier to some RE? If so, it needs to be introduced explicitly. Many of the policies and measures advancing certain forms of RE are designed as remedies to address the "high cost" issue.	Catherine - also worthy of brief discussion for ch. 11?
Seth Dunn (GE)	TS	125	23	-	-	-	-	-	Job creation and economic development deserve to be a separate driver.	Accepted
United States (U.S. Department of State)	TS	125	40	126	11	-	-	-	Rewrite discussion of socio-cultural barriers. Existing text is unclear and confusing.	Accepted
ICHIRO MAEDA (The Federation of Electric Power Companies of Japan)	TS	126	13	-	-	-	-	-	<comment> Delete the sentence below; "Most energy systems worldwide are still fossil fuel based." <reason> This sentence does not fit in this context.	Accepted

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Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table	Comments	Consideration by writing team
ICHIRO MAEDA (The Federation of Electric Power Companies of Japan)	TS	126	16	126	19	-	-	-	<p><comment> Delete the sentence below; "The external costs and risks of non-sustainable options continue to be insufficiently recognized, identified, quantified and incorporated." <reason> RE requires high maintenance costs over existing grids. In addition, "The external costs and risks of non-sustainable options continue to be insufficiently recognized, identified, quantified and incorporated." is too abstract.</p>	will consider as we revise text.
United States (U.S. Department of State)	TS	126	37	-	-	-	-	-	Delete "in technological and structural transition". See earlier comments on structural change. To most economists, this phrase implies changing composition of macro-economic activity.	Accepted
United States (U.S. Department of State)	TS	126	14	126	15	-	-	-	Delete end of sentence discussing "locks in" and "locks out".	will consider as we revise text.
United States (U.S. Department of State)	TS	126	17	-	-	-	-	-	Substitute "non-RE" for "non-sustainable". See earlier comments on Brundtland definition of sustainable development. It is important not to imply that non-RE technologies cannot meet the Brundtland test of sustainable development.	Accepted
United States (U.S. Department of State)	TS	126	16	126	19	-	-	-	This discussion is too generalized. It should distinguish, for example, between developed and developing country situations. For many of the developed countries, serious environmental regulation and enforcement has internalized the more significant non-GHG external costs of non-RE conventional technologies.	This might be worth brief discussion for ch. 11 more broadly?
Switzerland (Swiss Federal Office for the Environment)	TS	127	23	-	-	-	-	-	Add sentence ""Carbon market mechanisms such as project-based offsets and emissions trading also require regulation"".	Accepted
Axel Michaelowa (University of Zurich)	TS	127	23	127	23	-	-	-	Add sentence "Carbon market mechanisms such as project-based offsets and emissions trading also require regulation".	Accepted
Susanne Kadner (Technical Support Unit)	TS	127	17	127	28	-	-	-	Ch 11: No need to repeat info covered in Table 11.1. Reference to table is sufficient.	Accepted
Jänicke Martin (Environmental Policy Research Centre)	TS	127	41	-	-	-	-	-	Please add after "improvement": "This inter-linked and dynamic process of innovation and market development can stimulate also the policy process, encouraging policymakers to introduce stricter targets".	will consider as we revise text.
Axel Michaelowa (University of Zurich)	TS	127	3	127	6	-	-	-	Rephrase "These costs ... generated" as follows "Despite having been criticized for its high transaction cost, the CDM has mobilised a large number of small-scale renewable energy projects. According to the Riso CDM pipeline, over 800 renewable energy projects - i.e. 35% of all registered projects under the CDM - had an installed capacity of less than 20 MW."	Accepted

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Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table	Comments	Consideration by writing team
Rainer Walz (Fraunhofer Systems and Innovation Research)	TS	127	31	127	43	-	-	-	the relation between technology push and demand pull policies and resulting virtuous cycles is much more complex. It requires a functioning systems of innovation for renewable energies. There has been specific work how virtuous but also vicious cycles can be started, based on a functions of innovation system approach (see comments to chapter 11).	Accepted
Seth Dunn (GE)	TS	128	22	-	-	-	-	-	See comment 2. How do these relate to the criteria laid out in the SPM?	Accepted
Rainer Walz (Fraunhofer Systems and Innovation Research)	TS	129	28	129	41	-	-	-	this section is very weak, and does not account for the vast string of literature dealing with a systems of innovation perspective for renewable energy. The technical summary should reflect the complexity of the task, and the systemic nature of the underlying processes. see comments to chapter 11.	Accepted
Rainer Walz (Fraunhofer Systems and Innovation Research)	TS	129	28	129	41	-	-	-	This section remains very vague with regard to the policy options; improving the communication between the actors (e.g. between suppliers of renewable technologies, users, and research institutions) and enlarging networks should be added. Furthermore, in order to prevent a one sided identification of technology development with R&D funding, the wording should stronger emphasize that deployment policies are also "demand side oriented innovation policies".	Accepted
ICHIRO MAEDA (The Federation of Electric Power Companies of Japan)	TS	130	37	-	-	-	-	-	<comment> Add the sentence below; "although these elements have also negative aspects such as maintenance costs over existing grids." <reason> Implementation of RE requires high maintenance costs over existing grids. In addition the equality between RE and other types of generation should be taken into consideration. Include this. <reference> Frondel, Manuel (at.al), 2009, 'Economic Impacts from the Promotion of Renewable Energy Technologies - The German Experience' in Ruhr Economic Paper, no.156 (November 2009) http://www.rwi-essen.de/media/content/pages/publikationen/ruhr-economic-papers/REP_09_156.pdf	Accepted
ICHIRO MAEDA (The Federation of Electric Power Companies of Japan)	TS	130	28	131	28	-	-	-	<comment> Add the sentence below; "Immoderate political promoting causes rising energy cost, undesirable influences in the market, increasing load on the grid...etc"	will consider as we revise text.

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Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table	Comments	Consideration by writing team
ICHIRO MAEDA (The Federation of Electric Power Companies of Japan)	TS	130	39	-	-	-	-	-	<p><comment> Delete "Priority dispatch and access." <reason> Whether priority access is applied for RE or not should be judged by each authority taking into consideration the equality between RE and other types of generation. What is more, priority access can not solve any operational issues, meanwhile, others could do it.?</p>	The literature notes that FITs have included this thus far.
ICHIRO MAEDA (The Federation of Electric Power Companies of Japan)	TS	130	44	-	-	-	-	-	<p><comment> Delete the sentence below; "Provide tariffs for all potential generators, including utilities." <reason> Implementation of RE requires high maintenance costs over existing grids. In addition the equality between RE and other types of generation should be taken into consideration. <reference> ?Fronde, Manuel (at.al), 2009, 'Economic Impacts from the Promotion of Renewable Energy Technologies - The German Experience' in Ruhr Economic Paper, no.156 (November 2009) http://www.bmu.de/english/current_press_releases/pm/46008.php ???</p>	Accepted
ICHIRO MAEDA (The Federation of Electric Power Companies of Japan)	TS	130	12	-	-	-	-	-	<p><comment> Delete the word "clean" in the sentence below; "RE enhances access to reliable, affordable clean energy to meet basic needs, especially through small scale decentralized systems renewable, and it allows for industries, production and transport to leapfrog and avoid dependence on fossil fuels." <reason> "Clean energy" is not defined in this report, and not the all RE is clean or low-emitting.</p>	Accepted
United States (U.S. Department of State)	TS	130	1	130	27	-	-	-	Section on "Developing Country Off-Grid and Rural Issues" is weak and incomplete, even for a summary. Rewrite.	Accepted
Keigo Akimoto (Research Institute of Innovative Technology for the Earth (RITE))	TS	130	29	131	28	-	-	-	The sentences evaluate policies relating RE and use the word of ""successful"" etc. The criteria of ""success"" may be large increase in RE installation in the sentences. However, many trade-offs exist under installed policies. For example, electricity prices in most of countries where installed FIT increase. Evaluations of policies should be carefully described considering many trade-offs. The sentences should be carefully modified.	Accepted

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Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table	Comments	Consideration by writing team
ICHIRO MAEDA (The Federation of Electric Power Companies of Japan)	TS	131	22	131	28	-	-	-	<comment> Add the item below; Establish affordable quota considering load to grid. <reason> necessary element	Not one of the details in most successful quota systems.
ICHIRO MAEDA (The Federation of Electric Power Companies of Japan)	TS	131	2	-	-	-	-	-	<comment> Amend "the rate" to "the rates of all energies.", as follows; "Ensure that costs are integrated into the rates of all energies" <reason> Implementation of RE requires high maintenance costs over existing grids. In addition the equality between RE and other types of generation should be taken into consideration. <reference> FrondeI, Manuel (at.al), 2009, 'Economic Impacts from the Promotion of Renewable Energy Technologies - The German Experience' in Ruhr Economic Paper, no.156 (November 2009) http://www.bmu.de/english/current_press_releases/pm/46008.php??	No examples of this in the literature.
ICHIRO MAEDA (The Federation of Electric Power Companies of Japan)	TS	131	1	-	-	-	-	-	<comment> Delete the sentence below; "Guarantee tariffs for long enough time period to ensure adequate rate of return." <reason> Implementation of RE requires high maintenance costs over existing grids. In addition the equality between RE and other types of generation should be taken into consideration. <reference> FrondeI, Manuel (at.al), 2009, 'Economic Impacts from the Promotion of Renewable Energy Technologies - The German Experience' in Ruhr Economic Paper, no.156 (November 2009) http://www.bmu.de/english/current_press_releases/pm/46008.php	critical aspect of FITs.
Seth Dunn (GE)	TS	131	26	-	-	-	-	-	Interim or near-term targets are also critical (in addition to a long-term) target, to encourage early action and learning.	Accepted
Susanne Kadner (Technical Support Unit)	TS	133	3	-	-	-	-	-	Ch 11: Isn't biofuel a fossil fuel substitute?	Accepted

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ICHIRO MAEDA (The Federation of Electric Power Companies of Japan)	TS	134	10	-	-	-	-	-	<p><comment> Change from "successful experiences" to "successful aspect of experiences".</p> <p><reason> ?The deployment of RE doesn't only involve a good aspect, but also a bad one such as the increase of national cost. Therefore, it is not always appropriate to assess as "success" generally based on only a good aspect at present.</p> <p><reference> Frondel, Manuel (at.al), 2009, 'Economic Impacts from the Promotion of Renewable Energy Technologies - The German Experience' in Ruhr Economic Paper, no.156 (November 2009) http://www.bmu.de/english/current_press_releases/pm/46008.php</p>	Accepted
ICHIRO MAEDA (The Federation of Electric Power Companies of Japan)	TS	134	22	-	-	-	-	-	<p><comment> Add the sentence "as well as nuclear" as below; "A shift from the current energy system to one that includes a high proportion of RE as well as nuclear"</p> <p><reason> An energy future based on low-CO2 consist of not only RE but also nuclear and so on.</p> <p><reference> ?IEA and NEA, Technology Roadmap - Nuclear Energy, 2010?David JC MacKay, Sustainable Energy - without the hot air, Cambridge, 2009</p>	will revise text
Susanne Kadner (Technical Support Unit)	TS	134	13	134	18	-	-	-	Ch 11: Very general - what exact information can a policy maker take away from such a statement? Please be more specific!	Accepted
Rainer Walz (Fraunhofer Systems and Innovation Research)	TS	134	4	134	18	-	TS 11.4	-	The reviewer agrees with the message that it is important how the specific policies are embedded in a wider setting. However, drawing on the relevant literature from innovation research would give the argument more credit and could explain what the authors mean with evolutionary processes. (see comments on chapter 11)	Accepted

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Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table	Comments	Consideration by writing team
ICHIRO MAEDA (The Federation of Electric Power Companies of Japan)	TS	135	22	-	-	-	-	-	<comment> Add the sentence "as well as nuclear and energy use" as below; "Governments are required to orchestrate the deliberate move from fossil fuels to RE use as well as nuclear and energy use." <reason> ?An energy future based on low-CO2 consist of not only RE but also nuclear and so on. <reference> ?IEA and NEA, Technology Roadmap - Nuclear Energy, 2010?David JC MacKay, Sustainable Energy - without the hot air, Cambridge, 2009	will revise text
ICHIRO MAEDA (The Federation of Electric Power Companies of Japan)	TS	135	27	-	-	-	-	-	<comment> Add the sentence "as well as nuclear" as below; "RE Policies, the enabling environment and more structural shifts are all on a continuum towards a transition to an energy system as well as nuclear" <reason> ?An energy future based on low-CO2 consist of not only RE but also nuclear and so on. <reference> ?IEA and NEA, Technology Roadmap - Nuclear Energy, 2010?David JC MacKay, Sustainable Energy - without the hot air, Cambridge, 2009	Accepted
ICHIRO MAEDA (The Federation of Electric Power Companies of Japan)	TS	135	7	135	9	-	-	-	<comment> Amend the sentence as follows; [original] "Further RE is trying to integrate into a system (including policies, regulations and infrastructure) that was built to suit fossil fuels (which have a number of continuing useful qualities such as energy density and portability) and nuclear power." [propos?? amendment] "Further RE is trying to integrate into a system (including policies, regulations and infrastructure) that was built to suit stable and controllable power sources." <reason> REs, just as Hydropower or Geothermal were also taken into account to build the existing system.	value-laden language
ICHIRO MAEDA (The Federation of Electric Power Companies of Japan)	TS	135	9	135	10	-	-	-	<comment> Delete the sentence below; "While RE provides different benefits, services are similar." <reason> This sentence is totally unnecessary and does not fit in this context.	Accepted

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Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table	Comments	Consideration by writing team
ICHIRO MAEDA (The Federation of Electric Power Companies of Japan)	TS	135	21	135	22	-	-	-	<comment> Amend "RE" to "low-carbon energy" [original] "Governments are required to orchestrate the deliberate move from fossil fuels to RE use." [proposed amendment] "Governments are required to orchestrate the deliberate move from fossil fuels to low-carbon energy use." <reason> RE is not the only way to realizing low-carbon society.	Accepted
United States (U.S. Department of State)	TS	135	19	130	38	-	-	-	Section on "Choices and Implications" is unclear, seemingly incomplete and lacking purpose. It adds nothing to the section, or the TS. Delete the entire section.	will revise text
Jänicke Martin (Environmental Policy Research Centre)	TS	135	30	-	31	-	-	-	This should be deleted: If "optimism" makes sense as a category (I am doubtful): there are hundreds of reasons for being technologically optimistic. Isn't this the message of SRREN? How effective would be a policy approach which is characterised by behavioural optimism?	Accepted
Seth Dunn (GE)	TS	135	32	-	36	-	-	-	Unclear; are these determinants of policy success?	Accepted
John Twidell (AMSET Centre)	TS	-	-	-	-	-	-	TS 1	This table, as with much other information in this section, repeats table SPM4 of the Policy Summary. Shorten the Technical Summary by omitting the table itself here. Why have it in both Summaries? The same comment refers to many of the other tables and text.	Table has been removed from TS text in FD.
Susanne Kadner (Technical Support Unit)	TS	-	-	-	-	-	-	TS 1.1	Ch 1: Range of estimates (low-high) are given for which year? 2020 - 2030 - 2050?	Table has been removed from TS text in FD.
United States (U.S. Department of State)	TS	-	-	-	-	-	-	TS 1.1	First column, fifth row: Replace "BAU Primary Energy" with: "Business-as-Usual Primary Energy Demand"	Table replaced with figure in SRREN FD.
United States (U.S. Department of State)	TS	-	-	-	-	-	-	TS 1.1	In this Table, its footnotes, or its accompanying text, define what is meant by "Technical Potential" and explain how it is different from "theoretical potential" and "market potential". These are fundamentally important constructs to facilitate understanding and communication regarding the potential of RE resources.	Full definitions now appear in Glossary.
United States (U.S. Department of State)	TS	-	-	-	-	-	-	TS 1.1	It would help the reader if some context were available with regard to the size of the numbers in the table. For example show the value of current world energy consumption and the value (EJ/y) for current renewable energy consumption.	Table has been removed from TS text in FD. Replacement figure makes direct reference to demand figures as reference.

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United States (U.S. Department of State)	TS	-	-	-	-	-	-	TS 1.1	More clarity is required regarding wind energy resource potentials in the Table. The figures for wind energy resource potential and for the high and low ranges of estimates found in the literature should be clearly broken out for on-shore and off-shore. These figures should avoid mixing or double counting the two kinds of wind potential, to the extent possible. The high and low ranges should acknowledge the most recent literature, as may be appropriate. One study that may assist in this regard is Capps, S. B., and C. S. Zender (2010), Journal of Geophysical Research, 115, D09101	Assumptions detailed in underlying chapter, that is clearly referenced in revised text/figure notes. Additional reference is appreciated.
Gerrit Hansen (TSU)	TS	-	-	-	-	-	-	TS 1.1	please reconcile figures for Solar CSP range of estimates, and information given in the column named "sources for ranges of estimates". The according figures can not be found in chapter 3. table is not consistently reporting SRREN numbers in addition to Krewitt et al. for ranges of estimates. Compare e.g. for geothermal table TS4.1; a row for "total" values might add to readability as TS and chapter 1 text refers to total technical potentials.	Table has been replaced with figure in revised TS. All efforts were made to assure consistency with underlying chapters.
United States (U.S. Department of State)	TS	-	-	-	-	-	-	TS 1.1	Question: Regarding solar energy and the presented figures for PV and CSP, since these two technologies in theory could be substitutes, is there double-counting or, alternatively, what principles and methods are used to parse them? A footnote would be helpful.	In figure that replaces this table in SRREN FD, solar energy is categorized strictly under primary energy to avoid problems of this kind.
United States (U.S. Department of State)	TS	-	-	-	-	-	-	TS 1.1	see the comment on Table SPM 4 on Krewitt's estimates for hydropower	Noted.
United States (U.S. Department of State)	TS	-	-	-	-	-	-	TS 1.1	The methodology used to generate this table must be explained here. Definitions are needed for all the terms. Sample calculations showing how factors are generated are needed. Footnote 3 suggests that all these numbers are basically useless.	Table has been removed from TS text in FD. Replacement figure makes direct reference to underlying text where methodology and assumptions are clearly explained.
Timm Zwicker (IPCC WG III)	TS	-	-	-	-	-	-	TS 1.1	This table can also be found in Chapter 10 (Table 10.3.1) and Chapter 1 (Table 1.3) and SPM (SPM.4.1). I suggest to remove this table from Chapter 10 and to only have it in Chapter 1. It should then be referenced and discussed in Ch.10 ... if needed. Before removing the table please provide all information collected in Ch.10 to Chapter 1, as though the tables seem to have the same origin, they have forked and developed differently. In the columns 'Range of Estimates' this table should give the full range that is found in the report, not just Krewitt, 2009. It should be discussed why this figure gives the Technical Resource Potential particularly for the Krewitt paper.	Noted. Chapters will coordinate to assure consistency and correct placement of information.

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United States (U.S. Department of State)	TS	-	-	-	-	-	-	TS 1.2	In column 1 delete the following words: barriers, issues, barriers, barriers, barriers. In column 2, row 2, delete the end parenthesis. In column 2, row 6, capitalize "Economic" Add a final row: Workforce Education and training	Table deleted from TS text.
Nico Bauer (Potsdam Institute for Climate Impact Research)	TS	-	-	-	-	-	-	TS 1.2	merge market failure and economic barriers, see critique on main text in ch1	Table deleted in revisions. Categories combined in new draft text.
United States (U.S. Department of State)	TS	-	-	-	-	-	-	TS 1.2	Table TS 1.2 needs substantially more detail explaining the factors within it. Rather than simply stating "Market failures", a breakout of the various kinds of market failures and market frictions needs to be provided with an explanation of what they are, followed by explanation of the relevant policy instruments for each. This should be done for all of the barriers listed. See comments elsewhere.	Table deleted from TS text.
United States (U.S. Department of State)	TS	-	-	-	-	-	-	TS 1.2	Under "Technical and structural barriers" add "inadequate options for dealing with intermittency of some renewables."	Table deleted from TS text.
United States (U.S. Department of State)	TS	-	-	-	-	-	-	TS 11.1	Insert before "fixed price", the word "advantageous".	adding the word would require more explanation about "advantageous" to whom, when? For example at spiking periods the tariff may be lower than the spot price
United States (U.S. Department of State)	TS	-	-	-	-	-	-	TS 11.1	On policy labeled "priority dispatch", replace the word "ensures", which suggests a normative goal, with the word "mandates", which correctly describes the operating mechanism.	Accepted
United States (U.S. Department of State)	TS	-	-	-	-	-	-	TS 11.1	On policy labeled "RPS", insert sentence about costs after "capacity." The sentence would read, "The higher costs of RE are borne by the consuming communities."	the idea is accepted but the text is shortened
United States (U.S. Department of State)	TS	-	-	-	-	-	-	TS 11.1	On the policy labeled "priority access to network", delete the phrase "with unhindered", and add at the end of the sentence the phrase, "without bearing the costs of doing so".	there is a distinction between "access to network" and "dispatch or integration of the RE in the network flows; for access RE often does pay some costs (for example a special meter)
Axel Michaelowa (University of Zurich)	TS	-	-	-	-	-	-	TS 11.1	The Table should include a section "Carbon Driven", with entries "Project-based carbon offsets", "Carbon emissions trading schemes" Definitions should read (for offsets): "Carbon offset credits per kWh produced issued ex post" (for trading schemes) "Renewable energy production is exempt from having to submit emissions allowances to the regulator".	The fact that RE generation does not have to pay for carbon emissions is not other than other activities in society not paying for carbon emissions they do not emit

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United States (U.S. Department of State)	TS	-	-	-	-	-	-	TS 3.1	It would be more useful to show the estimates by the various studies directly.	will be updated with new references
Gerrit Hansen (TSU)	TS	-	-	-	-	-	-	TS 3.1	table does not exist in this form in chapter 3, nor is the provided information otherwise easily accessible. Information from chapter 10 scenarios is not discussed. Please reconcile this table with the information in chapter 3.9 and include the scenario results in your discussion.	will be updated with new references
United States (U.S. Department of State)	TS	-	-	-	-	-	-	TS 3.1	The right most column would be clearer if labeled as follows "Investment in RD&D (2005-2030)".	will be updated with new references
Gerrit Hansen (TSU)	TS	-	-	-	-	-	-	TS 5.1	According to the OOA, technology chapters should refrain from comparing their performance to other RE and non RE options. Table TS5.1 might be more rightly placed in chapter 8 or chapter 9, while of course a statement and numbers on high energy payback ratio of HP can be included in chapter 5.	figure will be removed form hydro part but will be propoosed to be kept in the TS - text edited and fig also proposed for cah 8 or 9 - ch 5 main text to be edited CLA ask
United States (U.S. Department of State)	TS	-	-	-	-	-	-	TS 5.1	Explain why, for Africa, technical potential (1750 TWh/Yr) is two times current annual generation (983 TWh), whereas capacity potential (399 GW) is twenty times greater than currently installed capacity (21 GW). These figures should be fairly well matched. There must be an error.	Accepted
United States (U.S. Department of State)	TS	-	-	-	-	-	-	TS 5.1	This table does not appear in Chapter 5 on Hydropower, but it appears to be based on the numbers that are in Figure 5.3. There is a typo in the Annual Generation for Africa -- it should be 93 TWh/yr rather than 983. Check it.	Accepted
Klaus Bonhoff (NOW GmbH National Organization Hydrogen and Fuel Cell Technology)	TS	-	-	-	-	-	-	TS 8.1	Motor manufacturers continuously communicate that	Unclear comment
United States (U.S. Department of State)	TS	-	-	-	-	-	-	TS 8.1	Need to mention aviation fuels.	Specify that table is only for ground vehicles (not air and not maritime)

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Klaus Bonhoff (NOW GmbH National Organization Hydrogen and Fuel Cell Technology)	TS	-	-	-	-	-	-	TS 8.1	Row 2, Col. 3: At the German 'Clean Energy Partnership' (CEP) hydrogen is sold at a price of 8€/kg (www.cleanenergy-partnership.de). Consumption of a modern HFCV is between 1.0 and 1.4 kg/100 km. So the current fuel costs of a demonstration HFCV are comparable to conventional vehicles. Current hydrogen prices are not market prices, but the industries involved are aware that hydrogen will have to be offered at competitive prices once HFCVs are market-introduced. The study 'GermanHy' (Dena et al 2009) suggests that mobility based on fuel cells and hydrogen will be possible at today's costs if the development targets for vehicles are met. The study estimates that hydrogen will cost between 4 and 5.5 €/kg in 2020, and between 3.5 and 4.5 €/kg in 2030. Source: Dena, FZK, ISI, LBST, Wuppertal Institut (2009) GermanHy: Studie zur Frage: 'Woher kommt der Wasserstoff in Deutschland bis 2050?', no place, August (www.germanhy.de). The table in the draft report compares H2 in kg with gasoline in litres!	Comment is consistent with numbers presented in the Table. References will be added into Section 8.3.1
Oyvind Christophersen (Climate and Pollution Agency)	TS	-	-	-	-	-	-	TS 8.1	There is an inconsistency in addressing environmental impacts of transportation fuel/technology alternatives. GHG are addressed through well-to-wheel studies (neglecting the important component of manufacturing the vehicles, but still some life-cycle aspects), but for air pollution only direct emissions are addressed.	Additional notes added to table to clarify these points.
United States (U.S. Department of State)	TS	-	-	-	-	-	TS 10.1	-	For clarity, in the caption text, after "all reviewed scenarios", insert "including baseline (reference case) and mitigation (emissions constrained) scenarios". The figure is a brilliant representation of 162 scenarios.	Accepted
United States (U.S. Department of State)	TS	-	-	-	-	-	TS 10.1	-	Questions requiring clarification: Is the measure of energy consistently on primary energy--how is biomass treated versus renewables such as wind, or particularly geothermal? And for all of these studies, do they consider very high penetrations of renewables into the grid or other sectors, or do they assume fundamental limits due to variability?	it will be dealt with in the text
Susanne Kadner (Technical Support Unit)	TS	-	-	-	-	-	TS 10.2	-	Ch 10: Graph for wind - for ease of comparison increase maximum value on y-axis to 150 EJ/y and then swap with hydro to stick to order in which technologies are listed in SRREN.	figure will be deleted
Susanne Kadner (Technical Support Unit)	TS	-	-	-	-	-	TS 10.2	-	Ch 10: Where will the discussion take place what these projected levels of RE share in electricity supply mean for integration? In chapter 8, statements are made that integration of large shares of variable RE sources (i.e. above 30%) into existing system will require a paradigm shift (p. 77 line 135).	figure will be deleted

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Susanne Kadner (Technical Support Unit)	TS	-	-	-	-	-	TS 10.2	-	Ch 8: Please see Figure 10.2 in Chapter 10. Where will the discussion take place what these projected levels of RE share in electricity supply mean for integration? In chapter 8, statements are made that integration of large shares of variable RE sources (i.e. above 30%) into existing system will require a paradigm shift (p. 77 line 135).	figure will be deleted
United States (U.S. Department of State)	TS	-	-	-	-	-	TS 10.2	-	In the figure caption add "For reference purposes, global energy demand for 2020, 2030, and 2050 range as follows, [xxx-aaa], [yyy-bbb], and [zzz-ccc], respectively".	figure will be deleted
Susanne Kadner (Technical Support Unit)	TS	-	-	-	-	-	TS 10.3	-	Ch 10: Match info in figure legend with that in Figure TS 10.4.	legend and headline will be clarified
massimo tavoni (FEEM and CMCC)	TS	-	-	-	-	-	TS 10.3	-	Why the estimates of the RECIPE project are shown only for the REMIND model? As a model comparison exercise, the average of all included models should be reported. Indeed, this is the rule followed in the very same table for the EMF22 exercise, which actually consisted of a considerably larger groups of models.	will be clarified
Susanne Kadner (Technical Support Unit)	TS	-	-	-	-	-	TS 10.4	-	Ch 10: Figure legend - Colour coding for RE industry projection not distinguishable from advanced ER	will be clarified
Susanne Kadner (Technical Support Unit)	TS	-	-	-	-	-	TS 10.5	-	Ch 10: not clear which scenarios were used for analysis: WEO 2007 or 2008/2009? See also page 106 line 15. Also, the figure is not interpreted in the text; add text or remove figure.	will be clarified
United States (U.S. Department of State)	TS	-	-	-	-	-	TS 10.5	-	In the figure caption explain the bold red horizontal line. Also insert "mitigation" in the figure title before the word "scenarios".	first part accepted, secon part rejected (not all of the scenarios are mitigation scenarios)
Gerrit Hansen (TSU)	TS	-	-	-	-	-	TS 10.5	-	what does the red line represent? Figure does not include Remind and EMF22; it is not very clear and difficult to read.	will be clarified
Susanne Kadner (Technical Support Unit)	TS	-	-	-	-	-	TS 10.6	-	Ch 10: Graph 10.6.a should be compared to graph shown in TS section of Chapter 3! They stem from different sources but show similar trend.... agreement on which to present is needed.	figure will be deleted
Gerrit Hansen (TSU)	TS	-	-	-	-	-	TS 10.6	-	chapter 3 has a different learning curve for solar PV, 10.6b is not referenced in solar chapter	figure will be deleted
Taishi Sugiyama (Central Research Institute of Electric Power Industry (CRIEPI))	TS	-	-	-	-	-	TS 10.6	-	The "guide to the eye" line reminds me of notorious hockey stick diagram of so-called IPCC scandal. To me, the costs look saturating after 2000. I recommend you put two lines in the diagram to accommodate two different views - one line as it stands, and the other line which bends in 2000 and remains flat afterward up to 2008.	Figure will be removed
Susanne Kadner (Technical Support Unit)	TS	-	-	-	-	-	TS 10.7	-	Ch 10: Figure does not match description in text (page 115 lines 12-14) - which scenario is shown (Energy Revolution?)?	figure will be replace by a new one

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Susanne Kadner (Technical Support Unit)	TS	-	-	-	-	-	TS 10.8	-	Ch 10: What are targets of the Lead Scenario - please specify in text.	figure will be deleted
Susanne Kadner (Technical Support Unit)	TS	-	-	-	-	-	TS 11.1	-	Ch 11: Figure legend should read ... 2005-early 2010	Accepted
Gerrit Hansen (TSU)	TS	-	-	-	-	-	TS 11.2	-	Figure refers to small hydro, consistency with SRREN definition (glossary) needs to be ensured	we will change labeling and work to ensure consistency with the glossary entry
Gerrit Hansen (TSU)	TS	-	-	-	-	-	TS 3.2	-	all photos have very low informative value, and do not add value to the TS	Figure will be removed
Susanne Kadner (Technical Support Unit)	TS	-	-	-	-	-	TS 3.2	-	Ch 3: Images do not provide much added value; instead the TS of this chapter needs several good graphs to convey the key messages.	Figure will be removed
Susanne Kadner (Technical Support Unit)	TS	-	-	-	-	-	TS 3.3	-	Ch 3: Should read figure number TS 3.1	to be corrected
Susanne Kadner (Technical Support Unit)	TS	-	-	-	-	-	TS 3.3	-	Ch 3: This figure and the corresponding text should rather be presented in the cost section.	Figure will be removed
United States (U.S. Department of State)	TS	-	-	-	-	-	TS 3.3	-	Figure TS 3.3 should explain the substantial flattening of the unit cost curve around 1.E03 to 1.E04 in accumulated MW of solar PV modules. This was due, in part, to Silicon supply constraints and high demand, but an explanation of the divergence from trend is needed. Are there recent references that suggest a resumption in the downward trend with production increases?	Figure will be removed
Susanne Kadner (Technical Support Unit)	TS	-	-	-	-	-	TS 4.1	-	Ch 4: Change order of depths as presented in Table TS 4.1. Also, please specify that this figure shows the global technical potential.	Depths seem to be correctly ordered, and "global" is in the table caption.
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	TS	-	-	-	-	-	TS 4.2	-	Arrange legend on the right side of the figure.	This figure probably be replaced.
Susanne Kadner (Technical Support Unit)	TS	-	-	-	-	-	TS 4.2	-	Ch 4: Importance of temperature gradients for geothermal energy production needs to be explained in text.	Fig. 4.2 of TS would probably be replaced. If not a short sentence will be added in the proper place of TS.
Ladislav Rybach (Geowatt AG Zurich (company))	TS	-	-	-	-	-	TS 4.2	-	Replace by all means this figure and the figure caption by Figure 4.5 and lines 5-7 on page 17 of Chapter 4!	Fig. 4.2 of TS would probably be replaced. If not a short sentence will be added in the proper place of TS.
Susanne Kadner (Technical Support Unit)	TS	-	-	-	-	-	TS 4.3	-	Ch 4: Figure needs to be self-explanatory without reference to full text in the SRREN - needs to be adapted.	Figure was re-made in chapter 4, and then the new figure will be included.
Susanne Kadner (Technical Support Unit)	TS	-	-	-	-	-	TS 5.1	-	Ch 5: As agreed in Oxford, no technology chapter should provide comparative information; this will be covered in Chapter 9; figure needs to be removed.	figure will be removed form hydro part but will be proposed to be kept in the TS - text edited and fig also proposed for cah 8 or 9 - ch 5 main text to be edited CLA ask

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Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	TS	-	-	-	-	-	TS 5.1	-	It does not seem right to make comparisons with other technologies. Either it can be done in a final section or not at all - but certainly not scattered within some RE sections, not in others.	figure will be removed form hydro part but will be proposed to be kept in the TS - text edited and fig also proposed for cah 8 or 9 - ch 5 main text to be edited CLA ask
Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	TS	-	-	-	-	-	TS 5.3	-	This figure is too detailed as compared with the discussion made at previous RE sections; it can be summarized by some sentences and help reduce document lenght.	will be replaced by text
Susanne Kadner (Technical Support Unit)	TS	-	-	-	-	-	TS 7.1	-	Ch 7: References and figure descriptions should all be placed in figure legend.	Will need to discuss with TSU what they are exactly looking for
Susanne Kadner (Technical Support Unit)	TS	-	-	-	-	-	TS 7.4	-	Ch 7: References and figure descriptions should all be placed in figure legend.	Will need to discuss with TSU what they are exactly looking for
Gerrit Hansen (TSU)	TS	-	-	-	-	-	TS 8.2	-	Figure reported for PE do not correspond with figures in table SPM 2. please reconcile	Consistent figures for primary energy selected and implemented throughout report.
United States (U.S. Department of State)	TS	-	-	-	-	-	TS 8.4	-	Terms and industry jargon used in the Figure TS 8.4 should be explained, as the Technical Summary will likely be read by non-subject matter experts.	Accepted