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

Summary for Policymakers

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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>>*

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
¿vind Christophersen (Climate and Pollution Agency)	SPM	0	-	-	-	-	-	-	A list of all Acronyms should be added.	An acronym list appears in the glossary. As is tradition with IPCC reports, this will be the reference for the SPM as well.
¿vind Christophersen (Climate and Pollution Agency)	SPM	0	-	-	-	-	-	-	Both EJ, PJ, MW and kWh are used. The relationship between these should be explained and quantified.	Noted. For reasons of space, an in depth explanation of energy terminology may be reserved for Annexes to the full report.
United States (U.S. Department of State)	SPM	0	-	-	-	-	-	-	From the perspective of a larger, non-RE technical community, the current draft occasionally exhibits a tone of advocacy and selective inattention to RE issues, costs and problems. Comparisons to non-RE energy technologies should be 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). Specific suggestions as to how to fix these issues are provided in detailed comments.	Rewritten with an attempt to eliminate any advocacy language and to clearly present all related issues in a balanced way.
Manfred Orgis (Ministry of Environment)	SPM	0	-	-	-	-	-	-	General: it would be very relevant to include some information on those countries with a remarkable increase in the share of RE technologies in the recent years and to identify the specific circumstances that allowed such increase.	Rewritten for SPM FD; Section 3 briefly discusses some of the RE production leading countries. Due to space restrictions, discussing the specific circumstances in each case was not possible. Case studies are provided in Chapter 11 of the main report for this purpose.
Manfred Treber (Germanwatch e.V.)	SPM	0	-	-	-	-	-	-	I miss the more differentiated conclusions (e.g. page 116 at the end of Ch 2) on bioenergy in the SPM	The most relevant will be added
Leonidas Osvaldo GIRARDIN (Fundación Bariloche)	SPM	0	-	-	-	-	-	-	It is necessary to highlight the role that RE could play in reducing vulnerabilities of Energy Supply to Climate Change. In this sense, there are many sinergies between mitigation and adaptation of Energy Sector to Climate Change.	Energy security has been highlighted as a major SD goal in Section 5.
Manfred Treber (Germanwatch e.V.)	SPM	0	-	-	-	-	-	-	It would be helpful to have a small paragraph in the SPM on biomass and CCS to achieve negative emissions which are necessary for ambitious global scenarios (with below 2 degrees). See Par 2.6.3.3 or the last item on page 116.	A new figure has been introduced in SPM 5 that presents exactly this.
United Kingdom (Department of Energy and Climate Change)	SPM	0	-	-	-	-	-	-	It would be useful to include within the SPM a map summarising where renewable energy sources are available globally.	While authors agree with the usefulness of the suggestion, a comprehensive comparison of the location of RE resources was not presented in the SRREN, and therefore cannot be presented in the SPM.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Jörn Scharlemann (Ministry of the Environment, and Rural and Marine Affairs)	SPM	0	-	-	-	-	-	-	Overall very little mentioning of the environmental impacts of RE, in particular links to GHG emissions and the potential of RE as useful tools for climate change mitigation. Key environmental concerns of RE should be highlighted in the SPM more prominently.	Rewritten for SPM FD; Section 5 discusses GHG emissions and env. Concerns in a more comprehensive way.
Manfred Treber (Germanwatch e.V.)	SPM	0	-	-	-	-	-	-	Please insert into the SPM two main points from Ch. 8 which are policy relevant: 1. ""The timeframe for new technologies relying on batteries, fuel cells, or advanced biofuels could be even longer since they all need further RD&D investment and international standardization before they can be fully commercialized. Further cost reductions would then be needed to achieve wide customer acceptance."" (p. 73, l.21 - 24) and 2. ""Even at high oil prices, government support policies may most likely be needed to subsidize these technologies in order to reach cost-competitive levels and gain customer acceptance."" (p.75, l. 26 - 28)	Will add a comment on timelines but for all RE techs.
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	SPM	0	-	-	-	-	-	-	SPM gives a good overview of already known facts and adds some new descriptions. Nonetheless, there are no concrete recommendations for actions. There are no assessments of which policy measures for the promotion of RE have worked well, where and when or which barriers for the deployment of RE have been overcome where, when and how.	Rewritten with a focus on bringing across these messages.
Manfred Treber (Germanwatch e.V.)	SPM	0	-	-	-	-	-	-	The crucial topic of competition between food security and bio-energy use has to be mentioned in the SPM (compare 2.5.5.4: p 78, l 14ff: ""Political crises that affect energy markets would thus affect food prices. For around one billion people in the world who live in absolute poverty, this situation poses additional risks to food security"")	A box has been introduced in SPM 5 on the role of bioenergy in land-use change and rural development that includes this discussion.
¿vind Christophersen (Climate and Pollution Agency)	SPM	0	-	-	-	-	-	-	The importance of energy savings/increased efficiency should be emphasized more and the potential presented; eg projections of the global need for energy in the future with ¿business as usual and with an ambitious increase in energy efficiency.	A focus on energy efficiency is outside the scope of the SPM. However, the authors recognize EE as important and mention it where appropriate throughought the report.
¿vind Christophersen (Climate and Pollution Agency)	SPM	0	-	-	-	-	-	-	The role of storaged hydro as provider of both short term controllable energy and a long term battery service could be more emhasised in this chapter (See Ch. TS, page 51, line 9-15).	This is mentioned in Box SPM 1 as well as in Section SPM 4. More detailed discussion appears in par.5.2.5 p14 line 20 to 26
Canada (Environment Canada)	SPM	0	-	-	-	-	-	-	The SPM is currently quite long and dense compared to SPMs of the AR4 and other IPCC reports. Continued revision is needed to simplify and streamline the SPM to key findings written at a level appropriate for a non-specialized audience.	Rewritten for SPM FD with a focus on streamlining key findings and simplifying.

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¿vind Christophersen (Climate and Pollution Agency)	SPM	0	-	-	-	-	-	-	The SPM should be simplified; less information presented with shorter and easier understandable sentences and figures would be more helpful for the policymaker. Further should the information be presented in a way that makes comparison easier.	Rewritten for SPM FD with a focus on simplification and to facilitate comparison.
Italy (Institute for Environmental Protection and Research (ISPRA))	SPM	0	-	-	-	-	-	-	The SPM succeeds in integrating cross-cutting information on all renewable energy sources with more specific data referring to specific sources, e.g. as concerns environmental and social aspects, potential, costs. However, the lack of any discussion on policy mechanisms to support deployment of RE may give the impression that the issue is not relevant.	Rewritten for SPM FD; See section 7
United States (U.S. Department of State)	SPM	0	-	-	-	-	-	-	The SPM suffers from a lack of clarity in its organization and objectives. It should serve as a means of conveying key messages from the whole report. It needs to be organized to clearly inform policymakers of the role of RE. The suggestion is to re-arrange it as follows: Rename Section 2 "Drivers and Solutions for a Low-Carbon Economy" Create a new Section 2.3, called "General Solutions" that consists of the first 3 paragraphs of the current Section 3 (p. 5, line 14 - p. 6, line 8), though starting with paragraph 2 (p. 5, line 24) and moving paragraph 1 (p. 5, lines 14 - 23) to the end of the section. The purpose of this is to move from the general need for sustainability to the specific need for low-carbon energy. Rename Section 3 "RE Solutions." Divide into 3 sub-sections: 3.1 "Characteristics of RE," 3.2 "Benefits of RE," 3.3 "Challenges for RE." Start section 3.1 with paragraph 4 that begins on p. 6, line 9 and continue through paragraph 5 (p. 6, line 13 - p. 8, line 32). Skip to paragraph 7 (p. 9, line 5 - p. 11, line 5), then to 3.12, 3.13, 3.14 (p. 14, lines 20 - 44). Start Section 3.2 "Benefits of RE" with paragraphs 3.8 and 3.9 (p. 11, lines 6 - 19). Continue with paragraph 13 (p. 14, lines 27 - 38). Start Section 3.3 "Challenges for RE" with 3.6 (p. 8, lines 33 - 36), then continue with paragraphs 6.1 and 6.2 (p. 25 line 14 - p. 26, line 23). Continue with paragraphs 3.10 and 3.11 (p. 12 line 7 - p. 14 line 19). Conclude with paragraph 7.1 (p. 27 lines 20 - 35).	Rewritten for SPM FD, largely considering these suggestions for restructuring.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Australia (0)	SPM	0	-	-	-	-	-	-	There is a sense that key information in the body of the Report is missing from the Summary, and that the key messages of the SPM are unclear. For instance, if the four points in the Introduction are the Key Messages, then the supporting material should be organised to provide clear linkage back to, and better inform the Key Messages. As it stands the seven sections of the SPM are without reference to any particular message. We reiterate that more rigour is required in the use of particular terms and the definition of those terms. For example, there seems to be confusion over the use of the terms 'financial barriers', 'economic', 'commercial', 'economically affordable'. Furthermore the terms 'economically sustainable', 'cost-effective' and 'economically affordable' do not mean the same thing, although they are used interchangeably. The SPM could benefit from: - a focus on RE sectors other than just electricity generation; - information on how energy pricing impacts on the deployment of RE or energy markets; and - improved diagrams ¿ current network diagrams are confusing and hard to understand for non-technical people.	Efforts made to more clearly present key messages in each section. Efforts made to more consistently use terminology that exactly reflects the glossary. Graphics amended for clarity.
Leonidas Osvaldo GIRARDIN (Fundación Bariloche)	SPM	0	-	-	-	-	-	-	There is no enough emphasis about the critical role of Technology Transfer and Capacity Building. The creation and development of human and institutional capabilities are crucial issues for ensuring the maintenance of the equipment once installed.	Noted.
Canada (Environment Canada)	SPM	0	-	-	-	-	-	-	Throughout the SPM, there is inconsistent use of the bracketed chapter references. Some appear with the major finding statements (in bold), others appear in text and some paragraphs make no references to underlying chapters. Breaking up the dense paragraph structure into bullets (similar to AR4 SPMs) may help in associating chapter references with specific information.	Rewritten in a consistent manner for SPM FD Because of the structure of the SD section (with 2 levels of bullets before introducing consistent bulleting), it was impossible to introduce comprehensive bullets throughout the SPM.
Canada (Environment Canada)	SPM	0	-	-	-	-	-	-	Unlike the AR4, the SRREN SPM does not include any quantitative or qualitative assessment of uncertainty associated with its main findings. Consistent representation of uncertainty within the WG contributions to the AR4 was key to facilitating effective and transparent communication of the report's findings. We recommend that a similar approach be considered for SRREN.	Though authors agree with the usefulness of uncertainty language, it has been excluded from the SRREN as negotiations on formal uncertainty language in the IPCC were ongoing at the time of writing.

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United Kingdom (Department of Energy and Climate Change)	SPM	0	-	-	-	-	-	-	We favour framing the SPM with policy-relevant questions, which are essential to meet policy community needs and improve overall structure. The key questions which need to be addressed by the SRREN are; - 1) What is the practical (technologically, economically etc) potential for renewable energy both globally and regionally?2) Will it be possible to scale up renewables quickly enough enough to meet gaps in supply and to help us reduce emissions to meet a 2C stabilisation target? 3) What are the risks and benefits (financial and technical) of renewable energy over fossil fuels? 4) To what degree can a modern economy be run on renewable energy? 5) How practical is it for developing countries to develop using renewable energy and avoid significant expansion of their use of fossil fuels?	Rewritten with a focus on more prominently answering these suggested key questions to the extent possible with the underlying text of the SRREN.
John Twidell (AMSET Centre)	SPM	1	-	32	-	-	-	-	Comment: This Summary fails to consider significantly Passive Solar Architecture, which in practice includes low-energy buildings. This omission should be acknowledged cleary at the beginning and end by words such as 'Energy use in buildings, especially for heating and cooling, is substantial, both for owners and for nations as a whole. Solar architecture, especially the passive aspects, allows solar energy to be used for both heating and cooling. However the benefits, although substantial, are difficult to assess and are usually absent from national statistics and energy supply studies. Therefore this IPCC review unfortunately tends to underrate the sugject'.	Noted. Will be included if space permits.
STEPHANE POUFFARY (Energies 2050)	SPM	1	-	32	-	-	-	-	Summary extremely clear and detailed. A pleasure to read.	Thank you!
Leonidas Osvaldo GIRARDIN (Fundación Bariloche)	SPM	1	25	1	32	-	-	-	The regional assessment of RE resources should include also human resources available to operate and mantaining the equipment as well as for adapting technologies transfered	Noted.
¿vind Christophersen (Climate and Pollution Agency)	SPM	2	-	32	-	-	-	-	A general comment is that the potential of ocean energy seems under communicated and or little researched.Ocean enery is not included in e.g. figures SPM 2, SPM 4 and SPM 7. Also ocean energy contributes with 0.00 EJ in 2007 (Table SPM 2). We are not saying that this is wrong, but it is difficult to understand from the SPM why ocean energy has so low marked share and why the potential is so little given that 2/3 of the world's surface is water and most countries have boundaries to the ocean with it's waste contente of different energy forms.We think that better directions on how to stimulate developement for this RE medium is needed.	Attempts made to clarify contributions of ocean energy in all figures (i.e. not that the potential is low, but rather that the technology is at an earlier state of development).
¿vind Christophersen (Climate and Pollution Agency)	SPM	2	-	32	-	-	-	-	All abbreviations should be explained/spelt out the first time they appear in the SPM. We cannot expect policy makers to og to the glossary to check them out. If in the list of content one wish for estetical reasons to keep RE in ch 6, RE can be incerted in brackets in ch 5.We also think the unit EJ should be explained.	Attempt made to spell out all abbreviations in SPM the first time that they appear.

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Babacar Sarr (ENERTEC-SARL)	SPM	2	14	3	39	-	-	-	Should have identical section title (page 2 of 32 line 14 & page 3 of 32 line 39) Policies and instruments for advancing RE deployment	will consider as we revise.
Haroon Kheshgi (ExxonMobil Research and Engineering Company)	SPM	2	7	2	10	-	-	-	This states that ¿The Special Report provides¿analysis based on literature¿to support the thesis that RE can contribute significantly¿. As stated this implies that report does not consider literature that might not support this thesis. Either this statement should be removed, or the SRREN should be redrafted and consider all relevant literature without preconditioning the assessment based on this thesis.	Statement removed from SPM.
Chile (CONAMA)	SPM	3	23	-	-	1	-	-	In the introduction, where it mentions ¿aid sustainable development¿ incorporate a sentence regarding the importance of job creation. The promotion of renewable energies is not only favorable to the environment and the economy, it is also a key issue to generating employment. Since the middle of the 1990´s, a diversity of studies, providing evidence on this matter, has been published. In this way, the creation of jobs through renewable energies is, or should be, a strong argument for the promoting of such sources of energies.Examples of Job Creation Within the Field of Renewable Energies 1. In 1994, the production, installation and maintenance of renewable energy technologies led to approximately 110,000 jobs within the European Union. (Source: European Forum on Sources of Renewable Energies in Europe, Madrid, 1995) 2. Employment related to renewable energies reaches more than 2,332,000 people around the world. (Source: Worldwatch Institute Report, ¿Green jobs: Towards Decent Work in a Sustainable, Low-Carbon World¿. UNEP in collaboration with ILO, IOE, ITUC, Nairobi, September 2008) 3. Job creation through renewable energies in Spain: 109,368 jobs in 2009. (Source: Report, ¿Green Jobs in a Sustainable Economy¿. Observatory for Sustainability in Spain in collaboration with the Foundation on Biodiversity, Madrid, 2010) The IPCC Report stresses several times that renewable energies have ¿economic, social and ecological benefits¿, but the social realm focuses primarily to ¿improve the quality of life of the poor¿. It seems that the only mention of employment throughout the report is the following: ¿domestic job creation¿ and ¿higher employment¿. There is no broader reference with respect to promoting renewable energies and job creation (Comment made by Alwine Woischnik)	Relevant text deleted. Job creation now mentioned in Section 5
Richard Taylor (International Hydropower Association)	SPM	3	28	3	28	1	-	-	Insert ""and optimise the integration of"" after ""develop"" and before ""RE technologies"". Development effort alone is not sufficient, the optimised integration of RE tech is key	Relevant Text deleted.

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Garcia Javier (Garcia Monge Consultant)	SPM	3	32	3	32	1.	-	-	May I suggest to add an aditional bullet after ""vigilance to the opportunities (¿)"" : ""capacity building to develop RE projects at the local levels.""	Relevant Text deleted.
Garcia Javier (Garcia Monge Consultant)	SPM	3	22	3	22	1.	-	-	May I suggest to add these two features of RE in the description: ""RE, in its many forms, has the potential to mitigate GHG emissions, enchance energy security, stabilize long term costs of energy and reduce exposition to energy shock prices, provide modern and affordable energy services to those currently without, (...)	Relevant Text deleted.
Several experts 0 (Ministry of the Indutry, Tourism and Trade)	SPM	3	-	-	-	1	-	-	RE has positive impact on employment and security of supply. These facts should be mentioned in the introduction	Covered in detail in new Section SPM 5. Introduction condensed significantly.
China (China Meteorological Administration)	SPM	3	33	3	40	1	-	-	Since the previous bullets have addressed the necessary economically feasible conditions for renewable energy technologies and their implementing approaches, but all focusing on the conditions at national level, it is suggested that one last bullet be added after them: "an international collaborative platform on which sustainable RE information, technology and products can be exchanged freely and smoothly." The motivation of this addition is to enhance international cooperation in this aspect.	Bullets removed from SPM FD. The role of institutions is in part covered in SPM 7 in the revised version as part of an 'enabling environment'.
Canada (Environment Canada)	SPM	3	0	-	-	1	-	-	SPMs for previous IPCC reports (e.g., AR4) have typically had very short introductions and included all content in the main body of the SPM. Suggest considering a similar approach for SRREN to reduce repetition in the SPM. Some content from the introduction could perhaps be used in the Preface.	SPM FD rewritten accordingly.
Gian-Kasper Plattner (IPCC WGI TSU, University of Bern)	SPM	3	26	-	-	-	-	-	"economic playing-field" -- is this a widely used scientific expression? Could it be replaced?	Relevant Text deleted.
Gian-Kasper Plattner (IPCC WGI TSU, University of Bern)	SPM	3	9	3	10	-	-	-	"the goals outlined in the AR4 for limiting global mean temperature increases and stabilizing the concentrations of greenhouse gases in the atmosphere -- suggest to swap the "stabilizing GHG" part with the "limiting global mean temperature" as this then follows the sequence of processes (from emissions to concentrations to climate change). I also suggest to change the formulation "goals outlined in the AR4", as it seems to me that to outline goals would be close to policy-prescriptive, which IPCC should not be... Can you add specific reference to what exactly in the IPCC AR4 this is referring to?	Relevant Text deleted.
Gunnar Luderer (Potsdam Institute for Climate Impact Research)	SPM	3	7	-	10	-	-	-	"This report provides ¿ an analysis ¿ to support the thesis that RE can contribute significantly ..." - This statement suggests that the goal of the report is to prove the usefulness of RE. Since the IPCC acts as honest broker rather than an advocate of certain technologies, this should be formulated more neutral, e.g. "This report aims at assessing the potential role of RE within a broad portfolio of mitigation options."	Relevant Text deleted.

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Arthur Lee (Chevron Corporation)	SPM	3	25	-	25	-	-	-	¿ socially acceptable""	Relevant Text deleted.
Nico Bauer (Potsdam Institute for Climate Impact Research)	SPM	3	3	-	-	-	-	-	¿Mitigation of the Intergovernmental Panel on Climate Change (IPCC) focuses on¿	As it is clear that this is an IPCC report, this addition viewed as unnecessary.
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	SPM	3	26	3	32	-	-	-	<comment> Add the item below; - Infrastructure construction such as reinforccement of energy system and securement fair burdensharing involved. <reason> They are essential elements to put RE technologies and energy practices into an economically affordable use.	Relevant Text deleted.
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	SPM	3	7	3	10	-	-	-	<comment> Add the words as below; "This Special Report provides a technology and systems level analysis based on the technical literature to support the thesis that RE can, though not the only solution, contribute significantly within a broad portfolio of mitigation options to the goals outlined in the AR4 for limiting global mean temperature increases and stabilizing the concentration of greenhouse gases (GHGs) in the atmosphere. <reason> There are many mitigation options to the goals outlined in the AR4 besides RE.	Relevant Text deleted.
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	SPM	3	13	3	15	-	-	-	<comment> Amend "Financial barriers"to "Economic barriers" or "Economic and financial barriers", as follows; "2) Economic barriers exist for many RE systems to compete directly with incumbent energy systems in the short-term, but continually improving technologies, efficient use improvements, policies and cost reductions from increased experience can aid the transition to a new sustainable energy system." <reason> Because challenges to introduction of RE are economic barriers of initial cost rather than financial barriers.	Relevant Text deleted.

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ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	SPM	3	16	3	18	-	-	-	<comment> Delete "Regulatory barriers inadvertently discourage the use of RE in many cases, but", and amend the sentence as follows; [original] "3) Regulatory barriers inadvertently discourage the use of RE in many cases, but countries that have eliminated them and established supportive policies have seen RE provide a rapidly growing share of energy services." [proposed amendment] "3) Countries that have established supportive policies have seen RE provide a rapidly growing share of energy services." <reason> Because there is no reference to evidence to generalize particular "regulatory barriers" of RE. The body text of the report introduces some incentives but mentions few regulations as barriers.	Relevant Text deleted.
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	SPM	3	1	4	3	-	-	-	<comment> -Need to define "Renewable Energy", and explain why this report deals with the 6 energy sources, "Bioenergy, Direct Solar, Geothermal, Hydropower, Ocean Energy and Wind Energy", on this report. -As a footnote, please insert the sentence "EU DIRECTIVE defines renewable sources as non-fossil sources, namely wind, solar, aerothermal, geothermal, hydrothermal and ocean energy, hydropower, biomass, landfill gas, sewage teratment plant gas and biogases. " <reason> There are different definitions of RE, as in EU or in Japan (see references). <references> -DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives [EU] -Order for enforcement of the act on promoting use of non-fossil fuel energy sources and effective use of fossil fuel energy sources by energy suppliers[JAPAN] http://www.meti.go.jp/press/20090825001/20090825001-2.pdf (page3) -Energy Basic Plan[JAPAN] http://www.meti.go.jp/press/20100618004/20100618004-2.pdf (page24)	A full definition of RE appears in the Glossary.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	3	26	3	32	-	-	-	a more logical order of bullets may be 2-3-4-1-5 (2nd bullet 1st, etc)	Relevant Text deleted.
Gian-Kasper Plattner (IPCC WGI TSU, University of Bern)	SPM	3	4	-	-	-	-	-	Abbreviation Renewable Energies: RE -- given that the short title of the Special Report is SRREN, wouldn't it make more sense to use REN as the consistent abbreviation?	RE was selected as it was viewed by authors to be the most appropriate representation/acronym.

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United Kingdom (Department of Energy and Climate Change)	SPM	3	26	3	32	-	-	-	An additional bullet should be added along the lines of "efforts to address the environmental and social impacts of renewable energy technologies". This issue is covered well later in the chapter (pages 13 and 14) but needs mentioning alongside the other factors on page 3.	Relevant Text deleted.
Australia (0)	SPM	3	11	3	21	-	-	-	An additional conclusion could be added for policy makers, that the right renewable share of energy and the right mix of renewables is specific to country circumstances (perhaps something along the lines of the statement at page 16 lines 29-34).	Relevant Text deleted.
Nico Bauer (Potsdam Institute for Climate Impact Research)	SPM	3	7	3	21	-	-	-	Are these the main conclusions? Does not seem to flow from the text. On the other hand, what is missing in e.g. 3) is that RE would actually be more competitive if negative impacts of climate change would be internalized	Relevant Text deleted.
Canada (Environment Canada)	SPM	3	11	3	11	-	-	-	Before moving into these overarching statements, it is suggested that RE be defined for the purposes of this report (including listing types of RE or making reference to types in Box SPM1).	Relevant Text deleted.
¿vind Christophersen (Climate and Pollution Agency)	SPM	3	7	3	10	-	-	-	Consider another word than "goal" in this sentence. We are not sure that this is the correct way to refer to AR4.	Sentence deleted in revised text.
Manfred Orgis (Ministry of Environment)	SPM	3	25	3	25	-	-	-	environmentally sustainable and social acceptable use requires:	Relevant Text deleted.
Australia (0)	SPM	3	13	-	-	-	-	-	Financial barriers' needs to be defined.	Relevant Text deleted.
Frank Mastiaux (EON Climate & Renewables)	SPM	3	33	3	40	-	-	-	Good topics for sections, however the link with the structure of the full report remains somewaht unclear	Restructured in SPM FD to better reflect report structure.
Nico Bauer (Potsdam Institute for Climate Impact Research)	SPM	3	19	3	21	-	-	-	High carbon technologies will not be technologically locked out via investments in RES!!! Institutional lock out by carbon pricing must be considered as well. RE can help to reduce the costs of implementing this policy. The authors only state a hypothesis that is disputable.	Relevant Text deleted.
Nico Bauer (Potsdam Institute for Climate Impact Research)	SPM	3	1	-	-	-	-	-	I am missing a referenc to UNFCCC.	Noted.
Nico Bauer (Potsdam Institute for Climate Impact Research)	SPM	3	7	3	10	-	-	-	I am missing a reference to negative aspects of RE that may unfold and that are currently present as certain additional conditions are not fulfilled. Eg. food vs. fuel, co-emisisons, deforestation and bio-div loss, grid instability, nature conservation [hydro], induced seismic activity, etc. pp.	Included in revised SPM FD, Section SPM 5
Nico Bauer (Potsdam Institute for Climate Impact Research)	SPM	3	26	-	-	-	-	-	I do not get this point! Who should have ""continued attention""? In what way is attention changing anything?	Relevant Text deleted.
Nico Bauer (Potsdam Institute for Climate Impact Research)	SPM	3	27	-	-	-	-	-	I do not think that this is a high priority issue for implementation at the level of putting RE into practice. Regional assessments are more important for sub-national policy makers.	Relevant Text deleted.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Juan Jose Sanchez (Ministry of the Environment, and Rural and Marine Affairs)	SPM	3	32	-	-	-	-	-	I would suggest to include another bullet point saying: ""strong international cooperation to enhance technology transfer and development""	Relevant Text deleted.
Nico Bauer (Potsdam Institute for Climate Impact Research)	SPM	3	28	-	-	-	-	-	improve instead of develop	Relevant Text deleted.
Helmut Haberl (Institute of Social Ecology, Vienna)	SPM	3	26	3	32	-	-	-	In my view, RE also requires continuous attention to possible social and ecological drawbacks, and implementation of the best possible policies/measures to avoid negative consequences	Relevant Text deleted.
United States (U.S. Department of State)	SPM	3	14	-	-	-	-	-	Insert after "short-term": "especially in situations where incumbent systems are supported by existing infrastructure and subsidies."	Relevant Text deleted.
Gunnar Luderer (Potsdam Institute for Climate Impact Research)	SPM	3	11	-	21	-	-	-	It is not clear if this list provides hypothesis the report started out with or results.	Relevant Text deleted.
Canada (Environment Canada)	SPM	3	11	3	21	-	-	-	It is not clear what these four statements are and why they are numbered - are they main conclusions of the report?	Relevant Text deleted.
Manfred Orgis (Ministry of Environment)	SPM	3	0	-	-	-	-	-	It is suggested to address in the SPM stronger the socio economic barriers to deploy renewable energy sources and how to overcome those barriers.	Discussion now more clear in section 5 of SPM FD
Manfred Orgis (Ministry of Environment)	SPM	3	29	3	30	-	-	-	it is suggested to restructure those bullet points and to address policy tools in one bullet point and the other concepts in another.	Relevant Text deleted.
Manfred Orgis (Ministry of Environment)	SPM	3	29	3	29	-	-	-	it is to address not only development of policy tools but also implementation of policy tools.	Relevant Text deleted.
Frank Mastiaux (EON Climate & Renewables)	SPM	3	-	-	-	-	-	-	It seems to be neglected, that often very good RE resources are at distance to the demand centres. Consequently, it is not just a matter of RES production, but also of RES transport e.g. for biofuels by train or cars, for biogas by pipelines, for electricity by grids. A concentration on the RES production alone is certainly not sustainable.	Discussed now in Section 4 in SPM FD
Juan Jose Sanchez (Ministry of the Environment, and Rural and Marine Affairs)	SPM	3	15	-	-	-	-	-	It should include also ""cost evolution of other conventional sources""	Relevant Text deleted.
Juan Jose Sanchez (Ministry of the Environment, and Rural and Marine Affairs)	SPM	3	13	-	-	-	-	-	It should say ""Economic and Financial barriers...""	Relevant Text deleted.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Juan Jose Sanchez (Ministry of the Environment, and Rural and Marine Affairs)	SPM	3	22	-	-	-	-	-	It should say ""to mitigate GHG emissions and other pollutants""	Relevant Text deleted. Other pollutants discussed in SPM 5
Manfred Orgis (Ministry of Environment)	SPM	3	26	3	26	-	-	-	meaning of bullet point unclear; either delete or substitute. The following wording is suggested: ongoing assessment of new and innovative emerging technologies	Relevant Text deleted.
Finland (Finniah Meteorological Institute)	SPM	3	8	-	-	-	-	-	Please add the highlighted text: This Special Report provides a technology and systems level analysis based on the technical literature to _determine how_ RE can contribute _efficiently_ within a broad portfolio of mitigation options to the goals outlined in the AR4 for limiting global mean temperature increases and stabilizing the concentration of greenhouse gases (GHGs) in the atmosphere.	Relevant Text deleted.
Finland (Finniah Meteorological Institute)	SPM	3	25	-	-	-	-	-	Please change to "socially": ... and socially acceptable¿	Relevant Text deleted.
United States (U.S. Department of State)	SPM	3	17	-	-	-	-	-	Replace "eliminated them and established supportive policies" with "implemented policies to address them". It is unlikely that any country has actually completely eliminated all barriers, since the barriers are quite diverse and dependent on individual projects and local circumstances. The best countries can hope to do is to create policies to address barriers.	Relevant Text deleted.
United States (U.S. Department of State)	SPM	3	11	3	12	-	-	-	Replace "enable signification implementation of" with "contribute to significant development of". RE will contribute as part of a portfolio of mitigation options, and the low-carbon energy economy will develop, not be implemented deterministically.	Relevant Text deleted.
Emmanuel Branche (Electricité de France)	SPM	3	13	3	13	-	-	-	Replace "financial barriers" by "economical barriers" as this paragraph is dedicated to RE costs and not financial difficulties encountered by RE developers	Relevant Text deleted.
United States (U.S. Department of State)	SPM	3	8	-	-	-	-	-	Replace "support the thesis that RE can" with "evaluate the potential for RE to". The purpose of a scientific assessment is to assess a thesis, not support it.	Relevant Text deleted.
Steve Sawyer (Global Wind Energy Council)	SPM	3	27	3	27	-	-	-	should be 'regional, national and local assessments of RE resources'	Relevant Text deleted.
Finland (Finniah Meteorological Institute)	SPM	3	-	-	-	-	-	-	Some parts of the introduction seem more like a summary, eg in the lines 11-32.	Introduction condensed significantly in SPM FD.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	3	7	3	10	-	-	-	SRRENN does not have a thesis and he AR4 does not set goals, both are there to assess knowledge. This suggests that SRREN is policy prescriptive, which it is not, and should not be. I therefore suggest to change this para, so that it will read: "This Special Report provides a technology and systems level analysis based on the technical literature to assess the contribution that RE can make to limiting mean temperature increases and stabilising the concentrations of greenhouse gases (GHGs) in the atmosphere.".	Text deleted.
Manfred Orgis (Ministry of Environment)	SPM	3	28	3	28	-	-	-	stronger (or: enhanced) research and development efforts ¿.	Relevant Text deleted.
Australia (0)	SPM	3	26	-	-	-	-	-	Suggest adding at the end of the sentence ", including the removal of subsidies for fossil energy-use."	Relevant Text deleted.
Switzerland (Swiss Federal Office for the Environment)	SPM	3	8	-	-	-	-	-	Suggestion for rephrasing: ¿... to support the thesis that RE can contribute...¿ to ¿... to assess the thesis that RE can contribute...¿. It is often critizized that IPCC reports have the aim to confirm a prescribed thesis. The existing sentence can be taken as proof for this criticism.	Relevant Text deleted.
Nico Bauer (Potsdam Institute for Climate Impact Research)	SPM	3	7	-	-	-	-	-	Technical literature is not sofficient. The scientific literature is what needs to be reviewed.	Relevant Text deleted.
Australia (0)	SPM	3	11	3	12	-	-	-	The four key messages (not explicitly stated) could be supplemented by an additional message: Drivers for RE introduction differ from country/country and/or regions: Technical Summary (TS) includes more information to support this but this should be clearly articulated in the SPM.	Relevant Text deleted.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	3	11	3	21	-	-	-	The function of the listing is unclear. I therefore suggest to insert: "This report shows that:".	Relevant Text deleted.
United Kingdom (Department of Energy and Climate Change)	SPM	3	7	-	8	-	-	-	The intention of the report is to explore and analyze how RE has the potential to significantly mitigate climate change. These lines of the report, however make one think that RE is already significantly mitigating the effects of climate change. This may not be the intent of the lines, but that impression is left in the reader - an impression that is probably incorrect and in any event is not supported anywhere in the body of the report by data showing such an impact at present. Is it possible to estimate how much renewable energy already contributes to emission reduction?	Text deleted.
Finland (Finniah Meteorological Institute)	SPM	3	12	-	-	-	-	-	The text would be better, if the highlighted words could be added: 1) The RE resource is widely available, and a sufficient RE technology base already exists to enable significant _contribution towards_ a low-carbon and sustainable energy economy.	Relevant Text deleted.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Nico Bauer (Potsdam Institute for Climate Impact Research)	SPM	3	33	3	40	-	-	-	There is no reference to the issue how climate change affects RE. There is no item (except the integration) that points to possible risks and negative impacts.	Risks and environmental impacts appear in Section 5 of the FD. CC impacts on RE are covered under RE technologies.
Modesto Fernandez Diaz-Silveira (Ministry of Science, Technology and Environment)	SPM	3	21	-	-	-	-	-	There is not any mention to the especial challenges posed by biofuels, as a RE that has a potential for the reduction of fossil fuels, but at the same time could be going against food security in the world, mostly in developing countries.	Discussion now appears in SPM 5, Box SPM 2
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	SPM	3	11	-	21	-	-	-	these statements are so general that they do not give any information at all. In some of the chapter some good statements can be found, that could be used here. Two examples from chp 10, e.g. p. 19, line 8-10 and p. 24, line 7-13. These statements could be directly used in the SPM.	Relevant Text deleted.
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	SPM	3	26	-	32	-	-	-	This bullet point list is not wrong, but at the beginning of the SPM I would like to learn the most important conclusions that can be drawn from the chapters. An answer should be given to the question: can RE do the job?	Relevant Text deleted.
Nico Bauer (Potsdam Institute for Climate Impact Research)	SPM	3	29	-	-	-	-	-	This bullet point should also refer to regulations that are required to tackle the potential negative effects of RE deployment (e.g. to trigger investments into grid, storage, and back-up for balancing fluctuating renewables).	Relevant Text deleted.
Gunnar Luderer (Potsdam Institute for Climate Impact Research)	SPM	3	26	-	32	-	-	-	This list of items is rather loose. It doesn't seem to be comprehensive. For instance, all the challenges related to integration of RE are neglected.	Relevant Text deleted.
Keigo Akimoto (Research Institute of Innovative Technology for the Earth (RITE))	SPM	3	19	3	21	-	-	-	This sentence is unclear, and should be revised.	Relevant Text deleted.
Gunnar Luderer (Potsdam Institute for Climate Impact Research)	SPM	3	26	-	-	-	-	-	This statement is rather abstract. What are the implications for policymakers?	Relevant Text deleted.
Finland (Finniah Meteorological Institute)	SPM	3	19	3	22	-	-	-	While the sentence is true, it is not well balanced as there are also many instances where emphasizing RE is in conflict with other development priorities. Present research cannot tell the relative importance of positive synergies and negative conflicts.	Relevant Text deleted.
United Kingdom (Department of Energy and Climate Change)	SPM	3	32	-	-	Introduction	-	-	A general omission in the technical summary and hence reflected in the summary for policy makers is the lack of reference or discussion on energy return on investment or net energy. The inclusion of this discussion as well as the net energy returns for the renewable energy options discussed would require an additional bullet after line 32 stating - "assessment of their Energy Return on Investment.	A thorough discussion of LCOEs encompasses cost considerations in the SPM. It appears within the RE technologies section.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
United Kingdom (Department of Energy and Climate Change)	SPM	3	40	-	-	Introduction	-	-	The Technical Summary requires a section on Energy Return on Investment so the Introduction should reflect this with mention of this as an additional bullet point stating "Assessment of Energy Returns on Investment of different Renewable Energy sources."	A thorough discussion of LCOEs encompasses cost considerations in the SPM. It appears within the RE technologies section.
Canada (Environment Canada)	SPM	4	0	-	-	-	-	-	Sections 2 and 3 bounce between a focus on RE and a broader focus on climate change and energy in general; it is not until midway through section 3 that the focus remains on RE issues. While some contextual information on climate change and energy is required, we suggest that these sections be reviewed to ensure that the information presented is concise and essential to supporting the "thesis" identified on pg. 3, line 8.	Rewritten for SPM FD to present a clearer focus on RE, and to streamline information to support key messages.
Canada (Environment Canada)	SPM	4	4	4	29	2.1	-	-	Suggest that another option for structuring this section would be to introduce the concept of climate change as a driver for a low-carbon economy, and then explaining and justifying.	Section has been restructured.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	4	4	4	4	-	-	-	The section provides a number of arguments for pursuing a low carbon economy. The term 'driver' in the section heading however, is usually applied to factors that promote a certain development. I do not think the section heading covers its content and suggest to change the heading to read; "2. Arguments for a Low-Cabon Economy".	Section substantially rewritten to better reflect title and clearly present drivers and solutions.
Finland (Finniah Meteorological Institute)	SPM	4	4	-	-	-	-	-	The title might be better like this: Curbing climate change	Title revised to better reflect contents as 'drivers and solutions for a low-carbon economy'
Andreas Fischlin (Systems Ecology, IBZ, ETH Zurich)	SPM	4	6	4	7	2.1	-	-	I do not believe this statement is a correct representation of a key message from AR4 WGI. First uncertainty guidance was used by WGI and that does not state make statements of the form 90% likelihood. If numbers should be mentioned then they should be at leat 90% but less than 99%. Moreover, to lump together climate change detection and human cause is not a particular good idea and I suggest authors treat these two items separately. Finally, associating the same probability with the two statements, i.e. (i) climate change [CC] has been detected and (ii) CC is anthropogenic are very unlikely to have the same probability figure.	Text amended to directly quote AR4 findings.
Japan (the Japanese Ministry of Foreign Affairs)	SPM	4	6	-	-	-	-	-	"is a 90 percent likelihood" should be written as defined: "very likely >90%"	Text amended to directly quote AR4 findings.
Manfred Orgis (Ministry of Environment)	SPM	4	6	4	9	-	-	-	It is suggested to address also climate sensitivity as the uncertainty related to climate sensitivity also contributes significantly to the uncertainty reflected by the range provided.	Text amended to directly quote AR4 findings.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
France (MEEDDM (Ministry of Ecology, Energy, Sustainable Development and the Sea))	SPM	4	6	-	-	-	-	-	Replace ""The IPCC¿s 2007 AR4 concluded that there is a 90 percent likelihood that global warming is happening and that most of it is caused by human actions"" by the more accurate statement ""The IPCC¿s 2007 AR4 concluded that global warming is unequivocial and that there is a 90 percent that most of it is caused by human actions""	Text amended to directly quote AR4 findings.
Steve Sawyer (Global Wind Energy Council)	SPM	4	6	4	6	-	-	-	should be '¿AR4 concluded that there is a >90% likelihood that¿' see AR4 SYR SPM p5 "Most of the observed increase in global average temperatures since the mid-20th century is very likely due to the observed increase in anthropogenic GHG concentrations.7" as well as the AR4 uncertainty guidance, where 'very likely' = >90%	Text amended to directly quote AR4 findings.
Canada (Environment Canada)	SPM	4	6	4	7	-	-	-	This is not correct. The SPM of the WG1 AR4 report states 'Warming of the climate system is unequivocal'. It also states 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'. Very likely means >90% likelihood. Thus this should be reworded 'The IPCC's 2007 AR4 concluded that global warming is unequivocal and that it is very likely that most of this warming is due to human emissions of greenhouse gases'. Alternatively replace 'it is very likely' with 'there is >90% likelihood'. Note that 'human actions' is not the same as 'human emissions of greenhouse gases', since the former included aerosol forcing, which is very uncertain- the WG1 statement specifically refers to GHGs for this reason.	Text amended to directly quote AR4 findings.
China (China Meteorological Administration)	SPM	4	6	4	7	2,1	-	-	The IPCC AR4 2007 concluded "there is a 90 percent likelyhood that global warming is happening and that most of it is caused by human action" should be changed into the original AR4 text as follows:" Warming of the climate system is unequivocal. 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." The current text is a wrong elaboration on IPCC conclusion.	Text amended to directly quote AR4 findings.
Australia (0)	SPM	4	7	4	9	-	-	-	Make explicit that AR4/SRES scenarios reflect non-mitigation conditions	Text amended to directly quote AR4 findings.
Gian-Kasper Plattner (IPCC WGI TSU, University of Bern)	SPM	4	8	-	-	-	-	-	"AR4 ¿ projected that, by the end of this century, global annual average temperature will have risen" -- suggest to rewrite making it clear that (1) those results are not based on "IPCC projections", but simulations carried out under the community-driven CMIP-3 project and assessed by IPCC WGI, (2) that these results are indeed projections, not predictions, thus avoiding formulations like "will have risen", which could be easily be misinterpreted. --> thus write something along the lines of "Global annual average temperature projections for the end of the century reported in IPCC AR4 WGI range from 1.1. to 6.4oC, depending on..."	Text amended to directly quote AR4 findings.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Germany (Federal Ministry for the Environment, Nature Conservation and Nuclear Safety)	SPM	4	8	4	9	-	-	-	Note that for good reason, the IPCC AR4 made a very conscious choice not to report an overall uncertainty range for end-of-century warming, but only to report scenario-specific ranges. This should not be disregarded here. Thus, revise to say: "¿ will have risen by between 1.1 to 2.9 for the lowest non-mitigation scenario and 2.4 to 6.4 for the highest assessed non-mitigation scenario"	Text amended to directly quote AR4 findings.
Gian-Kasper Plattner (IPCC WGI TSU, University of Bern)	SPM	4	8	-	-	-	-	-	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.	Relevant text deleted in rewrite.
Steve Sawyer (Global Wind Energy Council)	SPM	4	8	4	9	-	-	-	should be be '¿will have risen by between 1.1° and 6.4+N9compared to the 1980-1999 average, or 1.6 to 6.9 compared to the 1850-1899 (pre-industrial) average...' See AR4 SYR SPM table SPM.1 - esp. note (d)	Relevant text deleted in rewrite.
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	SPM	4	9	-	-	2.1	-	-	Does [1.1.1.] refer to AR4 or to the SRREN?	SRREN. Clarified in introduction to SPM FD.
Andreas Fischlin (Systems Ecology, IBZ, ETH Zurich)	SPM	4	9	4	9	2.1	-	-	Not carefully enough worded: This range is first a particular confidence interval and subsumes not only scenario assumptions, notably IPCC SRES scenarios, but also uncertainties on responses of the climate system as have entered the quantitative projections from which these figures have been derived.	Relevant text deleted in rewrite.
Andreas Fischlin (Systems Ecology, IBZ, ETH Zurich)	SPM	4	10	4	11	2.1	-	-	Daring and questionable statement that needs refinement. I believe it can't be found in this simplistic form in the AR4.	Relevant text deleted.
Alex Nauels (IPCC WGI TSU, University of Bern)	SPM	4	10	4	11	-	-	-	Comment by Alex Nauels, Science Assistant WGI TSU, University of Bern: sentence "Climate change is a major consequence of the more fundamental problem of unsustainable development" -- this is somewhat confusing, in particular why unustainable development should be a "more fundamental problem" than "climate change". What's this based on? Please provide a reference.	Relevant text deleted.
Germany (Federal Ministry for the Environment, Nature Conservation and Nuclear Safety)	SPM	4	10	4	11	-	-	-	Delete the sentence "Climate Change is a major consequence of the more fundamental problem of unsustainable development". The following sentences capture the cycle of unsustainable development and climate change better. The current sentence wrongly characterizes climate change simply as a consequence, not as a reason for why the development path is unsustainable. Thus, it seems best to delete that sentence.	Relevant text deleted.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Australia (0)	SPM	4	10	4	11	-	-	-	First sentence about sustainable development is new and not found in AR4. Climate change is a problem of failure to recognise (and price) the externality costs of emitting greenhouse gases. It is a step too far to link climate change with unsustainable development in general - the SRREN is not the place to mount this case (even if it were true).	Relevant text deleted.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	4	10	4	11	-	-	-	I think the positioning of CC in relation to SD may invite a lot of debate that is not functional. I therefore suggest to change the sentence to read: "Climate change is a major element of unsustainable development.".	Relevant text deleted.
France (MEEDDM (Ministry of Ecology, Energy, Sustainable Development and the Sea))	SPM	4	10	-	-	-	-	-	Not a scientific statement. Replace by ""Climate change is a major consequence of the anthrpogenic GHG emissions	Relevant text deleted.
Finland (Finniah Meteorological Institute)	SPM	4	10	4	15	-	-	-	This para could be shortened. Delete the first two sentences. Modify the beginning of the last sentence: The AR4 concluded that the impacts.... Then combine this sentence to the para above in line 9.	Relevant text deleted.
Nico Bauer (Potsdam Institute for Climate Impact Research)	SPM	4	10	4	15	-	-	-	where are these statements in the underying chapter? Reference to section missing as well	Relevant text deleted.
China (China Meteorological Administration)	SPM	4	10	4	11	2,1	-	-	The sentence "Climate change is a major consequence of the more fundamental problem of unsustainable development" should be changed into "Climate change can be induced as a consequence of the more fundamental problem of unsustainable development." as the problem of climate change is joint consequence of human activity and natural variation.	Relevant text deleted.
Andreas Fischlin (Systems Ecology, IBZ, ETH Zurich)	SPM	4	11	4	13	2.1	-	-	It is not just human systems that are directly impacted by CC. There are also indirect effects through CC impacts on natural systems, including water systems, ecosystems, agriculture (from hardly managed to intensively managed agroecosystems) etc. This statement falls short on describing well the full range of the CC impacts.	Relevant text deleted.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	4	11	4	11	-	-	-	For clarity I suggest to insert "(WGII)" after "AR4".	Relevant text deleted.
France (MEEDDM (Ministry of Ecology, Energy, Sustainable Development and the Sea))	SPM	4	11	15	15	-	-	-	Were such statements approved as part of an AR4 SPM ? Quote precise wording.	Relevant text deleted.
France (MEEDDM (Ministry of Ecology, Energy, Sustainable Development and the Sea))	SPM	4	12	-	-	-	-	-	Delete ""fundamentally""	Relevant text deleted.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Modesto Fernandez Diaz-Silveira (Ministry of Science, Technology and Environment)	SPM	4	15	-	-	-	-	-	It is not really in this way. There is a common understanding that impacts of climate change will be worst for poor people in developing countries in an extent that will be surpassing that felt by poor people in developed countries. It is a mistake to put both categories at the same level. I agree that both groups will be suffering the consequences of climate change, but with significant differences.	Relevant text deleted.
Gian-Kasper Plattner (IPCC WGI TSU, University of Bern)	SPM	4	15	-	-	-	-	-	replace significant with, e.g., substantial if significant here does not carry a statistical meaning	Relevant text deleted.
United Kingdom (Department of Energy and Climate Change)	SPM	4	16	15	20	2.1	-	-	Some reference to the impact of agriculture should be made here	Reworded to clarify that energy related emissions are only one contributor. Focus, though remains on energy as this is the focus of the SRREN.
Gian-Kasper Plattner (IPCC WGI TSU, University of Bern)	SPM	4	16	4	17	-	-	-	"GHGs carbon dioxide" --> "GHG carbon dioxide" (mixing plural and singular)	Relevant text deleted.
¿vind Christophersen (Climate and Pollution Agency)	SPM	4	16	-	17	-	-	-	Delete "heat trapping" or otherwise rewrite this sentence	Accepted.
Japan (the Japanese Ministry of Foreign Affairs)	SPM	4	16	4	20	-	-	-	It is certainly important to pay attention to inadvertent products like fugitive gas from pipelines. But the statement here gives a misleading impression that cited activities are the only cause of increase in methane concentrations, while the agriculture is another major driver of increasing methane. We propose to insert any remark to delimt the range in which this statement is correctly applied. For example, inserting "in energy supply sector," before "methane as an inadvertent product of ..." in line 17 would be appropriate. "Over 80% of primary energy1 comes from fossil fuels, which produce the heat trapping GHGs carbon dioxide as the products of combustion and, in energy supply sector, methane as an inadvertent product of drilling, mining and transporting those fuels."	Reworded to clarify that energy related emissions are only one contributor. Focus, though remains on energy as this is the focus of the SRREN.
Brazil (Ministry of Science and Technology)	SPM	4	16	4	17	-	-	-	Remove the phrase ¿carbon dioxide¿ to broaden the scope of the sentence. The production of fossil fuels also releases significant amounts of methane.	Relevant text deleted.
France (MEEDDM (Ministry of Ecology, Energy, Sustainable Development and the Sea))	SPM	4	16	15	20	-	-	-	The present wording suggests that energy production is the only source, which is not true, specially as far as methane is concerned	Reworded to clarify that energy related emissions are only one contributor. Focus, though remains on energy as this is the focus of the SRREN.
China (China Meteorological Administration)	SPM	4	17	4	18	2,1	-	-	GHG carbon dioxide should be changed into "GHGs" as carbon dioxide is GHG.	Accepted.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Canada (Environment Canada)	SPM	4	18	4	19	-	-	-	Delete 'When measured by their comparative global warming potentials'. This caveat isn't needed. CO2 and CH4 have contributed the largest radiative forcing increase since preindustrial (e.g. IPCC AR4, WG1, Fig SPM.2). We could simulate the climate response to these forcings individually and would find that they have made the largest contributions to the warming. There is no need to refer to GWPs here.	Relevant text deleted in rewrite.
Andreas Fischlin (Systems Ecology, IBZ, ETH Zurich)	SPM	4	19	4	20	2.1	-	-	I do not call 55% a majority and if the uncertainty with emissions from LUC are considered, roughly half-half would be more adequate. That fossil fuels started to dominate the picture is true, but this statement is about past accumulated effects. The authors should check the figures and revise the statement accordingly.	Relevant text deleted in rewrite.
Finland (Finniah Meteorological Institute)	SPM	4	21	4	29	-	-	-	Please add as the last sentence on line 29: In order to achieve this, there is a need to shift to low carbon energy sources for energy services. The language in the Technical summary; page5, lines 21-26, is useful in developing this para.	Relevant text deleted in revised text.
Emmanuel Branche (Electricité de France)	SPM	4	21	4	21	-	-	-	Replace "CO2" by "CO2e", as it is carbon dioxide equivalent (e.g. all greenhouse gases)	Accepted.
Jorge Bonnet Fernández-Trujillo (Agencia Canaria de Desarrollo Sostenible y Cambio Climático)	SPM	4	21	4	21	-	-	-	The main problem is CO2 emissions not Carbon emissions (CO is also a Carbon compound emission but it is not a GHG). Please add "dioxide" after "Carbon" and before "emissions". If the authors want to include all the green house gases then "Carbon" could be replaced with "GHG"	Accepted.
Nico Bauer (Potsdam Institute for Climate Impact Research)	SPM	4	21	-	-	-	-	-	There is no reference to other GHGs.	Accepted.
China (China Meteorological Administration)	SPM	4	21	4	22	2,1	-	-	The number 390 needs to be reconfirmed as the latest WMO report indicate the GHG concentration in 2008 is 385ppm, the global GHG concentration will not exceed 390ppm in year 2010 even if the concentration is increasing with a rate of 2ppm per year.	Accepted.
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	SPM	4	23	-	24	2.1	-	-	This sentence is controversial. Does it reflect the current discussion? The AR4 number have often been misinterpreted as necessary conditions but they just analysed the scenarios available at that time.	Relevant text deleted in rewrite.
Japan (the Japanese Ministry of Foreign Affairs)	SPM	4	23	4	24	-	-	-	Here the meaning of "target" is uncertain. Also, as there is no agreed target for limiting global temperature increases, this sentence is misleading.	Relevant text deleted in rewrite.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Germany (Federal Ministry for the Environment, Nature Conservation and Nuclear Safety)	SPM	4	23	4	24	-	-	-	IPCC AR4 (see e.g. Table 5.1 in IPCC SYR) concluded form its literature review that 2015 is the latest peaking date for the lowest class of scenarios that have a chance to limit warming to 2C. Thus, revise "in the coming decade" to "in this decade".	Relevant text deleted in rewrite.
Keigo Akimoto (Research Institute of Innovative Technology for the Earth (RITE))	SPM	4	23	4	24	-	-	-	The sentence ""in order to meet targets for limiting temperature increase"" is unclear, and should be reviesed.	Relevant text deleted in rewrite.
Manfred Orgis (Ministry of Environment)	SPM	4	23	4	29	-	-	-	This text is too policy prescriptive as no agreement has been achieved on a long-term target. It is suggested to delete this text	Accepted.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	4	23	4	24	-	-	-	Without specification this statement is untrue. I therefore suggest to insert "currently debated in the UNFCCC" after "targets".	Relevant text deleted in rewrite.
China (China Meteorological Administration)	SPM	4	23	4	29	2,1	-	-	This section should not refer to any single temperature increase targets because 2 °C or 1.5 °C still does not reach a concensus, the long-term target still depends on international negotiations under UNFCCC. This report as a scientific report should not prejudge the outcome from ongoing negotiation. The exact conclusion or findings from AR4 should be used as follows "In order to stabilize the concentration of GHGs in the atmosphere, emissions would need to peak and decline thereafter. The lower the stabilization level, the more quickly this peak and decline would need to occur. Mitigation efforts over the next two to three decades will have a large impact on opportunities to achieve lower stabilization levels."	Relevant text deleted in rewrite.
Roberto Acosta Moreno (CITMA)	SPM	4	24	-	-	2.1	-	-	I suggest to add a footnote when the Copenhagen Accord is mentioned. The content of the footnote as follows: ""The 15th Conference of Parties of the UNFCCC took note of this accord. See decision 2/CP.15"" . Comment: this is important to indicate the origen, characteristics and bibliographic source of the Copenhagen Accord.	Relevant text deleted in rewrite.
Roberto Acosta Moreno (CITMA)	SPM	4	24	-	-	2.1	-	-	I suggest to delete ""now"" . It is unnecessary and can mislead the reader.	Relevant text deleted in rewrite.
Japan (the Japanese Ministry of Foreign Affairs)	SPM	4	24	-	26	-	-	-	"advocate" should be changed in relation with "the Copenhagen Accord," which only "recognizes" the scientific view that the increase in global temperature should be below 2 degrees Celsius and "agrees that deep cuts in global emissions are required according the science and as documented by the IPCC Fourth Assessment Report with a view to reduce global emissions so as to hold the increase in global temperature below 2 degrees Celsius." Also, there is no reference to "below preindustrial values" in the Copenhagen Accord.	Relevant text deleted in rewrite.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Modesto Fernandez Diaz-Silveira (Ministry of Science, Technology and Environment)	SPM	4	24	-	-	-	-	-	Better than to quote "many governments and the Copenhagen Accord", it is more appropriate to say that "The trend of negotiations under the Climate Change Convention during the last years clearly advocate that to avoid..." and continue to the end of the sentence.	Relevant text deleted in rewrite.
Keigo Akimoto (Research Institute of Innovative Technology for the Earth (RITE))	SPM	4	24	4	27	-	-	-	Copenhagen Accord does not mention that 2 degrees limit ""below preindustrial values"". The sentence should be revised.	Relevant text deleted in rewrite.
United States (U.S. Department of State)	SPM	4	24	-	-	-	-	-	Delete "and the Copenhagen Accord now advocate" and replace with "have noted".	Relevant text deleted in rewrite.
Australia (0)	SPM	4	24	4	27	-	-	-	Reference to 1.5 degrees C does not align with Chapter 1, page 4, lines 6 to 7. SPM should accurately reflect Copenhagen Accord reference to limiting warming to below 2 degrees C.	Relevant text deleted in rewrite.
Arthur Lee (Chevron Corporation)	SPM	4	24	-	27	-	-	-	The phrasing here is not accurate. The ""¿Copenhagen Accord advocates¿"" The Copenhagen Accord does not advocate. It is a non-binding agreement that recognizes the 2 degrees goal. That would be a more accurate description. It is correct to separate ""Many governments advocate, and the Copenhagen Accord recognizes..."" which would be a better and more accurate statement. Yes, I agree with the description that small island developing states are advocating a 1.5 degree rise limit.	Relevant text deleted in rewrite.
Nico Bauer (Potsdam Institute for Climate Impact Research)	SPM	4	24	4	27	-	-	-	This is a strong statement. The copenhagen accord makes a different notion. Please keep closer to the original statement.	Relevant text deleted in rewrite.
Japan (the Japanese Ministry of Foreign Affairs)	SPM	4	26	-	-	-	-	-	"2 degrees C BELOW preindustrial values" should be "2 degrees C ABOVE preindustrial values"	Relevant text deleted in rewrite.
Gian-Kasper Plattner (IPCC WGI TSU, University of Bern)	SPM	4	26	-	-	-	-	-	"to hold temperature rises to less than 2oC below preindustrial values" --> "to less than 2oC ABOVE preindustrial values"	Relevant text deleted in rewrite.
¿vind Christophersen (Climate and Pollution Agency)	SPM	4	26	-	-	-	-	-	Change "below preindustrial values" to "above preindustrial values"	Relevant text deleted in rewrite.
Steve Sawyer (Global Wind Energy Council)	SPM	4	26	4	27	-	-	-	suggest '¿preindustrial values¿with more than 100 countries, including small island developing states, calling for limiting the temperature increase to below 1.5°C	Relevant text deleted in rewrite.
United States (U.S. Department of State)	SPM	4	26	4	27	-	-	-	Text should read "¿less than 2 C below preindustrial values. Some small island developing states and other less developed countries have supported limiting¿"	Relevant text deleted in rewrite.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Nico Bauer (Potsdam Institute for Climate Impact Research)	SPM	4	26	4	27	-	-	-	where is this in the underlying chapter? Reference to section missing as well	Relevant text deleted in rewrite.
Roberto Acosta Moreno (CITMA)	SPM	4	27	-	-	2.1	-	-	I suggest to substitute ""less developed countries"" by ""developing countries"". Comment: No only less developed countries are asking for limiting temperature increases below 1.5o C., but other developing countries, such as Bolivia that it is requesting to limit the increase to 1oC. Other developing countries (no belonging to less developed countries) are also supporting this position.	Relevant text deleted in rewrite.
Juan Jose Sanchez (Ministry of the Environment, and Rural and Marine Affairs)	SPM	4	27	-	-	-	-	-	Even 1ºC (i.e.: Bolivia)	Relevant text deleted in rewrite.
Japan (the Japanese Ministry of Foreign Affairs)	SPM	4	27	4	29	-	-	-	It is not appropriate to cite only one scenario category. 2 degrees Celsius is not a "goal" but the one of the estimation provided in the IPCC scinarios.	Relevant text deleted in rewrite.
United States (U.S. Department of State)	SPM	4	27	4	29	-	-	-	Replace "to achieve this goal will" with "achieving this goal would".	Relevant text deleted in rewrite.
Germany (Federal Ministry for the Environment, Nature Conservation and Nuclear Safety)	SPM	4	27	4	29	-	-	-	The current sentence regarding AR4 has three inaccuracies: a) The AR4 statement is about CO2 only, b) the peaking date is 2015, not 2020 and c) It is not clear, whether THIS GOAL refers to 1.5 or 2C. See Table 5.1 in AR4 Synthesis Report. Thus, rephrase to read: "The AR4 indicated that to achieve this 2C goal will require global GHG	WILL STATE CORRECTLY FROM AR4
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	4	27	4	29	-	-	-	To be accurate, I suggest to add "at the latest" after "and begin to decline by 2020".	Relevant text deleted in rewrite.
Gian-Kasper Plattner (IPCC WGI TSU, University of Bern)	SPM	4	28	-	-	-	-	-	"indicated that to achieve this goal will require" --> "indicated that achieving this goal will require"	Relevant text deleted in rewrite.
United Kingdom (Department of Energy and Climate Change)	SPM	4	28	-	29	-	-	-	While overall global reductions must be 50%, the figure is misleading because it fails to distinguish between the developed and developing worlds (or ANNEX I and Annex II nations). The developed world will need to reduce by somewhat more than 80% while the developing world's required reduction will be much less as they have been given much more head room in which to develop. This should be reflected in the figure. The figure is not incorrect as it stands, but rather fails to produce the complete picture of interest.	Relevant text deleted in rewrite.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Andreas Fischlin (Systems Ecology, IBZ, ETH Zurich)	SPM	4	29	4	29	2.1	-	-	Why not mentioning then also all relevant figures from Box 13.7? Gupta, S., Tirpak, D. A., Burger, N., Gupta, J., N. Höhne, Boncheva, A. I., G. Kanoan, M., Kolstad, C., Kruger, J. A., Michaelowa, A., Murase, S., Pershing, J., S. T., & Sari, A., 2007. Policies, instruments and co-operative arrangements. In: Metz, B., Davidson, O. R., Bosch, P. R., Dave, R., & Meyer, L. A. (eds.). Climate change 2007: Mitigation. Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC). Cambridge University Press: Cambridge, UK. 746-807. (http://www.ipcc.ch)	Relevant text deleted in rewrite.
Steve Sawyer (Global Wind Energy Council)	SPM	4	29	4	29	-	-	-	should be '¿to begin declining by 2015.' See AR4 SYR SPM table SPM 6 - as well as Chapter 1 p 4 line 8 of this SOD	Relevant text deleted in rewrite.
¿vind Christophersen (Climate and Pollution Agency)	SPM	4	30	5	12	-	-	-	Both the bold text and the rest of section 2.2.focus too much on "text-book" issues. The text could benefit from shortening an more focus on which results that can assist the policymakers in there development of strategies. E.g. that the strategies could be more effective if it take into account the differences between countries at different levels of development, that there is a need to address energy security and sustainability in a climate change perspective etc.	Accepted. Shortened and made more policy relevant.
Finland (Finniah Meteorological Institute)	SPM	4	30	-	-	-	-	-	The title might be better like this: Provision of secure and sustainable energy services.	Sub-title deleted in revised version.
China (China Meteorological Administration)	SPM	4	30	4	30	2,2	-	-	The title should be changed into "Secure sustainable energy supply" because the access to energy is a primary requirement for energy supply. Then such system should be sustainable as explained in the following two paras.	Sub-title deleted in revised version.
United Kingdom (Department of Energy and Climate Change)	SPM	4	31	15	31	2.2	-	-	Health is included in welfare and could be omitted	authors WISH TO HIGHLIGHT HEALTH, though will reorganize text to clarify.
Helmut Haberl (Institute of Social Ecology, Vienna)	SPM	4	31	4	37	-	-	-	I think that this para would greatly profit from a sound definition of "energy services" and their clear distinction from energy flows such as primary, final or useful energy. This is a prerequisite for understanding many important (large and/or cost-effictive) energy conservation potentials, e.g. those from 'low energy houses': Their most important feature is that they need little useful energy (e.g. heat) to provide comfortable living or working space	Full definition appears in SRREN glossary.
United States (U.S. Department of State)	SPM	4	31	4	32	-	-	-	This sentence is awkward. Energy services are directly related to economic development but their role in human health and well-being is outside the scope of this report. Rephrase as: "Access to energy services is fundamental for economic development."	Accepted.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Roberto Acosta Moreno (CITMA)	SPM	4	32	4	34	2.2	-	-	I suggest to stop the first sentence after ""essential energy services"". I also suggest to modify the following new sentence as follows: ""However, energy services varies markedly for those at the subsistence level in developing countries, which are in many cases far from being secure, and those living in an energy intensive economy"". Comment: the objective of the two changes introduced in the sentence is to avoid the perception that the concept ""secure energy services"" could be different for those at the subsistence level than for those living in an energy intensive economy"".	Relevant text deleted in rewrite.
United Kingdom (Department of Energy and Climate Change)	SPM	4	32	15	37	2.2	-	-	Not sure what the key points are - is it that what is required to be secure depends on context or that different energy systems meet needs at different levels with different resources and characteristics or something else?	Paragraph rewritten to remove discussion on differing energy systems, clarifying key points.
Finland (Finniah Meteorological Institute)	SPM	4	32	4	37	-	-	-	The first sentence (line 31) starts out well, but the rest of the para is lacking future orientation. That would be useful.	Accepted. Second half of paragraph removed in rewrite.
Nico Bauer (Potsdam Institute for Climate Impact Research)	SPM	4	32	4	37	-	-	-	where is this in the underlying chapter? Reference to section missing as well	underlying references clarified.
Arthur Lee (Chevron Corporation)	SPM	4	36	-	36	-	-	-	For the later¿"" should be ""For the latter¿""	Accepted.
Canada (Environment Canada)	SPM	4	36	4	36	-	-	-	Typographic error: Change "later" to "latter"	Accepted.
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	SPM	4	38	4	40	-	-	-	Delete "and socially acceptable", and amend the sentence as follows;[original] "Sustainable energy services require the ongoing delivery of energy resources over time that are economically affordable, environmentally sustainable (low pollution and carbon dioxide emissions) and socially acceptable." [proposed amendment] "Sustainable energy services require the ongoing delivery of energy resources over time that are economically affordable, environmentally sustainable (low pollution and carbon dioxide emissions)." <reason> This phrase for defining sustainable energy service is misleading. It seems to be one-sided description from "anti-nuclear."	THIS IS DEFINITION OF SUSTAINABLE DEVELOPMENT
Australia (0)	SPM	4	38	5	4	-	-	-	Here there is some attempt to define 'economically affordable', 'environmentally sustainable' and 'socially acceptable'. However, confusion is also introduced. Presumably 'economically sustainable' is meant to read 'economically affordable'; and 'socially sustainable' is meant to read 'socially acceptable'? If not, what do these other terms mean that is different? It is suggested the sentence Page 5 lines 1-2 read "It must also be economically affordable in terms of using scarce resources to promote human well-being."	Rewritten to CLARIFY

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	SPM	4	38	5	4	-	-	-	Some additional reference to ""low risk"" could improve the description and perception of what is ""sustainable""	WILL CLARIFY USE OF SUSTAINABLE
Nico Bauer (Potsdam Institute for Climate Impact Research)	SPM	4	38	5	4	-	-	-	Where is this in the underlying chapter? Reference to section missing as well; Furthermore: definitions are confusing and intertwined: what is economically affordable? Economically sustainable? What is the best possible way accorfding to criteria of human well-being?	IT IS IN CH 1 WILL CLARIFY AND REFERENCE
Modesto Fernandez Diaz-Silveira (Ministry of Science, Technology and Environment)	SPM	4	40	-	-	-	-	-	It is important to have an idea of what "socially acceptable" means. It is very important when dealing with biofuels, and also, to a certain extent, wit forest products (wood and non-wood). In the case of biofuels, it could be linked to not affecting the "right to food" (as an FAO concept) and the access to human food in a fair way, including through not increaing food prices (being accessible, mainly to poor people) and with a minimum acceptable of quality.	terminology removed from SPM text.
United States (U.S. Department of State)	SPM	4	40	4	41	-	-	-	Replace "In order for¿" with "A sustainable energy source must be able to produce¿".	Relevant text deleted.
Canada (Environment Canada)	SPM	4	40	4	40	-	-	-	Suggest adding "considered" as follows: "In order for an energy source to be considered sustainable¿"	Accepted.
Manfred Orgis (Ministry of Environment)	SPM	4	40	5	4	-	-	-	This text looks like a definition of a sustainable energy source. However, the text does not reflect such definition already developed. It is suggested to include already agreed language.	Accepted.
United Kingdom (Department of Energy and Climate Change)	SPM	4	41	15	41	2.2	-	-	Low greenhouse gas emissions?	UNCLEAR PAGE REFERENCE
Germany (Federal Ministry for the Environment, Nature Conservation and Nuclear Safety)	SPM	4	41	4	41	-	-	-	Add ", zero or net negative " after "¿ to continue producing energy over time with low ". Reason: Just "low" emissions will not be sufficient to limit warming and sea level rise over time. Thus at least some part of the energy production has to happen with zero or net negative emission levels (biomass & CCS).	NO REFERNCE TO SUPPORT THIS CONTENTION
Brazil (Ministry of Science and Technology)	SPM	4	41	-	-	-	-	-	Carbon dioxide should be replacedby ""GHG"", in order to broaden the scope of the sentence.	Accepted.
Michael Jack (Scion (NZ Forest Research Institute))	SPM	4	41	5	1	-	-	-	should read ""to continue producing energy over time with comparitively lower envirnmental impacts inparticular GHG emissions.""	Sentence revised for clarity. GHG emissions mentioned later in paragraph.
¿vind Christophersen (Climate and Pollution Agency)	SPM	4	-	-	-	2.1	-	-	Please include estimates of the world's remaining fossil fuel estimate and when these will be exempted diven the current demand. It will be enlightning in order to better understand the point of energy security.	SRREN does not include literature on remaining fossil fuel reserves.
Finland (Finniah Meteorological Institute)	SPM	4	-	-	-	-	-	-	The whole section 2.2. needs more substance in the area of energy security. This is, in fact, a key issue for wider use of renewables.	Paragraph on energy security introduced in Section SPM.5 of FD.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
United States (U.S. Department of State)	SPM	5	1	5	4	-	-	-	Replace the sentence that begins "It must also be economically¿" with "Also, the amount of economic investment in sustainable energy services should be commensurate with the overall benefits to society."	Good suggestion. Sentence rewritten in a more general way, but reflecting these sentiments.
Roberto Acosta Moreno (CITMA)	SPM	5	2	-	-	2.2	-	-	I suggest to delete ""scarce"" . Comment: No always can be used scarce resources. The key concept is ""in the best possible way"" as it is mentioned in the sentence.	Accepted.
Gian-Kasper Plattner (IPCC WGI TSU, University of Bern)	SPM	5	2	5	3	-	-	-	delete "to be sustainable" in "to be sustainable, the technology must be socially sustainable"?	Accepted.
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	SPM	5	2	5	4	-	-	-	Delete the sentence below; "Finally, to be sustainable, the technology must be socially sustainable in terms of providing livelihoods and maintaining social and political acceptance" <reason> It makes issues extremely political to refer to social and political acceptance in defining sustainability of energy.	SOCIAL SUSTAINABILITY IS PART OF THE DEFINITION OF SUSTAINABLE DEVELOPMENT
David Clubb (European Environment Agency)	SPM	5	2	5	4	-	-	-	I disagree with the criterion that a sustainable energy source must necessarily provide livelihoods. If we could obtain an energy source with zero pollution and very low cost which didn't contribute towards employment, I still think it would be worth pursuing.	JOBS ARE SEEN AS AN ECONOMIC AND SOCIAL BENEFIT TO SOCIETY
Steve Sawyer (Global Wind Energy Council)	SPM	5	2	5	3	-	-	-	I find the sentence beginning with 'It must also be conomically sustainable¿' very confusing. What are criteria of human-well being, and how do they get translated 'in the best possible way' to achieve economic sustainability? Suggest clarification of concepts or deletion.	Accepted. Revised to clarify.
Japan (the Japanese Ministry of Foreign Affairs)	SPM	5	2	-	4	-	-	-	The idea that a technology should be "socially sustainable" does not make sense and requires further explanation. Furthermore, the preceding sentences have discussed the sustainablility of energy sources, and so should this sentence.	SOCIAL SUSTAINABILITY IS PART OF THE DEFINITION OF SUSTAINABLE DEVELOPMENT
Richard Taylor (International Hydropower Association)	SPM	5	3	5	3	2	-	-	Insert ""limiting social impacts"" after ""of"" and before ""providing""	Relevant text deleted.
Helmut Haberl (Institute of Social Ecology, Vienna)	SPM	5	3	-	-	-	-	-	I suggest to insert "maintaining, enhancing or even" before "providing livelihoods"	Relevant text deleted.
Modesto Fernandez Diaz-Silveira (Ministry of Science, Technology and Environment)	SPM	5	4	-	-	-	-	-	As in the previous comment: it should be defined what social and political acceptance means, taking into account the special conditions and needs of developing countries. It is a concept that could be interpreted in many different ways, in different countries, or even different regions in the world.	Relevant text deleted.
Finland (Finniah Meteorological Institute)	SPM	5	4	5	16	-	-	-	The lists: It might be better to use the full text from the technical report - much clearer.	No list appears at location comment specifies. Unclear.
Michael Jack (Scion (NZ Forest Research Institute))	SPM	5	5	5	5	-	-	-	Need to define ""systems perspective""	Relevant text deleted.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Nico Bauer (Potsdam Institute for Climate Impact Research)	SPM	5	5	5	6	-	-	-	The paragraph starts with a promissing sentence that starts with the the system perspective and the multi-scale problem. Unfortunately, the paragraph does not come back to the system perspective but delivers a list of issues related to development problems. This paragraph can be improved by relating the issues to the lond/short term and local/global scales that may be catpured by the system perspective.	Relevant text deleted.
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	SPM	5	5	-	-	2.2.	-	-	add "in general" after the second "deployment".	Relevant text deleted.
Andreas Fischlin (Systems Ecology, IBZ, ETH Zurich)	SPM	5	6	5	6	2.1	-	-	The mentioning of only the MDGs appears to be unbalanced.	Relevant text deleted.
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	SPM	5	6	-	-	3	-	-	All references to chapter 10.1. are wrong. Section 10.1. does only provide a very general overview and I have not at all seen the statements there that you have concluded here. And as 1.1.4 does not provide these conclusions either, I wonder where they come from.	Relevant text deleted.
United States (U.S. Department of State)	SPM	5	6	5	12	-	-	-	The report can mention the MDGs but should not endorse and provide commentary on them.	Relevant text deleted.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	5	6	5	10	-	-	-	This listing reads a bit odd. It seems as if the MDGs push for electricity only to enable scholing at home. I suggest to change "allow domestic lighting and electricity to enable education at home" to "allow general access to electricity for households and schools".	Relevant text deleted.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	5	10	5	12	-	-	-	Although not disagreeing with the statement, the statement is not supported by the text in section 1.1.6	Rewritten in Section SPM 5 in FD to exactly reflect Ch 9 text.
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	SPM	5	10	5	12	-	-	-	Amend "clean energy"to "sustainable energy" "Quantitative measures of energy access, sustainability, and social impact will be needed to chart progress and challenges in implementing sustainable energy solutions that meet development and sustainability goals [1.1.6]." <reason>What "clean energy" means is ambiguous in the report, so it should be replace with other expression.	Rewritten in Section SPM 5 in FD to simplify and clarify.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	5	10	5	12	-	-	-	This sentence is more complicated than it needs to be. I suggest to rephrase it to read: "Better access to clean and low carbon energy, while improving sustainability and reducing negative social impacts will be needed to meet development and sustainability goals.".	Rewritten in Section SPM 5 in FD to simplify and clarify.
Nico Bauer (Potsdam Institute for Climate Impact Research)	SPM	5	10	5	12	-	-	-	Where is this in the underlying chapter?	WILL PROVIDE REFERENCE TO CORRECT SECTION

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
United Kingdom (Department of Energy and Climate Change)	SPM	5	12	-	-	Drivers for Low Carbon Economy	-	-	A key driver that has been omitted from the analysis in the report, is the depletion projection of key fossil fuels. Much has been written on the peaking of global oil production and when that might occur. There are an increasing number of credible independent studies indicating that global oil production will begin to decline within the coming 5 years. In addition, there are an increasing number of independent studies suggesting that global coal production will peak during the course of the 2020's if not before. The availability and cost of fossil fuels is certain to drive investment in renewable energy options once fossil fuels become scarce and are increasingly costly. Not only will depletion drive the adoption of renewable energy investment, it will also have a bearing on CO2 emissions as less is burned.	Noted.
¿vind Christophersen (Climate and Pollution Agency)	SPM	5	13	14	44	3	-	-	Section 3 is in our view very long and contains too much text book type of language for an SPM. We believe the text could be shortened by focusing more on the solution oriented and policy relevant material. The tables are informative while the figures could be improved.	Section rewritten for FD to shorten and focus on key messages. Unclear figures removed.
¿vind Christophersen (Climate and Pollution Agency)	SPM	5	13	-	-	3	-	-	To improve sustainable decision-making in the energy sector we propose that a box is included in section 3 describing the different tools for comparison of different energy systems and their pros and cons such as LCA-analysis, studies of the whole chain from production through transmission to end use, energy pay-back ratio etc. This could assist the policymakers in their efforts in using natural resources in the most efficient way. Furthermore it would be good with some clarification since the report refers to different tools for comparison of energy systems in an inconsistent way. LCA at several places, energy payback time mainly deleted to wind energy and energy pay-back ratio (sometimes named pay back ratio) in the TS ch. 9 and related to hydro. The different tools have different advantages and downsides. E.g. we believe energy pack-back ratio is a better tool than energy pay-back time as part of an LCA analysis since the former take into account the whole life cycle. The life cycle take into account differences in lifetime, maintenance, dismantling and waste treatment which may be very different from energy source to energy source also when comparing RE and non-renewable sources such as nuclear where the waste treatment will be an important part.	A comparative analysis of LCA GHG emissions now appears in Section SPM 5 and a comparative LCOE analysis appears in Section SPM 4.
Finland (Finniah Meteorological Institute)	SPM	5	13	-	-	-	-	-	The title ¿Solutions¿ should be developed further. How about using the title from the Technical report ¿The role of RE in addressing CC¿ (page 5, line 27) ? OR ¿ Renewable Energy in addressing climate change¿	Structure of SPM amended in FD. Solutions combined with Section 2 title and contents amended accordingly.
¿vind Christophersen (Climate and Pollution Agency)	SPM	5	13	-	-	-	-	-	We think figure TS 5.1 is informative and should be included in the SPM as well. It would be even better if it was possible to include the pay-back ratio for some non-renewable sources as well for comparison.	Noted.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Andreas Fischlin (Systems Ecology, IBZ, ETH Zurich)	SPM	5	14	5	16	3	-	-	An assertion that appears to be unfounded or comes too much in isolation. The reader needs some guidance whether this assertion will be backed up with strong findings or whether it just should believed here and now.	text will be revised
Juan Jose Sanchez (Ministry of the Environment, and Rural and Marine Affairs)	SPM	5	14	-	-	-	-	-	I would say: ""Development goals, including economic, social and environmental goals, may be pursued¿""	will be done, environment stands in this case for instance for air quality
United Kingdom (Department of Energy and Climate Change)	SPM	5	15	-	-	3	-	-	Given that infrastructure development is a long term investment need to highlight the fact that decisions made today can restrict future options (i.e. there is a danger of 'high-carbon lock-in')	its already said in line 23
Nico Bauer (Potsdam Institute for Climate Impact Research)	SPM	5	15	5	16	-	-	-	Low carbon investments do not automatically lock-out carbon intensive technologies. Policies addressing carbon emissions are necessray. The notion is necessary.	text will be revised
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	5	16	5	18	-	-	-	"Bottlenecks" and "barriers" are synonymous. Also the end of the sentence seems to have some redundancy. I therefore suggest to reformulate the sentence to read: "To address some of the barriers that untill now have hampered development, developing countries will need to invest in energy and other infrastructure that they currently lack.".	accepted.
United Kingdom (Department of Energy and Climate Change)	SPM	5	16	-	20	-	-	-	This line might be better placed in the previous paragraph, which talks about societal needs and the MDG goals. It is out of place in the existing paragraph.	no, because this describes the frame condition for investment in solutions. The latter one is the focus of this paragraph. With the re-writing the focus becomes much more clear
United States (U.S. Department of State)	SPM	5	18	-	-	-	-	-	Replace "also in terms of energy infrastructure" with "including energy infrastructure."	accepted.
United States (U.S. Department of State)	SPM	5	19	-	-	-	-	-	Insert "to invest in low-carbon growth" after "opportunity".	accepted.
Haroon Kheshgi (ExxonMobil Research and Engineering Company)	SPM	5	21	5	23	-	-	-	Should say ¿lifetime¿ and not ¿life-cycle¿. ¿Lock-in situations¿ is jargon and should be stated in plain language for the SPM.	accepted.
Richard Taylor (International Hydropower Association)	SPM	5	23	5	23	3	-	-	Delete ""avoid lock-in situations"" and replace with ""provide for adaptation"".	term lock in situation is avoided
United States (U.S. Department of State)	SPM	5	23	-	-	-	-	-	Suggest deleting "to avoid lock-in situations" since preceding portion of sentence describes this point.	term lock in situation is avoided

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
United Kingdom (Department of Energy and Climate Change)	SPM	5	23	-	-	Solutions	-	-	As fossil fuel supplies begin to decline so the risk of supply disruptions will increase. Energy related investments that create long-term lock-in to depleting resources are inherently risky. Countries that rely on the importation of fossil fuels should consider these risks carefully before making large fossil fuel investments.	thank you for the comment, we agree
Canada (Environment Canada)	SPM	5	24	5	26	-	-	-	Each of the main finding statements (in bold) should have an associated body of evidence to substantiate the finding. Suggest further elaborating the evidence for this statement.	Accepted. Text moved to Policies section, revised and elaborated.
Germany (Federal Ministry for the Environment, Nature Conservation and Nuclear Safety)	SPM	5	25	5	26	-	-	-	Rephrase "...and to maintain a supportive global climate system..." to " ¿ and to avoid dangerous anthropogenic climate change ...". Reason: The climate system has never been and will not be "supportive" for all sectors, regions and times - partially due to its variability. However, ecosystems, food production and human settlements are more or less adapted to the recent climate and its variability. The key issue here is to avoid "dangerous intereference with the climate system" - not to pretend that the climate is always supportive (as most would not say hurricanes, or heat waves are "supportive").	accepted. Text moved to Policies section, and revised according to these sentiments
United States (U.S. Department of State)	SPM	5	25	-	-	-	-	-	Replace "maintain a supportive" with "stabilize the"	Relevant text deleted in rewrite.
China (China Meteorological Administration)	SPM	5	27	6	6	3	-	-	The list of mitigation potential is not clear, firstly, there is no energy efficiency option in energy supply side, which is extremely important but is missing in list. Secondly, too much options for fuel switching. Thirdly, CHP should be a lower level option than others as it is a specific technology. This list needs further work to make it clear and logic.	Rewritten for SPM FD for clarity. EE in supply side included.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	5	27	5	27	-	-	-	"Still providing" suggests that only some of this essential service can be rescued, but I do not think that is intended by the authors. I suggest to replace "still providing" with "maintaining".	Noted.
Germany (Federal Ministry for the Environment, Nature Conservation and Nuclear Safety)	SPM	5	27	5	39	-	-	-	Constrain the list to the options that are relevant to renewable energy, as other options are not covered in depth in this report. In particular, the risks and challenges of switching to nuclear energy are not sufficiently dealt with, nor is this the report to do so, which is why there should not be a "solution" presented in this regard here. Thus, change the sentence on line 28 and 29 to read: "The following mitigation options related to RE supply are available", and then delete bullet 4 in the list, that currently says "Shift to lower carbon-emitting fuels such as from coal to natural gas or uranium"	List of options has been rewritten. Though options are not covered in depth, they are important to mention here to place RE in a broader context.
Canada (Environment Canada)	SPM	5	27	5	29	-	-	-	It should be made more clear to the reader that this is a comprehensive list of mechanisms for lowering GHGs from all energy sources, not just RE options (for example, shifting to natural gas and uranium (line 36) is not RE).	Rewritten for SPM FD to be more comprehensive

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Nico Bauer (Potsdam Institute for Climate Impact Research)	SPM	5	27	6	8	-	-	-	Reference should be made to section 1.1.5 as it should go there from ch10 (refer to comments on 1.1.5 and 10.1	Comment unclear.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	5	27	5	28	-	-	-	Text would become better readible if it was announced here that means for lowering GHG emissions can be both related to energy supply (low carbon energy supply) and to energy demand (improved end-use efficiency)	Rewritten for SPM FD to be more comprehensive, including EE measures.
Manfred Orgis (Ministry of Environment)	SPM	5	27	5	39	-	-	-	This text is confusing because this special report should address renewable energy sources but not options to reduce GHG emissions from the use of fossil fuels. This report is also not intended to address nuclear energy. However, it is recognized that the SPM should put the topic of the Special Report into the broader context. This might be part of the introduction.	List of options has been rewritten. Though options are not covered in depth, they are important to mention here to place RE in a broader context.
¿vind Christophersen (Climate and Pollution Agency)	SPM	5	27	5	27	-	-	-	We belive that the text after the bold text are talking about the "energy system" as a whole and not only the "energy sources"	Accepted.
United States (U.S. Department of State)	SPM	5	28	5	29	-	-	-	Replace the sentence "The following mitigation options¿" with: "The following options related to energy supply are part of the portfolio of mitigation strategies available."	Sentence reworded to reflect sentiment.
Juan Jose Sanchez (Ministry of the Environment, and Rural and Marine Affairs)	SPM	5	29	-	-	-	-	-	I would add a last sentence before starting with the bullet points: ""In all these options, life-cycle analyses should be considered to assess real mitigation when choosing one technology instead of other""	Rejected. This is simply a presentation of options available, not a recommendation for how to assess them.
Richard Taylor (International Hydropower Association)	SPM	5	30	5	39	3	-	-	Redraft bullets to provide more a more generic or conceptual overview of options, e.g. substituting high carbon fuel for lower carbon fuel (e.g. coal to gas of biofuel). Comment: These bullets seem to overemphasize or repeat particular energy source options, especially biomass among the renewable energy source options.	Rewritten for SPM FD to be more comprehensive
Richard Taylor (International Hydropower Association)	SPM	5	30	5	30	3	-	-	Replace ""zero"" with ""low""	accepted.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	SPM	5	30	5	39	-	-	-	Add the items below; -Promotion of nuclear power generation based on the premise safety assurance -Further improvement of thermal efficiency of thermal power plants -Reduction of transmission and distribution loss -R&D of clean coal technology <reason> These listed issues do not narrow mitigation options to RE, so various options should be given. <reference>"Environmental Action Plan by the Japanese Electric Utility Industry" http://www.fepc.or.jp/english/library/environmental_action_plan/__icsFiles/afieldfile/2009/12/08/action_plan2009E.pdf	Rewritten for SPM FD to be more comprehensive
Ichiro Maeda (Federation of Electric Power Companies, Japan)	SPM	5	30	-	-	-	-	-	As RE sources including wind, solar, and perhaps biomass require backup power generation, they cannot necessarily be referred to as "zero carbon primary energy sources". Consider changing to "low-carbon primary energy sources". See column 3 in ancillary file: SRREN_Draft2_Review_Maeda_Ichiro_VanErp091127EnergyTechnologiesComparisonTable_01.pdf	accepted.
Helmut Haberl (Institute of Social Ecology, Vienna)	SPM	5	30	5	39	-	-	-	In my view this list is not logically consistent and convincing.	Rewritten for SPM FD to be more comprehensive
¿vind Christophersen (Climate and Pollution Agency)	SPM	5	30	5	39	-	-	-	In the list of bullets we are missing the aspect of energy improved energy efficiency in the production og energy and the efficiency in systems for transport of energy like electricity networks.	Rewritten for SPM FD to be more comprehensive, including EE measures.
United Kingdom (Department of Energy and Climate Change)	SPM	5	30	-	-	-	-	-	There is a need here to define a zero carbon primary energy source. Does it include all forms of RE or a specific technology? This is the first place where the policy maker will have encountered this term, and so a very brief definition is in order here.	Term deleted from text.
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	SPM	5	31	5	33	-	-	-	Delete the sentence below; "Shift from coal, petroleum or natural gas to solid, liquid or gaseous biomass energy that is produced and used in a low carbon-emitting manner utilizing new crops and management strategies." <reason> It is too rough-and-ready to say definitely that fossil fuels should be shifted to biomass energy. The first and important step is to improve efficiency of fossil fuels use.	Rewritten for SPM FD to be more comprehensive, including EE measures.
Leonidas Osvaldo GIRARDIN (Fundación Bariloche)	SPM	5	31	5	33	-	-	-	It could be important to include also sustainable development criteria to avoid another impacts beyond GHG emissions (biodiversity, land use, etc.)	Thorough discussion on these points has been introduced in Section 5 in SPM FD
United States (U.S. Department of State)	SPM	5	31	-	-	-	-	-	Replace "low carbon-emitting" with "sustainable and efficient".	Sentence reworded in SPM FD. 'lower carbon emitting' has been removed.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
United Kingdom (Department of Energy and Climate Change)	SPM	5	32	6	8	3	-	-	Worth mentioning that some prefer the convention that discusses energy efficiency before renewables since basic exergy analysis says that reduction in demand is a good thing in its own right, but also reduces the amount of RE investment required	Rewritten for SPM FD to be more comprehensive, including EE measures.
Brazil (Ministry of Science and Technology)	SPM	5	32	-	-	-	-	-	The phrase ""new crops"" should be replaced by ""new and existing efficient crops"", bearing in mind that, with current technologies, sugar-gain ethanol can deliver GHG reductions of 86% compared to gasoline. Source: SRREN Chapter 2, p. 36, lines 20-21.	new crops' has been deleted in rewrite.
France (MEEDDM (Ministry of Ecology, Energy, Sustainable Development and the Sea))	SPM	5	33	-	-	-	-	-	Add at the end of the sentence "" not in competition with food production""	Relevant text deleted in revisions.
Modesto Fernandez Diaz-Silveira (Ministry of Science, Technology and Environment)	SPM	5	33	-	-	-	-	-	Another risk of increasing biofuels is related to water shortages in most regions of the world. More biofuel production means more water used for those crops, perhaps competing with water for producing food crops in agriculture, for industrial production, and for human livelihood. There should be a clear note warning on that, in the text, because this is the summary for policymakers and policymakers need this kind of clear warning for making informed decisions.	Water usage is now covered in SPM Section 5.
Modesto Fernandez Diaz-Silveira (Ministry of Science, Technology and Environment)	SPM	5	33	-	-	-	-	-	But addressing the risk of having crop food used as biofuel sources, competing with food needs of people, mainly in developing countries and furthermore with poor people in those countries. If not in this part, it should be stressed the importance to take into account this concern.	Discussion appears in revised text in; Box SPM 2
Italy (Institute for Environmental Protection and Research (ISPRA))	SPM	5	34	5	35	3	-	-	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]	Rewritten for SPM FD to be more comprehensive, including EE measures.
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	SPM	5	34	5	35	-	-	-	Delete "both fossil fuels and". <reason> Theme of this report SREEN is Renewable Energy, so that CHP should be set limit only to renewable energy sources.	Relevant text deleted in rewrite.
United Kingdom (Department of Energy and Climate Change)	SPM	5	34	16	35	-	-	-	It is unclear what this sentence means; it implies that CHP production can be more efficient than separate generation and heating; while true, it can also be less efficient; please clarify what is meant.	Relevant text deleted in rewrite.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	5	34	5	35	-	-	-	This element in the list seems more specific than it should be. I suggest to change it to read: "Increasing the efficiency of heat and power production, including combined heat and power (CHP), from both fossil fuels and RE sources.".	Relevant text deleted in rewrite.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Emmanuel Branche (Electricité de France)	SPM	5	36	5	36	-	-	-	"Natural gas" and "Uranium" should not be written in the same sentence according to me. Regarding primary energy, Uranium is a "zero carbon primary energy source" and Naural gas is "lower carbon-emitting source" (e.g. lower than coal or fioul, but with GHG emissions !). Proposition to separate natural gas and nuclear	Reworded in SPM FD to reflect these sentiments.
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	SPM	5	36	-	-	-	-	-	Delete the sentence below; "Shift to lower carbon-emitting fuels such as from coal to natural gas or to uranium." <reason> It is too rough-and-ready to say definitely coal should be shifted to non-carbon energy. The first and important step is to improve efficiency of fossil fuels use.	Rewritten for SPM FD to be more comprehensive, including EE measures.
France (MEEDDM (Ministry of Ecology, Energy, Sustainable Development and the Sea))	SPM	5	36	-	-	-	-	-	Replace uranium by nuclear fuels which would cover fast-breeder reactors and fusion	Reworded accordingly in SPM FD
United Kingdom (Department of Energy and Climate Change)	SPM	5	36	-	-	-	-	-	Uranium is not a carbon emitting fuel; it would fit better as a zero carbon source at line 30;	Reworded in SPM FD to reflect these sentiments.
Antoine BONDUELLE (E&E Consultant)	SPM	5	37	5	39	-	-	-	The issue of CCS is not at the same scale and probability of success than RE. The wording should take this inot account, for example, add ""if and when available""¿ in line 37	Bullet list does not discuss scale, nor probability of success. It is simply a presentation of options.
United Kingdom (Department of Energy and Climate Change)	SPM	5	37	16	39	-	-	-	We have found that people do not always easily grasp the lifecycle of biomass CO2 capture and then energy production without the release of most of the CO2, overall leading to net capture. It might be helpful to spell this out.	Reworded to clarity.
Roberto Acosta Moreno (CITMA)	SPM	5	38	-	-	-	-	-	Does the last sentence that begins with ""CCS also has the¿¿.."" supported by peer reviewed literature? Comment: To introduce this concept and it is not well supported by peer reviewed literature could create problems.	List of options has been rewritten for clarity. Though options are not covered in depth, they are important to mention here to place RE in a broader context.
Finland (Finniah Meteorological Institute)	SPM	5	-	-	-	-	-	-	Footnote 2: This is an important footnote, because life-cycle issues need to be discussed in the SPM	Comprehensive comparison of LCA GHG emissions now appears in Section SPM 5
Italy (Institute for Environmental Protection and Research (ISPRA))	SPM	6	30	6	31	3	-	-	According to the literature mentioned in § 5.6, lines 8-28, page 53, the issue concerning the occurrence of net life-cycle GHG emissions fror hydroelectric reservoirs is not solved, independently from the location of the reservoir. The sentence should be rephrased in a more general form, for instance by deleting "for certain reservoirs in tropical environments", or by deleting "for certain reservoirs" and adding "in particular" before "in tropical environments".	Recent studies and measurements on tropical reservoirs show that some of them can be carbon sinks. Therefore it is clear that only CERTAIN reservoirs (including under tropicale climate) may be net emitters. Relevant text has been deleted nonetheless.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Richard Taylor (International Hydropower Association)	SPM	6	30	6	30	3	-	-	Add ""a net increase in"" after ""low,"" and before ""methane"" and delete ""carbon dioxide"" and ""in tropical environments"".	Relevant text deleted in rewrite.
Andreas Fischlin (Systems Ecology, IBZ, ETH Zurich)	SPM	6	25	6	27	3	-	-	And what about fuel wood in its various forms? This needs to be considered here as well to be balanced.	Sustainable wood fuel has 0 GHGs
Richard Taylor (International Hydropower Association)	SPM	6	31	6	31	3	-	-	Delete ""tropical environments"". Delete ""needed"" and replace with ""ongoing"".	Relevant text deleted in rewrite.
Germany (Federal Ministry for the Environment, Nature Conservation and Nuclear Safety)	SPM	6	23	6	23	3	-	-	delete the full sentence, insert instead in italics: "use of bioenergy and hydropower can have negativ impacts on the GHG balance if not carefully designed" Rationale: italic introduction is missing, in the old sentence the problem is not spelled out clear enough.	Relevant text deleted in rewrite.
Andreas Fischlin (Systems Ecology, IBZ, ETH Zurich)	SPM	6	3	6	3	3	-	-	If you mention explicitly agriculture then you need to mention also forestry, not the least since it may well be involved in supplying fuels. Please be also consistent with what you state on line 13 as well as p. 10, lines 6-8.	Relevant text deleted in rewrite.
Richard Taylor (International Hydropower Association)	SPM	6	22	6	22	3	-	-	Insert ""8.1"" in bracketed references. Comment: Chapter 8 covers the critical discussion of RE integration in present and future energy systems	Relevant text deleted in rewrite.
Richard Taylor (International Hydropower Association)	SPM	6	7	6	8	3	-	-	Redraft. Comment: This paragraph makes no sense as it currently stands. Energy-related methods are also a prime means of mitigating climate change in the agriculture, forestry and waste sectors.	Relevant text deleted in rewrite.
Oluf Ulseth (Statkraft AS)	SPM	6	30	6	32	3	-	-	This passage omits to mention that some hydropower reservoirs have shown to act as a carbon sink (Studies produced by Huttunnen et al. in Finland, Tremblay et al in Canada and UNESCO /IHA GHG Emissions from Freshwater Reservoir Research project). Therefore, this sentence should read "For hydropower, research shows that life-cycle GHG emissions are typically very low. Some reservoirs have proven to act as carbon sink, while a net increase of methane and CO2 emissions may occure under specific circumstances in tropical environments. Research is needed (...)"	Carbon sink are not mentioned in section 5.6 . However the comment will be accepted if proper reference can be found.
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	SPM	6	25	-	27	3	-	-	Where does this number come from?	Relevant text deleted in rewrite.
Gian-Kasper Plattner (IPCC WGI TSU, University of Bern)	SPM	6	27	6	28	-	-	-	"and can be either positiv or very low or even negative" --> "and can be either positive, close to zero, or even negative" (as very low implies either a positive or a negative value)	Relevant text deleted in rewrite.
Gian-Kasper Plattner (IPCC WGI TSU, University of Bern)	SPM	6	20	-	-	-	-	-	"in the case RE" --> "in the case of RE"	Relevant text deleted in rewrite.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Gian-Kasper Plattner (IPCC WGI TSU, University of Bern)	SPM	6	11	-	-	-	-	-	"specific characteristics¿ and their potential use are varied" --> "specific characteristics¿ and their potential use differ"	Relevant text deleted in rewrite.
France (MEEDDM (Ministry of Ecology, Energy, Sustainable Development and the Sea))	SPM	6	4	-	-	-	-	-	Add at the end of the sentence ""Reduce transportation needs by an extensive use of green Its""	Noted.
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	SPM	6	2	6	6	-	-	-	Add the items below; -Electrification promotion, energy conservation and expansion of High efficiency electric equipment ?*Heat pumps, heat storage air conditioning, electric vehicles, and others -Utilization of untapped energy sources ?*Heat recovery from river water, waste incineration facilities and substations -Load leveling promotion such as heat pump & thermal storage systems ?*Heat pump & thermal storage type air conditioning/hot-water supply -R&D of CO2 refrigerant heat pump hot water heater, electric vehicles, and others <reason> We, electric industries, think that electrification based on low carbon generation is the most effective and practical solution on demand-side. In other words, simultaneous attainment of decarbonaizing generation and demand-side electrification is the best way to realize low carbon economy. <reference> "Environmental Action Plan by the Japanese Electric Utility Industry" http://www.fepc.or.jp/english/library/environmental_action_plan/__icsFiles/afieldfile/2009/12/08/action_plan2009E.pdf	Bullet list has been rewritten to be more comprehensive, though space allocated is an important consideration. Too much detail here for the SPM.
Finland (Finniah Meteorological Institute)	SPM	6	31	-	-	-	-	-	Also other than tropical water reservoirs can emit GHG emissions.	In all reservoirs

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	SPM	6	18	6	20	-	-	-	Amend the sentence as follows;[original] "The literature suggests that, in most cases, these impacts are small, and that the net life-cycle GHG emissions of RE technologies are low compared to fossil-fuel energy supply; moreover ... [proposed amendment] "The literature suggests that, in most cases, these impacts are small, and that the net life-cycle GHG emissions of RE technologies are low compared to fossil-fuel energy supply but sometimes higher compared to nuclear energy supply, however, integrating the intermittent renewables (e.g. solar, wind) need stand-by traditional power plants (e.g fossil fueled thermal power plants) to balance the supply and demand, and so in this sense, it may be considered that renewables may raise the amount of the emission from the traditional power plants; moreover ... <reason> Comparison with nuclear is required for impartial evaluation among energy sources. If we consicer life-cycle GHG emissions, we should also add effects on other generation energy sources through electric systems.	Relevant text deleted in rewrite.
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	SPM	6	21	6	22	-	-	-	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)	Relevant text deleted in rewrite.
Atle Harby (SINTEF Energy Research)	SPM	6	30	6	30	-	-	-	As almost all results of GHG emissions are gross estimates, I suggest to insert "gross emissions of" after "that" and before "methane" in this sentence.	Relevant text deleted in rewrite.
Steve Sawyer (Global Wind Energy Council)	SPM	6	5	6	5	-	-	-	behavior' should be singular here in common English usage¿same in chapter 10.	accepted.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	6	27	6	29	-	-	-	Carbon stocks may be lost due to desired land use change. In fact, carbon stocks may be lost due to established land use. I therefore suggest to replace "undesired land use changes." by "land use and land use change.".	Sentence should read: "may be irreversibly lost by poor land use change practice
Antoine BONDUELLE (E&E Consultant)	SPM	6	5	6	6	-	-	-	change consumer behaviour"" is too limited and does not represent well the relevant chapters in AR4. Maybe phrase this as ""change consumption patterns through behaviour or regulation, so as to use fewer carbon and energy-intensive products and services.	Reworded in SPM FD to reflect these sentiments.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Modesto Fernandez Diaz-Silveira (Ministry of Science, Technology and Environment)	SPM	6	26	-	-	-	-	-	Climate change will be imposing also a huge pressure to agriculture in the whole world. It is already predicted that crops will be having more and more difficulties for growing in changing climates, with higher or lower temperatures, droughts or floods (with changing rain patterns). It will mean farmers having to move to higher or lower latitudes, to shift to other land levels" from valleys to mountains, or even from lower parts to higher parts of the mountains).If we don't take that into account, pressures over agriculture and poor people in developing countries will challenge food production and make even more difficult to produce bioenergy from plants and crop products.	This issue discussed in Ch2 text and in the TS. Not necessarily a major issue if temperature increase is limited to 2 degrees. Some information will be added to SPM.
Ichiro Maeda (Federation of Electric Power Companies, Japan)	SPM	6	13	6	22	-	-	-	Consider mentioning the possibility of relying on fossil-fuel power generation to provide more economical backup for vairable RE output. Reference "Cost" column in file: SRREN_Draft2_Review_Maeda_Ichiro_VanErp091127EnergyTechnologiesComparisonTable_01.pdf	Discussion of GHG has been rewritten in Section 5 - now encaptured in a comprehensive LCA analysis.
¿vind Christophersen (Climate and Pollution Agency)	SPM	6	9	6	9	-	-	-	Consider to focus the bold text more on what is available. E.g.: ¿Several RE sources and technologies readily available have the ability¿"	Reject. Availability is not the topic of this paragraph .
United States (U.S. Department of State)	SPM	6	11	6	12	-	-	-	Delete reference to Box SPM 1 and replace with this sentence: "In this report, the following RE sources are considered: bioenergy, direct solar energy, geothermal energy, hydropower, ocean energy, and wind energy (for more details and description of these technologies, see Section 5)."	Reject. SPM has been restructured in such a way that original reference to Box SPM 1 is more accurate.
Nico Bauer (Potsdam Institute for Climate Impact Research)	SPM	6	11	6	12	-	-	-	Does the last sentence follow from Box SPM 1? If yes, reference to Box SPM 1 should go to the end of that paragraph. If not, it needs to be supported and referenced with underlying section. How is the sentence meant? Does it mean that there is a renewable energy for every application or that the entire energy needs can be supplied with RE?	Reworded to clarify and include correct reference.
Canada (Environment Canada)	SPM	6	31	6	31	-	-	-	Does this imply that these effects do not occur in non-tropical environments? Please clarify.	In all reservoirs
Australia (0)	SPM	6	23	-	-	-	-	-	for example, potential impacts on food prices and land clearing.	Sustainably developed requires care in LUC.Impact on food prices may be lowrer than oil price can induce
United Kingdom (Department of Energy and Climate Change)	SPM	6	1	-	6	-	-	-	Here there should be mention of the ways in which a shift in behaviour might lead to reduced demand. This is the first point at which the distinction between demand and supply control has been introduced, and so a mention of demand reduction is warranted. While this is admittedly a document on renewable energy, not on demand reduction, the feasibility of renewable energy playing a large role in the global supply mix increases as demand is reduced.	accepted.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	6	29	-	-	-	-	-	I assume "carbon stocks" refers to carbon stocks in soil. It may be more clear to poin that out.	Relevant text deleted in rewrite.
Helmut Haberl (Institute of Social Ecology, Vienna)	SPM	6	23	6	32	-	-	-	I think that the possible interrelation between GHG emissions and volume of bioenergy production, see above, should be mentioned here	We are developing a plot for that. Not sure there is space to plug it in SPM
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	6	7	6	8	-	-	-	In order to be complete, I suggest to add to the listing in line 10 ", feedstock, emissive use of synthetic gases"	Relevant text deleted in rewrite.
United States (U.S. Department of State)	SPM	6	16	-	-	-	-	-	Insert "some" before GHGs.	Relevant text deleted in rewrite.
Manfred Orgis (Ministry of Environment)	SPM	6	31	6	32	-	-	-	It is suggested to delete the last sentence because the life-cycle GHG emissions of a hydro-plant will always depend on the specific circumstances and the approach choosen to build the reservoir. No generic answers will be possible.	On-going research aims at better understanding the various phenomena happening in reservoirs, and generic models are and will be further developped, in particular under the UNESCO ongoing programme
Juan Jose Sanchez (Ministry of the Environment, and Rural and Marine Affairs)	SPM	6	21	6	22	-	-	-	It should say ""the use of storage and other tools (i.e.: smart grids, demand side management, ...) to enhance system flexibility for variable electricity integration¿""	Relevant text deleted in rewrite.
United Kingdom (Department of Energy and Climate Change)	SPM	6	27	6	29	-	-	-	It would be worth mentioning indirect impacts here - the emissions are not just due to loss of carbon stocks but also due to the displacement of the land function to other areas when the previous function of the land shifts.	Sentence on ILUC will be in SPM
United Kingdom (Department of Energy and Climate Change)	SPM	6	20	6	22	-	-	-	Other options include active network management and load controllers	Relevant text deleted in rewrite.
Helmut Haberl (Institute of Social Ecology, Vienna)	SPM	6	30	-	-	-	-	-	perhaps one might add "substantial" before "methane"	Relevant text deleted in rewrite.
Muhammad Mohsin Iqbal (Global Change Impact Studies Centre (GCISC))	SPM	6	2	-	-	-	-	-	Provide the same energy service with less energy"". This seems to be a long term option for developing countries like Pakistan as it will require an improvement in energy efficiencies, changes in the design of the buildings, use of energy saving lighting gadgets and changes in industrial and agricultural operations / processes.	accepted.
Emmanuel Branche (Electricité de France)	SPM	6	20	6	22	-	-	-	pumped storage hydro are currently used for development of high percentage of intermittent/variable RE (ref. chapter 8)	Relevant text deleted in rewrite.
Canada (Environment Canada)	SPM	6	5	6	6	-	-	-	Rather than saying "change", the preference is often instead to use "inform consumer behaviour to use fewer¿."	Noted.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Helmut Haberl (Institute of Social Ecology, Vienna)	SPM	6	13	-	-	-	-	-	Renewable energy can in fact also be C-negative, e.g. perennial grasses grown on degraded land that also transport C below the ground and store it there.	Discussion of GHG has been rewritten in Section 5 - now encaptured in a comprehensive LCA analysis.
France (MEEDDM (Ministry of Ecology, Energy, Sustainable Development and the Sea))	SPM	6	2	-	-	-	-	-	Replace ""energy service"" by""service""	Relevant text deleted in rewrite.
France (MEEDDM (Ministry of Ecology, Energy, Sustainable Development and the Sea))	SPM	6	15	17	16	-	-	-	Replace 'and installation"" by ""intallation and maintenance""	Relevant text deleted in rewrite.
United States (U.S. Department of State)	SPM	6	31	-	-	-	-	-	Reword to "certain types of hydropower projects in tropical environments."	It is not types of hydropower, but biomass and watershed
Leonidas Osvaldo GIRARDIN (Fundación Bariloche)	SPM	6	5	6	6	-	-	-	Taking into account not only the last steps of the life-cycle but also previous phases	Noted.
Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	SPM	6	1	6	6	-	-	-	The ""main mitigation options related to energy demand"" refer increased transportation efficiency but only very indirectly the reduction of transportation needs themselves, e.g. through the use of Information and Communication Technologies (ICT)	Comment unclear.
Supachai Panitchpakdi (United Nations Conference on Trade and Development)	SPM	6	13	6	32	-	-	-	The argument is made that RE technologies and equipment can be near-zero carbon emitters if managed appropriately. This seems to be unrealistic. One of the key laws of thermodynamics is that of entropy, i.e. that, unlike conventional fuel, RE is usually only available in dissipated (not concentrated) form and thus needs to be concentrated to become a comparative source of energy. This in turn requires effort, material and energy. So much so that several RE tend to have a negative energy balance.	Discussion of GHG has been rewritten in Section 5 - now encaptured in a comprehensive LCA analysis.
Helmut Haberl (Institute of Social Ecology, Vienna)	SPM	6	12	-	-	-	-	-	These are different kinds of useful energy, but not energy services. An energy service would, for example, be the provision of safe, comfortable and well-lit living space, i.e. an immaterial service derived from using energy, but not the energy itself.#	Accepted.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Gian-Kasper Plattner (IPCC WGI TSU, University of Bern)	SPM	6	3	6	5	-	-	-	this first, bolded sentence combines statements regarding observed temperature increase and its attribution to human activities that all have their origin in the WGI report, but as I read it not entirely correct. I suggest that the authors use the exact AR4 formulations, rather than to provide a reinterpretation of those. The IPCC WGI AR4 SPM stated (1) "Warming of the climate system is unequivocal..." which is a much stronger statement than the statement made here that "there is a 90 percent likelihood that global warming is happening". The IPCC WGI AR4 SPM indeed assigned a "very likely", but to the attribution statement and only for the roughly last 50 years: "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".	Text related to AR4 has been replaced with an exact quote to assure consistency.
Finland (Finniah Meteorological Institute)	SPM	6	23	32	-	-	-	-	This is an important paragraph, but not so easy to read. The message should be clearer with a bolded summary sentence at start.	Relevant text deleted in rewrite.
United Kingdom (Department of Energy and Climate Change)	SPM	6	9	-	12	-	-	-	This paragraph is somewhat mis-leading, and is not supported by the information elsewhere in the report (it is neither supported by nor contradicted by that information). RE certainly is diverse in terms of the original source of the energy, but it is not as flexible in application as other non-renewable sources such as oil, coal, or gas.	Reject. Text is supported by underlying chapters 2-7 and the presentation of the different technologies therein. This is not a comparison with fossil fuels - rather a simple presentation of RE options.
United Kingdom (Department of Energy and Climate Change)	SPM	6	20	17	22	-	-	-	This point is not central to the argument and could be omitted; also the point is arguable, as it implies by the use of "may".	Relevant text deleted in rewrite.
Finland (Finniah Meteorological Institute)	SPM	6	13	6	32	-	-	-	This section includes some of the concerns related to bioenergy. However, there is nothing on negative health impacts of particulate matter originating from bioenergy production. Indeed research shows in some cases switch from fossil to bioenergy reduces air quality.	Comprehensive discussion on these issues now appears in Box SPM 2 in SPM FD
Frank Mastiaux (EON Climate & Renewables)	SPM	6	13	6	22	-	-	-	This topic is crucial, although not fully explained here. It is to be questioned whether the problem is really caused by RE, or rather a characteristic of the whole power infrastructure. Intermittency is currently a topic for much research,and long term strategies are optimized to take this into account. That should be expressed more clear, suggestion to look at the following paragraph (line 31-32) where research is described clearly.	Discussion of GHG has been rewritten in Section 5 - now encaptured in a comprehensive LCA analysis.
¿vind Christophersen (Climate and Pollution Agency)	SPM	6	12	-	-	-	-	-	We suggest to simplify the sentence to "All the different types of energy services can be met with RE."	Reworded for clarity.
Leonidas Osvaldo GIRARDIN (Fundación Bariloche)	SPM	6	7	6	8	-	-	-	What about Industrial Process Emissions?	Relevant text deleted in rewrite.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
United Kingdom (Department of Energy and Climate Change)	SPM	6	13	6	22		-	-	There isn't any quantification of the estimates of the life-cycle emissions or impacts of renewable technologies in the SPM. Chapter 9 notes there is insufficcient research on this and highlights the importance of futre work (final paragraph of p.55 chapter 9). It would be good to include some kind of statement in the SPM in the relevant section on p.6 if only to qualify the statement that the life-cycle emissions of most RE technologies are low, given the potential for this kind of information to influence decisions.	Discussion of GHG has been rewritten in Section 5 - now encaptured in a comprehensive LCA analysis.
United Kingdom (Department of Energy and Climate Change)	SPM	6	27	6	29		-	-	Wording perhaps could be re-visited in the interests of clarity: 'The GHG impacts of bioenergy are conditional, however, and can be either positive or very low or negative depending on the situation; negative impacts can, for example, occur when carbon stocks are lost due to undesired land use changes'. Also, not sure carbon stocks can be 'lost'.	Relevant text deleted in rewrite.
Andreas Fischlin (Systems Ecology, IBZ, ETH Zurich)	SPM	7	29	7	31	3	-	-	I am pleased to see that OTEC is given this emphasis	OK
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	SPM	7	-	-	-	3	Box 1	-	I find it hard to come to a full picture of the different technologies here. Sometimes, concrete numbers for the capacity factors are given, sometimes not. The items that are addressed in the individual paragraphs differ very much from each other, there should be at least a kind of common structure (e.g. mature or new technology, base-load or peak-load, scale of power plants, ...	Rewritten for SPM FD with an attempt to make technology structures more reflective of one another.
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	SPM	7	16	-	-	3	Box 1	-	what is geothermal "onshore and offshore"?	Removed reference to onshore and offshore. Text edited to read " Geothermal energy relies on the accessible thermal energy generated and stored in the Earth's interior~~, either onshore or offshore~~.…
Richard Taylor (International Hydropower Association)	SPM	7	22	7	23	3	SPM 1	-	Delete ""run-of-river projects"", ""dam"" and ""with a reservoir that provides the possibility of controllable output"".	Accepted
Richard Taylor (International Hydropower Association)	SPM	7	21	7	21	3	SPM 1	-	Insert ""(run of river, reservoir, pumped storage),"" after ""type"".	Accepted
Richard Taylor (International Hydropower Association)	SPM	7	25	7	25	3	SPM 1	-	Insert ""Storage and balancing are the main purpose of pumped storage hydropower facilities, with a major drive currently to increase storage capacity in many countries and regions"" after ""generation""	Accepted
United States (U.S. Department of State)	SPM	7	23	-	-	-	-	-	add "and energy storage." after "controllable output."	Dealt with under 385/12, 385/13, 385/14

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Several experts 0 (Ministry of the Indutry, Tourism and Trade)	SPM	7	22	-	-	-	-	-	An international agreed threshold (as power installed) for a system to be considered as small-scale hydraulic should be included. Large scale hydraulic installations should not be considered as renewable energy	"Renewable" is a non size-dependent attribute. International Conference for Renewable Energies (Bonn, 2004) and other United Nations organised conferences clearly confirmed hydropower (whatever the size) as a RES. Chapter 5 of this IPCC/SRREN substantiates the reasons behind not classifying hydropower projects according to size, but rather according to type and use.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	7	27	-	-	-	-	-	biomass is not mentioned in Chapter 6, I'd suggest not to introduce it here.	Accepted.
United Kingdom (Department of Energy and Climate Change)	SPM	7	-	-	-	-	-	-	Box SPM 1: The discussion, either here or later in the body of the report, doesn't mention how the removal of large scale global energies (via RE) might affect the global flow of material and energy. For example, extraction of energy from ocean currents would reduce the energy in those currents, which in turn will affect the flow of those currents as well as the environmental and ecological processes on which they depend. The answer may be that such natural processes are not affected significantly by large scale development of RE globally, but that answer is not presented anywhere in the report. This is a significant technical omission.	Noted.
Brazil (Ministry of Science and Technology)	SPM	7	6	7	7	-	-	-	Introduce ""biokerosene"" in the list of liquid biofuels between paratheses. Air transport is one of the most promising sectors for the deployment of biofuels.	Aviation is really a potential major use. Nevertheless, biokerosene is not yet common in the literature
France (MEEDDM (Ministry of Ecology, Energy, Sustainable Development and the Sea))	SPM	7	15	18	20	-	-	-	Mention that geothermal enegy is not strictly speaking renewable	Refer to Chapter 4 ines 25-28 on page 3 which reads, "Geothermal is a renewable resource as the extracted heat from an active reservoir is continuously restored by natural heat production, conduction and convection from surrounding hotter regions, and the extracted geothermal fluids are replenished by natural recharge and by injection of the depleted (cooled) fluids." Up to SPM to get verbose orleave to readers to get this info from Chapter 4

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
France (MEEDDM (Ministry of Ecology, Energy, Sustainable Development and the Sea))	SPM	7	21	18	25	-	-	-	Missing : Hydro power remains the only possibility of efficiently storing large amount of electric power, by pumping water from a lower lake to a upper lake.	mention PSPP (sentence to be proposed)
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	SPM	7	11	7	13	-	-	-	More clearly define and explain the sentence below. "Though solar energy relies on naturally variable energy flows, creating inherent variability in energy output" <reason>This sentense is too abstract. Define and prove it in detail.	the sentence will be rephrased
Gian-Kasper Plattner (IPCC WGI TSU, University of Bern)	SPM	7	3	7	5	-	-	-	only terrestrial sources are mentioned here under Biomass sources. What's the role of oceanic biomass for bioenergy production (if there is one at all¿)?	In the main text we discuss algae. Technology in initial stages. Not deserve to be quoted in SPM.
Gian-Kasper Plattner (IPCC WGI TSU, University of Bern)	SPM	7	3	-	-	-	-	-	only the first title "Bioenergy" is underlined --> make consistent	Table will be formatted formally by a graphic designer
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	7	30	-	-	-	-	-	Please clarify this, waves and swell are effectively the same thing in regards to energy generation, wave devices use typically swell waves to make power	Accepted.
United States (U.S. Department of State)	SPM	7	0	8	0	-	-	-	Recommend deleting Box SPM 1, as listing of technologies is redundant with Section 5.	A box to introduce the basics of the technologies is viewed by the authors to be important. Overlap with Section 5 of SOD draft will be condensed wherever possible.
Gerrit Hansen (TSU)	SPM	7	9	-	-	-	-	-	rephrase "energy produced by solar radiation"	will be changed
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	7	13	7	14	-	-	-	Solar radiation is a form of energy. I suggest to delete the redundant phrase "the solar radiation of". "electricity, thermal" seem an odd couple. I suggest to replace them by: "power, heat".	will be changed
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	7	28	-	-	-	-	-	suggest to include wave in this list	Accepted.
Modesto Fernandez Diaz-Silveira (Ministry of Science, Technology and Environment)	SPM	7	8	-	-	-	-	-	There is one concern about the use of bioenergy that requires some kind of process (i.e. production of liquid or gaseous fuels that requires some kind of chemical or physical treatment using different kinds of external energy, that could be carbon releasing, reducing the positive effect of substituting fossil fuels by bioenergy storing products. There should be another sentence in this para: "There is a risk of having some kind of processes where the use of external energy from other sources, necessary for producing some kinds of energy carriers (bioenergy), could be the source of carbon emissions, that could hamper (or at least reduce) the benefits of bioenergy".	When mentioning sustainable bioenergy we are taking into account the full LifeCycle emission analysis.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
France (MEEDDM (Ministry of Ecology, Energy, Sustainable Development and the Sea))	SPM	7	10	-	-	-	-	-	What is the technology which ""simple devices"" for lighting refers to""?	Relevant text deleted in rewrite.
Ella Stengler (CEWEP)	SPM	7	2	7	8	-	-	-	WtE (Waste-to-Energy) plants (incineration with energy recovery) treat municipal waste and produce energy (electricity and/or heat). In most of the plants waste is not pre-treated before it is fed into the furnace. In Europe most of the plants use grate furnace technology in which heterogenous waste can be incinerated. Municipal waste includes a biodegradable part, and in Europe it is considered that 50% of the energy produced comes from this biodegradable part.	We state that "part of these are used for feedstocks, which requires physical/chemical... Combustion is the other part!!
Manfred Treber (Germanwatch e.V.)	SPM	7	-	-	-	-	-	Box SPM 1	It is more instructive and much better for the lay reader to make the ordering of the different technologies NOT in alphabetical order but in the order of importance (potential or real contributions)	Authors have selected to order technologies according to electricity/thermal/transport for clarity.
United Kingdom (Department of Energy and Climate Change)	SPM	7	-	-	-	-	-	Box SPM 1	Section 5 state that use of traditional biomass is included in discussion of bioenergy, whereas this box and Table SPM2 seems to me to imply that it is excluded.	Main focus is on modern bioenergy. Effort will be made to clarify this in SPM text.
Several experts 0 (Ministry of the Indutry, Tourism and Trade)	SPM	7	18	7	20	-	-	Box SPM 1	The capacity load of geothermal energy systems is an interesting issue but to be consistent with the description in Box SPM 1 of the other RE systems, it should not be included unless the capacity factor of the rest of RE systems is included	Accepted.
China (China Meteorological Administration)	SPM	7	34	7	34	1-Box SPM.1	-	-	Not only "located on- or off-shore". Wind energy can also be used at inland regions with rich wind resources.	The chapter uses on-shore wind to refer to all land-based wind project sites, whether near shore or inland. We will clarify this in the glossary, for both onshore and offshore definitions.
China (China Meteorological Administration)	SPM	7	29	7	30	1-BOX SPM.1	-	-	The temporal scale of Swells is close to waves, and swells should belong to 'short-term' instead of 'medium-term'. So the sentence should be "¿¿ have short-term (e.g. waves, swells) and medium-term (e.g. tidal and ocean currents ¿¿)".	Reworded to remove 'short-term' and 'medium-term'

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	SPM	7	-	-	-	Box SPM 1	-	-	[Ocean energy] Add the sentence below; "For wave-power generation, it is required to resolve various technological challenges toward improvement in generating efficiency, cost down including the cost for power transport from offshore installation, maintenance and prevention of malfunction, conservation of maritime environment, transmission and power transport, and output-load leveling. Moreover, for generation by ocean thermal energy conversion which is at stage of research yet, it is essential to promote improvement of reliability, development of core technology and ensuring business feasiblity as combined plant, by urging further technology development and demonstration." <reason> It is necessary to mention some challenges to overcome hereafter as well as optimistic potentiality or expectation. <reference> "White Paper on Renewable Energy Technorogies"(NEDO) http://www.nedo.go.jp/library/ne_hakusyo/index.html	Entry for all technologies scaled down for space considerations. Cannot include this extra text in SPM.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	7	4	7	7	Box SPM.1	-	-	"Forest residues" are remains of forests. That is not what is meant here. I suggest to replace "forest" by "forestry".	Noted.
Roberto Acosta Moreno (CITMA)	SPM	7	6	-	7	Box SPM.1	-	-	I suggest to add ""bagasse"" in the first bracket. I also suggest to add ""black liquor"" in the second bracket. Both are biomass fuels that are used extensively in the sugar and pulp and paper industry, respectively.	Bagasse is coproduct from energy crops. Black liquor is not an energy carrier
Denis Aelbrecht (EDF)	SPM	7	21	7	26	Box SPM.1	-	-	In the Hydropower section of Box SPM.1, it would be interesting to remind that pumped-storage hydro is the only existing large scale available technology of energy storage	add PSPP Box SPM1
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	7	7	7	9	Box SPM.1	-	-	In the Netherlands the term "feedstock" is used for produced materials that have an energy content, such as plastics. I suggest to avoid this word here and delete the redundant phrase "as feedstocks which, through a variety of chemical and physical processes, produce energy carriers".	Feedstocks ae commonly used in literature as we used here.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	7	3	7	4	Box SPM.1	-	-	It seems odd to define bioenergy as a source of fuel. I therefore suggest to rephrase the first sentence of this box to read: "Bioenergy is made available from biomass, while biomass continues to be the world's major source of food, fodder and fibre.".	Let us know why is it odd? The statement is used extensively in literature
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	SPM	7	-	-	-	Box SPM1	-	-	[Bioenergy] Add the sentence below; It is necessary to promote bioenergy use, while to overcome some challenges for the future, such as conflict with foods, bio-diversity, economical effectiveness and suply stability. <reason> It is necessary to mention some challenges to overcome hereafter as well as optimistic potentiality or expectation. <reference> "White Paper on Renewable Energy Technorogies"(NEDO) http://www.nedo.go.jp/library/ne_hakusyo/index.html	Box introduced in Section SPM 5 to highlight such considerations to bioenergy use.

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ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	SPM	7	-	-	-	Box SPM1	-	-	[Direct solar energy] Add the sentence below; "Hereafter it is required to promote improvement in efficiency of output, reducing the cost and deveropment of system technologies for PV, and to address technology developments such as reliable and low cost next-generation heat storage systems, high-temperature heat storage systems, increase in temperature of thermal fluid and innovative systems for solar thermal at an early point." <reason> It is necessary to mention some challenges to overcome hereafter as well as optimistic potentiality or expectation. <reference> "White Paper on Renewable Energy Technorogies"(NEDO) http://www.nedo.go.jp/library/ne_hakusyo/index.html	Though text has been shortened, sentence introduced on technology maturity to reflect sentiments of this comment.
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	SPM	7	-	-	-	Box SPM1	-	-	[Direct solar energy] -Delete the sentence below; "Even when integrated storage is not available, the temporal profile of solar energy output sometimes correlates relatively well with energy demands" -It is necessary to specify that additional investment in energy systems(e.g. grids) is essential in order to respond to variability of energy output of electlicity. <reason> Original text is so misleading that the public are likely to misunderstand that solar energy system can be utilized by itself without storage system. Actually, other power generators work as buck-up sources in case there is no storage system, so complete independent system is impossible. For rulal electrification in developing countries, some storage system is required because imbalance between demand and supply of electricity occurs.	Sentence rewritten to clarify nature of solar energy, highlighting that it is variable and to some degree unpredictable.
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	SPM	7	-	-	-	Box SPM1	-	-	[Geothermal energy] Add the sentence below;"Improvement in technology of geothermal prospecting and reservoir control technology is important." <reason> It is necessary to mention some challenges to overcome hereafter as well as optimistic potentiality or expectation. <reference>"White Paper on Renewable Energy Technorogies"(NEDO) http://www.nedo.go.jp/library/ne_hakusyo/index.html	Though text has been shortened, sentence introduced on technology maturity to reflect sentiments of this comment.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	SPM	7	1	8	31	Box SPM1	-	-	As a footnote, "aerothermal(ambient air),geothermal(ground source) and hydrothermal(water) enegy captured by heat pumps are also renewable energy though they are not analyzed in detail except geothermal heat pumps in this SREEN" should be mentioned. <reason> Countries like UK, Germany and Japan etc.and EU have recently defined ambient air etc captured by heat pumps as renewable energy. Besides, the Energy Perspective 2010(ETP2010) published by IEA last month mentioned ambient air etc as renewable energy. In addition, on page 132 of TS, you mentioned the UK and Germany RES-H scheme as a bonus mechanism, where the renewable heat incentive(the UK) and Renewable heat Law(Germany) have categorized ambient air captured by heat pumps as eligible renewable energy. <reference> Energy Technology Perspective 2010(IEA, 2010.7) EU : Directive on the promotion of the use of energy from renewable sources http://eur-lex.europa.eu/LexUriServ/LexUriServ.do? uri=OJ:L:2009:140:0016:01:EN:HTML Germany : Renewable heat Law http://www.bmu.de/files/pdfs/allgemein/application/pdf/ee_waermeg_en.pdf Germany: Renewable Energy 2009 (BMU) http://www.erneuerbare- energien.de/files/pdfs/allgemein/application/pdf/ee_innovationen_energiezukunft_en_bf.pdf *heat pump as categorized as one of the form of solar radiation -UK:Renewalbe Heat Incentive http://www.rhincentive.co.uk/eligible/energies/ -Japan: Sophisticated Methods of Energy Supply Structures Bill on the Promotion of the Use of Nonfossil Energy Sources and Effective Use of Fossil Energy Source Materials by Energy Suppliers http://www.meti.go.jp/english/press/data/20090310_01.html?but only abstract?	Noted. Space constraints limit authors ability to incorporate technology specifics.
United Kingdom (Department of Energy and Climate Change)	SPM	7	8	-	-	Solutions	-	Box SPM.1.	The large-scale use of biomass for energy generation purposes risks affecting soil structure, soil fertility and hence food security.	This is mentioned in the main text but not in SPM due space limitation. We have to discuss disadvantages together with advantages.
United Kingdom (Department of Energy and Climate Change)	SPM	7	-	-	-	SPM 1	-	-	It is not clear why geothermal energy has technical detial on capacity factors, whereas the other sources do not.	Accepted.
United Kingdom (Department of Energy and Climate Change)	SPM	7	-	-	-	SPM 1	-	-	It is unclear why bio-energy from the sea is included in ocean energy.	Deleted in rewrite.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
United Kingdom (Department of Energy and Climate Change)	SPM	7	-	-	-	SPM 1	-	-	The definition of bio-energy is accurate but misleading, in that the GHG impact of the lifecycle is what metters. For example for any kind of waste or residue, it matters what the alternative pathway would be that is the baseline for GHG calculations. For wood, there is no benefit in burning it rather than natural gas if the alternative was to use it as a construction material to replace concrete.	Definition of bioenergy redrafted for clarity.
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	SPM	8	35	-	-	3	-	-	concerning the number of 13%: it should be stated that ony hydro and biomass contribute to that number, the others are neglegible so far. If available please also add the % of electricity production (here the share is higher).	Rewritten for SPM FD and taken into account accordingly.
China (China Meteorological Administration)	SPM	8	12	8	12	3	-	SPM 1	Both sweet sorghum- and Cassava ethanol production should be added to the table, considering the fact that the production is already quite substantive in China.	Table removed from SPM in rewrite.
Richard Taylor (International Hydropower Association)	SPM	8	22	8	22	3	-	SPM 1	Insert x's in the ""Reservoirs"" and ""Pumped Storage"" row and ""Decentralised"" column. Reservoirs and pumped storage are also available in decentralised form	Accepted
China (China Meteorological Administration)	SPM	8	13	8	14	3	-	SPM 1	Lignocellulose Ethanol Production and Lignocelluose Synfuel Production are not in Early Stage of Commercialization, they are still between R&D Stage and Demonstration or Pilot Project Stage.	Table removed from SPM in rewrite.
Australia (0)	SPM	8	14	-	-	-	-	-	Algal fuel production should be classified as in demonstration/pilot project stage, as there are a number of algal fuel pilot projects around the world.	We need unbiassed reference to add your request
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	8	33	8	33	-	-	-	I suggest to insert a statement here on the consideration of the localities suitable for RE, such as: " In contrast to fossil fuel, the potential for the generation of RE varies greatly spatially and between technologies. The suitability of locations for specific RE technologies may change with the climate (such as with regard to wind, sunshine and precipitation), and planning thus requires reliable projections of local climate change. For all potential energy sources, the distribution of energy demand and the feasibility of transport need to be considered in planning. []"	Noted.
John Twidell (AMSET Centre)	SPM	8	36	-	-	-	-	-	many forms of RE are growing rapidly' VAGUE STATEMENT. Replace with 'many forms of RE are rapidly increasing their capacity contribution'.	Sentence amended for clarity to read 'Deployment of RE has been increasing rapidly…'
¿vind Christophersen (Climate and Pollution Agency)	SPM	8	3	-	-	-	-	-	more active	accepted.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
United Kingdom (Department of Energy and Climate Change)	SPM	8	7	8	14	-	-	-	Pyrolysis should be included in this list. Also, it would be much better not to mention specific feedstocks but to refer to groups like starchy feedstocks for ethanol production or oily feedstocks for transesterification (e.g. that would then include e.g. used cooking oil, which is currently missing). Gasification is used for some heating applications in the UK. In the UK, CHP and combustion based power plant are early commerical (although not in most of Europe). Jatropha biodiesel should be early commercial because of limited crop experience.	We are listing here feedstocks and bioenergy. Not processes.
Nico Bauer (Potsdam Institute for Climate Impact Research)	SPM	8	36	-	-	-	-	-	refer to section 1.3.1 and 1.3.3	References to 1.3 included.
Canada (Environment Canada)	SPM	8	33	8	36	-	-	-	Sentence on regional variation seems to interrupt preceding and following sentences on the proportion of global energy supplied by RE. Suggest restructuring to move sentence on regional variation to end of paragraph. Suggest also that notion of regional variation be further elaborated with an explanation and/or examples.	Paragraph rewritten in SPM FD in consideration of these sentiments.
Michael Jack (Scion (NZ Forest Research Institute))	SPM	8	8	8	8	-	-	-	Should this read ""Anaerobic Digestion"" instead of just ""Digestion""	Table removed from SPM in rewrite.
Several experts 0 (Ministry of the Indutry, Tourism and Trade)	SPM	8	-	-	-	-	-	-	The table includes RE technologies. Under RE Bioenergy source, "algae fuel production" is included. Additionally, under Ocean Energy source, "Marine Biomass Farming" is included. Ocean Biomass production should be included in one single energy source	Table removed from SPM FD. In underlying text marine biomass farming has been removed from ocean energy category.
Frank Mastiaux (EON Climate & Renewables)	SPM	8	33	-	-	-	-	-	Wording ´shares remain´ low	Relevant text deleted in rewrite.
United Kingdom (Department of Energy and Climate Change)	SPM	-	-	-	-	-	-	SPM 1	For end-use of listed bioenergy sources 'transport' is given. Would be more accurate to say 'chemical energy', of which transport is not necessarily the only end use - especially in the future.	Transport is one of the 4 major end-use of energy. Chemical energy is not end-use.
Ladislaus Rybach (Geowatt AG Zurich (company))	SPM	-	-	-	-	-	-	SPM 1	An ¿x¿ must be added in the row ¿Geothermal/Direct use applications¿ also in the column ¿Primary Distribution Method/Centralized¿ (geothermal district heating systems operate in many countries).	Table removed from SPM FD
Gustavo Nadal (ExxonMobil Research and Engineering Company)	SPM	-	-	-	-	-	-	SPM 1	Both sugar cane ethanol and soy biodiesel are being used for power generation (Brazil and Argentina respectively)	Not ethanol or biodiesel. Byproducts or wastes from ethanol and biodiesel are.
Brazil (Ministry of Science and Technology)	SPM	-	-	-	-	-	-	SPM 1	Hydropower generation with the use of reservoirs can also play an important role in decentralised power generation. Therefore, this option should also be marked in Table SPM.1.	Table removed from SPM FD
United States (U.S. Department of State)	SPM	-	-	-	-	-	-	SPM 1	Recommend deleting Table SPM 1 - way too much detail for SPM.	Removed from SPM FD

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Nico Bauer (Potsdam Institute for Climate Impact Research)	SPM	-	-	-	-	-	-	SPM 1	Refereing to the cols for technology maturity: most of technologies characterized by a cross are only commercially marketed because of support schemes. There is - obviously - large scale production, that is also rapidly growing, but these technologies are not competitive without the supports given that there is no strong carbon price signal.	Table has been removed from SPM FD. Costs of technologies are discussed later in the section, though without quantification of policy support.
Gerrit Hansen (TSU)	SPM	-	-	-	-	-	-	SPM 1	source of table is not clear. According Categorization of technologies within the technology chapters should be provided. Classification of "solar fuels" as both central and decentralized technology is not clear, as current solar fuels are derived by complex technical processes and would not be expected to be distributed in a decentralized manner. This table contains a lot of valuble information in a concise form, but the categories (centralized/decentralized) should be explained more clearly, also given the fact that the SRREN also uses the terms "distributed" vs. central.	Table removed from SPM FD
Nico Bauer (Potsdam Institute for Climate Impact Research)	SPM	-	-	-	-	-	-	SPM 1	The cross at biomass lignocellulosic ethanol production being at an early commerciallization stage seems to optimistic.	Table removed from SPM FD, though will examine underlying text accordingly.
Nico Bauer (Potsdam Institute for Climate Impact Research)	SPM	-	-	-	-	-	-	SPM 1	The cross at wind kites and sails being at a demo stage seems too pessimistic. There is at least one firm in Hamburg, Germany, that aims at commercialization.	As always, this is a matter of degree. However, advanced kites for large-scale marine transport (not just sail boats) are hardly being commercially deployed at any scale. Offshore wind is listed as early stage commercial, but offshore wind is more advanced that kites for marine transport. It seems to us that these technologies are largely in the pilot project phase, so prefer to leave the market as it stands.
Nico Bauer (Potsdam Institute for Climate Impact Research)	SPM	-	-	-	-	-	-	SPM 1	The cross of biomass gasification-based power plant being at early stage commercialization is too optimistic in my perspective. I only know of a pilot plant operated in the 70ies in Scandinavia.	For black liquor at least one plant exists
Nico Bauer (Potsdam Institute for Climate Impact Research)	SPM	-	-	-	-	-	-	SPM 1	The dichotomy of central and decentral is not considered as a debate in the main text. If it should be displayed in the table it needs debate in the main text. Also in the report it appears only in one single header (8.2) as a subitem paralell with other characteristics like load mangement.	Table removed from SPM FD;

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Nico Bauer (Potsdam Institute for Climate Impact Research)	SPM	-	-	-	-	-	-	SPM 1	Wind energy: delete ""and Sails"", (see comment on chapter 1)	Though I have not seen the chapter 1 comment, presumably this refers to the fact that sails have, of course, been used in marine transport for millenia. The focus here is not to place emphasis on those mature technologies, but instead to focus on new technologies for marine transport such as kites. Good comment.
Michael Jack (Scion (NZ Forest Research Institute))	SPM	8	20	8	20	-	-	SPM 1	Direct use applications of geothermal can also be centralized. There are a number of examples of this in New Zealand especially utilization of waste heat from geothermal power plants.	Table removed from SPM FD
Andreas Fischlin (Systems Ecology, IBZ, ETH Zurich)	SPM	8	25	8	25	-	-	SPM 1	I doubt that the technology maturity for OTEC is correct. Please check whether this is really adequate given that OTEC is in use since decades, i.e. late 70ies (e.g. Penney, R. R. & D. Bharathan, 1987. Power from the sea. Scientific American, 256(1): 74-80).	Table removed from SPM FD
Helmut Haberl (Institute of Social Ecology, Vienna)	SPM	8	-	-	-	-	-	SPM 1	I think that it would be highly useful to add a column on possible environmental issues, positive and negative, associated with the different resources discussed here	Table removed from SPM FD, but positive and negative environmental issues are discussed more in depth in Section 5 of revised draft.
Ella Stengler (CEWEP)	SPM	8	5	8	35	-	-	SPM 1	Please mention "Incineration of biodegradable waste", see comment number 1	Table removed from SPM in rewrite.
Finland (Finniah Meteorological Institute)	SPM	8	-	-	-	-	-	SPM 1	The term ¿Digestion¿ should be replaced with ¿Anaerobic digestion (biogas production)¿ for clarity.For transport only liquide biofuels are mentioned here. Also biogas should be mentioned. The potential of biogas as vehicle fuel should be recognised by adding ¿transport¿ in the column ¿energy sector¿ on the line concerning Anaerobic digestion (biogas production).	accepted.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
United Kingdom (Department of Energy and Climate Change)	SPM	8	-	-	-	-	-	SPM 1.	The supporting information for the data in this table is hard to find and is spread throughout the rest of the text. This same problem occurs with essentially all of the tables and figures in the Summary for Policy Makers. In most cases the supporting information amounts to one or two sentences in the body of the report introducing a specific technology by describing it as emerging/in infancy/etc, with little or no justification for these claims (which doesn't mean the claims are incorrect; only that they aren't explained and supported). The information regarding whether the technologies are centralized or not is even more vague and in most cases is not mentioned in the report except for on this table. In addition, does knowing whether or not a technology is centralized or decentralized give necessary information to a policy maker if the endnote tells us that virtually all technologies can be used in both a centralized or decentralized fashion? Some of the technologies listed in the table are barely even mentioned in the remainder of the report (wind energy - wind kites and sails/bioenergy - algae fuel production). Marine biomass farming in particular is left out of the report and seems to be miscategorized; it may be suited for the bioenergy section and to some extent may refer to algal fuel production.	Table removed from SPM FD. Effort made to clearly introduce all figures/tables with text in revised draft.
United Kingdom (Department of Energy and Climate Change)	SPM	8	-	-	-	-	-	SPM1	Air source heat pumps are omitted	Table removed from SPM FD.
Australia (0)	SPM	8	-	8	-	-	-	SPM1	Table gives a false impression on development stages of certain technologies, for example PV - whilst some PV (silicon-based) is commercial, there is still much that could benefit from R&D support (for example organics/dyesol). Table overly represents biomass and under represents solar.	Bioenergy has more entries than solar because there are multiple feedstocks. Solar technologies are clearly shown to be in the R&D or Demo & Pilot stages.
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	SPM	8	-	9	-	Box SPM1	-	-	[Wind energy]Add the sentence below; "It is required to promote development of technologies for cost down, expansion of available area to place, reinforcement of environmental integrity, provision for accessing network with a view to deployment both onshore and offshore."<reason> It is necessary to mention some challenges to overcome hereafter as well as optimistic potentiality or expectation. <reference> "White Paper on Renewable Energy Technorogies"(NEDO) http://www.nedo.go.jp/library/ne_hakusyo/index.html	This section of text focuses on technology solutions, not barriers and challenges, so the suggested additions are not appropriate for this location. Barriers and challenges should, however, receive adequate treatment in the rest of the SPM.
United Kingdom (Department of Energy and Climate Change)	SPM	8	-	-	-	Solutions	-	Table SPM 1	This table should contain a column that lists the Energy Return on Investment of different Renewable Energy Technologies	Table removed from SPM FD. Cost information has been compiled in Section 3.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
United Kingdom (Department of Energy and Climate Change)	SPM	8	-	-	-	SPM1	-	-	It would be better to have a separate discussion of the issues surrounding energy mix and supply-demand balances rather than to discuss the system design in relation to each resource separately. Thus the optimum sizing of the overnight heat store for a CSP plant depends on the diurnal variation in power demand and the implications of absorbing high levels of wind depend on mix also. For example in asystem with CHP and wind, there will be excessive electricity production when it is windy and cold, but a period of Atlantic blocking in Europe in winter will tend to compensate low power generation from wind by high generation from CHP.	Rewritten for SPM FD, Section 4 contains discussion of balancing and the effects of intermittency on electric grids.
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	SPM	9	2	-	4	3	-	-	give reference to Box 10.1.	Discusion on direct equivalent moved to Annex II. Appropriate reference inserted accordingly.
China (China Meteorological Administration)	SPM	9	-	9	-	3	-	SPM2	It is suggested that both cassava and sweet sorghum-based ethanol production be added.	WILL SIMPLIFY FOR SPM
France (MEEDDM (Ministry of Ecology, Energy, Sustainable Development and the Sea))	SPM	9	1	-	-	-	-	-	Check consistency with the figures in the executive summaries of the relevant chapters. Add a footnote to bioenergy: ""the use of charcoal, wood, and manure for cooking, space heating, and lighting generally by poorer populations in developing countries called traditional represents 80% of the total"".	Table replaced with figure in revised draft. Consistency with chapters ensured. Footnote on traditional biomass included.
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	SPM	9	5	9	6	-	-	-	Delete ", and in some cases without the thermal losses to which combustible fuels are subject." Define "the same energy services." <reason> Thermal losses occur even in case of RE. The meaning of the phrase "same energy servicces" is wide-ranging. It should be defined.	Sentences removed from SPM text in rewrite.
¿vind Christophersen (Climate and Pollution Agency)	SPM	9	13	9	13	-	-	-	Figure does not give the full picture related to these issues since it does not address transport of energi and the efficiency of energy transport.	Transport is included in figure, particularly under mechanical energy services.
Nico Bauer (Potsdam Institute for Climate Impact Research)	SPM	9	1	9	13	-	-	-	goes a bit beyond the underlying chapter but could be inferred from 1.3.2	Efforts made to clearly reflect text from Ch 1 and figure introduced to replace Table SPM2 appears in Ch 1.
Helmut Haberl (Institute of Social Ecology, Vienna)	SPM	9	1	-	-	-	-	-	I think it would be valuable to state whether the figures repported here refer to NCV or GCV	Noted.
¿vind Christophersen (Climate and Pollution Agency)	SPM	9	7	-	-	-	-	-	In the beginning of the sentence, in the wording "There is a multi-step process", please specify what we are talking about, what is "there"?	Accepted. Terminology removed.
Japan (the Japanese Ministry of Foreign Affairs)	SPM	9	11	-	-	-	-	-	It should be made clear "the careful design" this sentence is referring to and provide a more descriptive explanation of what it means by "careful".	Relevant text deleted in rewrite.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Seth Dunn (GE)	SPM	9	10	-	-	-	-	-	Sentence unclear: suggest "Since it is these ultimate energy services...that users demand, careful design.."	Relevant text deleted in rewrite.
Nico Bauer (Potsdam Institute for Climate Impact Research)	SPM	9	5	9	6	-	-	-	The argument of thermal losses being a characteristic of conventional energy sources (fossils, nuclear) cannot serve as an argument that a priori supports renewables. Obviously thermal processes offer room for improvment. Moreover, also renewables are subject to losses. E.g. Solar PV only converts some solar radition into electricity, but the ""conventional"" statistical framework for accounting does not take this account. Moreover, centralized solar power is also subject to thermal losses and if thermal storage is considered these loos heat as well. Moreover, geo-thermal power production for example has very high thermal losses. Hence, the issue thermal losses is misleading and is not unequivocally supporting RES. (Finally, thermal losses of all steam cycles could be reduced if more cooling is available, which in turn could be defined as a renewable energy source.)	Sentences removed from SPM text in rewrite.
Ladislaus Rybach (Geowatt AG Zurich (company))	SPM	9	13	-	-	-	-	-	The text claims that ¿Since it is the ultimate energy services of electronics, lighting, heating, cooling, transportation or industrial and mechanical processes, careful design can minimize the amount of energy required to accomplish those services, and extract the required energy from renewable and other low GHG emitting sources. This is illustrated in Figure SPM 1.¿ Figure SPM 1 as it stands now is much too complicated for the envisaged purpose; it is more confusing than helpful. In addition, it is incorrect and incomplete: 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; 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).	WILL REDRAW FIGURE FOR CLARITY
Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	SPM	9	6	-	-	-	-	-	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¿""	accepted.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
United States (U.S. Department of State)	SPM	9	5	9	13	-	-	-	This paragraph does not clearly convey the message that is contained in the source material from Ch. 1, Section 1.3.1.1 (Energy pathways from source to end-use). The point of that section is to convey that energy services can be provided by some RE sources directly, without thermal conversion and its associated energy loss. The result is that the same energy services can be provided with less use of primary energy. Replace the two sentences on lines 5 and 6 with: "Because RE can provide some energy services directly, without thermal conversion losses, it can result in decreased use of primary energy." Replace the sentence on lines 10 - 13 with: "It is the ultimate energy services of electronics, lighting, heating, cooling, transportation or industrial and mechanical processes that are of value in the energy system. Design to extract the energy required to accomplish these services from RE can minimize life cycle energy losses and thereby decrease GHG emissions."	accepted.
Nico Bauer (Potsdam Institute for Climate Impact Research)	SPM	9	7	9	9	-	-	-	This sentence is not illustrated by Figure SPM 1 but can be inferred from 1.3.2	Introduction to figure reworded for clarity and relevance.
Finland (Finniah Meteorological Institute)	SPM	9	10	9	13	-	-	-	This sentence might become clearer with some further editing.	Relevant text deleted in rewrite.
Nico Bauer (Potsdam Institute for Climate Impact Research)	SPM	9	2	-	-	-	-	-	what are SRREN values? IEA numbers converted to direct equivalent method? Pls clarify	SRREN values removed. Figure relies only on IEA (converted to DE accounting method).
Zoltán Somogyi (Hungarian Forest Research Institute)	SPM	9	-	-	-	-	-	SPM 2	Another consequence of not having mitigation data other than "indicative" is that we do not have both enough basic data, and - probably - appropriate methodology for the assessment of the mitigation potential. These are issues that must be highlighted both in the main body of the chapters of the various RE sources, and in the chapters titled "Knownledge gaps", e.g. in section 10.3.6. As there could be many options to derive an estimate for each RE source, the estimated mitigation potential values are difficult, if not impossible, to assess, and may even be misleading.	Mitigation potential is an area identified in Table 1.1 in the underlying report as an area where more knowledge is needed. Specifically 'technology-specific mitigation potential'. This is covered in the 'Future cost and timing of Re deployment' bullet in the SPM Section 8.
Zoltán Somogyi (Hungarian Forest Research Institute)	SPM	9	-	-	-	-	-	SPM 2	Another sign, and proof, of lack of data can be found in section 10.3.4, which should analyse appropriate data. However, the chapter starts out by saying that "the following calculation is necessarily based on simplified assumptions and can only be seen as indicative". If it is true that, in general, we only have "indicative" values concerning mitigation then it means that, at the moment, we do not have a firm basis to suggest energy production technologies that could be alternatives to those based on burning fissile fuels. However painful this is, this point must be made very clear in those parts of the documents (e.g. SPM) that will be read by decision makers.	Noted. Comment is most relevant for underlying text, particularly Chapter 10. Where information in SPM is indicative, it will be made clear.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Zoltán Somogyi (Hungarian Forest Research Institute)	SPM	9	-	-	-	-	-	SPM 2	Concerning accounting of emissions, much depends on the rules of the accounting, i.e. where the system boundary lies, which sources of emissions are included in the system, and which are not. This is just but one issue, however, a very serious one, which plays a role when establishing the GHG balance of applying any project. The discussion of this issue in Chapters 2.5.1.2 and 2.5.2 is simply by far not enough.	Noted. Comment is most relevant for underlying text, particularly Chapter 9.
Zoltán Somogyi (Hungarian Forest Research Institute)	SPM	9	-	-	-	-	-	SPM 2	Concerning the knowledge gap in the estimation methodology, I strongly suggest to establish links between WG III and the Task Force on GHG Inventories (TFI) of IPCC. In my experience, this Task Force has been regularly neglected even by other working groups of IPCC, which is a great pity. The inventory community, of which I am an lead author (having worked in five chapters of various IPCC Guidelines), could certainly contribute to developing appropriate methodologies that could be applied not only at the country level, but also at the level of RE sources.	Noted.
Zoltán Somogyi (Hungarian Forest Research Institute)	SPM	9	-	-	-	-	-	SPM 2	I find it strange and a pity that there are only two references in the whole document (including SPM) on the IPCC 2006 Guidelines. The original idea of the Guidelines (both the latest one, as well as the original ones) is to assist countries with assess and implement their mitigation efforts, and if the Guidelines can meet this demand at the RE level than references should be there for this reason, however, if they cannot, this point should be made clear.	Noted. Comment is most relevant for underlying text.
Zoltán Somogyi (Hungarian Forest Research Institute)	SPM	9	-	-	-	-	-	SPM 2	I repeat my comment that I submitted in the first round concerning a strategic issue. It is that the use of energy from any source (also if it is renewable) must not only be analysed from an energetical point of you, but also concerning the net GHG balance of that energy source, and this GHG balance must be compared to that of other sources. Without such analyses no RE should be suggested to replace fossile fuels (which is not to say that fossile fuels are good, or course).	LCA analysis of GHG emissions included in Section 5 of revised draft.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Zoltán Somogyi (Hungarian Forest Research Institute)	SPM	9	-	-	-	-	-	SPM 2	In this respect, a link seems required (1) to the IPCC 2006 Guidelines that have been designed to assist countries to develop GHG inventories, and (2) to an analysis of why and how these same Guidelines cannot assist users in their efforts to analyse the GHG balance of the various RE systems. From an emission point of view, the RE systems themselves are not easy even to define, which may be one reason why it can be rather difficult to estimate the emission balance of these systems. (For example: what is a biomass system? Producing biomass in a field? What if machines are included: are the emissions associated with producing and/or functioning of these machnise are included? What if fertilizers are also used: where are emissions associated with producing/transporting/applying these fertilizers are also included? ect. This is discussed in the text to some extent, but not in enough details.)	Noted. The purpose of this table (a figure in the SPM FD) is simply to present the share of RE in the total global primary energy supply. Where GHG emissions are discussed the link to the IPCC guidelines would be more relevant. Due to space constraints, this may be more applicable to underlying chapter than SPM text.
Zoltán Somogyi (Hungarian Forest Research Institute)	SPM	9	-	-	-	-	-	SPM 2	IPCC could and should discuss, at least by demonstrating case studies, a comparison between various energy production systems using hard GHG data to make it clear (1) how much data and estimates we have (or, to what extent we lack data), (2) how much research in this area must be undertaken in future, and that (3) considering energy issues alone cannot be a justification for the application of, or suggesting, any type of renewable source of energy. This topic is partially mentioned in the text of the SPM stating that "The GHG impacts of bioenergy are conditional", see page 6. I believe that the emissions balance of the RE energy sources must specifically and explicitely be discussed. This is further justified by the available data e.g. in Table 2.3.3 where very different data of % GHG reduction from fossil reference can be found for the same RE source, at least for wood residue. Large differences may mean very different assumptions/methodologies, and this problem must explicitely be discussed and acknowledged somewhere in the document.	LCA analysis of GHG emissions included in Section 5 of revised draft. Further information on areas where more data is needed are included in Setion 8.
Zoltán Somogyi (Hungarian Forest Research Institute)	SPM	9	-	-	-	-	-	SPM 2	One sign of lack of appropriate GHG estimates for the various RE sources is Table TS 0.3 in the Technical Summary, which contains rather few data on mitigation potential (in million tonnes CO2, and not in other units which may have nothing to do with mitigation), and practically one or two for biomass.	Noted. Comment is most relevant for underlying text, particularly Chapter 9.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	9	-	-	-	-	-	SPM 2	Solar (see also comment 2): numbers seem inconsistent with those on page 8 of Chapter 3 (where heat alone is at 0.5% and PV is underestimated).	In redraft, consistency with underlying chapters assured.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Zoltán Somogyi (Hungarian Forest Research Institute)	SPM	9	-	-	-	-	-	SPM 2	The above requirement seems especially justified as GHG emissions are blamed for causing climate change. It is only logical that if current non-renewable energy sources that produce emissions are to be replaced by renewable energy sources, there must be a transparent demonstration that the suggested RE energy source is less emissions prone, how, to what extent, and why.	LCA analysis of GHG emissions included in Section 5 of revised draft.
Zoltán Somogyi (Hungarian Forest Research Institute)	SPM	9	-	-	-	-	-	SPM 2	Thus, in suggesting any RE source, energetical issues and mitigation/emission reduction issues must be separated. In other words, mitigation issues must not be neglected, and should be covered in the right places and to the right extent in the document. This is especially important to note given that the "thesis" of the introduction reads (page 3, rows 8-10) the following way? "RE can contribute significantly within a broad portfolio of mitigation options to the goals outlined in the AR4 for limiting global mean temperature increases and stabilizing the concentration of greenhouse gases (GHGs) in the atmosphere". How can these options be evaluated if there are no estimates on the mitigation potentials?	LCA analysis of GHG emissions included in Section 5 of revised draft. The role of RE in different GHG mitigation scenarios is discussed in Section 6.
Zoltán Somogyi (Hungarian Forest Research Institute)	SPM	9	-	-	-	-	-	SPM 2	When discussing and comparing the various options of various energy sources, such balances may not be, and most oftne not, established by simply applying the IPCC Guidelines for National Greenhouse Gas Inventories, which may be the only internationally approved and standardized methodology in this respect. One reason for this may be that these Guidelines have been developed for the country level, not for the project level, for which the purpose of developing the inventory may be very different than for the country level reporting. Further work may be needed to develop internationally approved guidances for the project level. Some guidance is given e.g. in the IPCC GPG for the LULUCF sector (Chapter 4.3), and a lot of methodologies have been developed for the CDM and the JI mechanisms (see the UNFCCC website).	Noted. The purpose of this table (a figure in the SPM FD) is simply to present the share of RE in the total global primary energy supply. Where GHG emissions are discussed the link to the IPCC guidelines would be more relevant. Due to space constraints, this may be more applicable to underlying chapter than SPM text.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	9	1	9	1	-	-	SPM2	All contributions are specified in two decimals, except for bioenergy, so I suggest to change "48" into "48.00".	Table removed from SPM FD, and replaced with Figure. In figure all decimals extend out to 1 decimal point except ocean energy (which requires more)
John Twidell (AMSET Centre)	SPM	9	-	-	-	-	-	SPM2	Giving number to 5 significant figures (e.g. fossil fuels 411.09) is stating far too great an accuracy. I suggest one decimal place and a comment in the caption "the number of significant figures of the data does not imply accuracy to the last figure"	accepted.
Sweden (Swedish Environmental Protection Agency)	SPM	9	-	-	-	-	-	SPM2	I think it should be clearly stated here that this is GLOBAL primary energy supply.	accepted.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Leonidas Osvaldo GIRARDIN (Fundación Bariloche)	SPM	9	-	-	-	-	-	SPM2	It could be intresting to include a classification by geographical region and (if possible) by Annex I or non Annex I country.	Good suggestion, though due to space limitations in SPM have retained global figures.
Michael Jack (Scion (NZ Forest Research Institute))	SPM	9	13	10	1	-	SPM 1	-	To be comprehensive this table should also include fuel cell options beyond hydrogen. There a significant development in fuel cells for other fuels e.g. methanol and even carbon. In fact there is a significant gap in chapter 2 on this potential technology pathway.	Figure has been revised to DROP HYDROGEN
Canada (Environment Canada)	SPM	10	1	10	1	-	SPM 1	-	Figure provides a good summary of the energy system, but the figure caption doesn't match the figure well and greater explanation and clarification of the figure is needed. The description refers to "differing amounts of end use energy" and "more or less primary energy" - this implies that there is some form of proportionality that is not coming through in the connecting lines of the figure or in the caption.	Figure substantially revised for clarity.
Canada (Environment Canada)	SPM	10	1	10	1	-	SPM 1	-	Gravitational Force' is not an energy source. The energy source for hydro is the sun - gravitational potential energy is just an intermediate form. For tidal energy some of the energy comes from the gravitational potential energy of the moon, whose orbit slowly decays due to tides. It is suggested that 'gravitational force' be replaced with 'gravitational potential energy', and that the arrow to the 'hydro' box be delegated	accepted.
Canada (Environment Canada)	SPM	10	1	10	1	-	SPM 1	-	Note that: i) nuclear energy appears to be a stranded energy source in the diagram; ii) electrochemical conversion links heat (for combined heat and power [CHP] applications); iii) fossil fuels can be used for electrochemical conversion (solid oxide fuel cells) for electricity and CHP.	Figure substantially revised for clarity.
¿vind Christophersen (Climate and Pollution Agency)	SPM	10	6	-	15	-	-	-	A result of these lines could a.o. be that electricity have advantages when used for mechanical purposes and lighting, while biomass have advantages when used for heating where this is possible. Check the numbers in line 7. We believe it is not so useful to talk abou ¿approximately¿ values. Since the energy losses will differ a lot from source to source. We would prefer that you give a lover and upper value such as ¿¿between xx and yy percent ...¿	Relevant text deleted in rewrite.
United Kingdom (Department of Energy and Climate Change)	SPM	10	6	21	15	-	-	-	It is again not clear why thermal losses are highlighted, especially when a reversible heat engine has losses, and mechanical losses are not, despite a frictionless machine being equivalent to a perfect heat engine. It would be better to use exergy as the conceptual framework for this discussion. This paragraph reads like special pleading for RE and you might consider cutting it out.	Relevant text deleted in rewrite.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	10	6	10	8	-	-	-	It is unclear what the two percentages refer to. The percentages seem not very favourable, but in fact biomass conversion does not have to differ much from fossil fuel conversion. I suggest to rephrase to: "Conversion of biomass to electricity has an efficiency between 10 and 50%, the top end of which is comparable to the most efficient fossil fuel conversion. Geothermal heat conversion to electricity has an efficiency of around 20%. Residual heat may be used or wasted".	Relevant text deleted in rewrite.
Helmut Haberl (Institute of Social Ecology, Vienna)	SPM	10	6	-	-	-	-	-	Sentence unclear	Relevant text deleted in rewrite.
Brazil (Ministry of Science and Technology)	SPM	10	6	-	-	-	-	-	The list of thermal conversion processes between parentheses should read as follows: ""(including from biomass, solar thermal and geothermal)"".	Relevant text deleted in rewrite.
Emmanuel Branche (Electricité de France)	SPM	10	6	10	15	-	-	-	This paragraph is very interesting. It could be useful to add a diagram on "energy payback ratio" to illustrate it. Reference : Gagnon, L., 2008: Energy Payback. Energy Policy, 36, 3317- 3322. (such figure is drafted in chapter 5)	Relevant text deleted in rewrite.
Frank Mastiaux (EON Climate & Renewables)	SPM	10	7	-	-	-	-	-	Thermal losses of energy are put in a negative perspective since technically from the Carnot-Process it is not possible to transform energy without any losses. Her it may be better to talk about some very low efficient power stations in developing country up to very sophisticated gas turbines with over 65 % efficiency	Relevant text deleted in rewrite.
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	SPM	10	8	10	9	-	-	-	Delete the sentence below; "Direct energy conversions from solar, hydro, ocean and wind energy to electricity do not suffer these thermal losses." <reason>This description is not necessarily correct. Available output energy is smaller than input energy needed because of losses in energy conversion.	Relevant text deleted in rewrite.
United Kingdom (Department of Energy and Climate Change)	SPM	10	8	-	9	-	-	-	While some forms of RE do not suffer the thermal losses that other sources might, they have their own losses that might be mentioned (losses of energy through tower and nacelle vibration in wind turbines, for example). As written, the paragraph makes it appear that RE has a distinctive feature of avoiding energy losses leading to inefficiency.	Relevant text deleted in rewrite.
United States (U.S. Department of State)	SPM	10	9	-	-	-	-	-	Insert the following sentence from Section 1.3.1.1 after "thermal losses": "Hence primary energy requirements are much smaller for these forms of RE than for fossil fuel, biomass combustion, or for nuclear power." This clarifies the point of highlighting the thermal conversion losses.	Relevant text deleted in rewrite.
Nico Bauer (Potsdam Institute for Climate Impact Research)	SPM	10	10	-	-	-	-	-	can be highly efficient? Pls clarify under what conditions they are or are not	Relevant text deleted in rewrite.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	SPM	10	10	10	12	-	-	-	Delete the sentence below; "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." <reason> It may evoke biased intention. Necessity of the reference to CCS has considerable doubt as a target for comparison.	Relevant text deleted in rewrite.
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	SPM	10	11	-	-	3	-	-	give % numbers for the additional "substantial energy inputs" that are needed.	Relevant text deleted in rewrite.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	10	12	-	-	-	-	-	Add that in this comparison energy services have similar carbon intensity (similar as in TS pg 9, ln23-25)	Relevant text deleted in rewrite.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	10	12	10	15	-	-	-	Although factually correct, this sentence seems to suggest that a systemic perspective is only needed for RE. To safeguard from this wrong interpretation, I suggest to rephrase the sentence to: "However, to determine the optimal composition of the mitigation portfolio requires not only an assessment of technical feasibility, but also a systemic perspective which takes into account social, environmental and economic impacts.".	Relevant text deleted in rewrite.
United Kingdom (Department of Energy and Climate Change)	SPM	10	12	10	15	-	-	-	See comment 2 above as this text says we need to look carefully at scenarios where high grade energy sources such as low carbon electricity are used to meet heat demand	Relevant text deleted in rewrite.
Finland (Finniah Meteorological Institute)	SPM	10	12	10	15	-	-	-	The last sentence: Although there is an evident conceptual connection, the last sentence does not link well to this para. Would the sentence sit better on page 11, lines 6-14?	Relevant text deleted in rewrite.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	10	12	10	15	-	-	-	This sentence suddenly comes out of thin air. It has little to do with the rest of the paragraph. Why is it here?	Relevant text deleted in rewrite.
Italy (Institute for Environmental Protection and Research (ISPRA))	SPM	10	13	10	13	3	-	-	Replace "about" with "but" (small typographical error)	Relevant text deleted in rewrite.
¿vind Christophersen (Climate and Pollution Agency)	SPM	10	13	-	-	-	-	-	Change "about also a¿" to "but also a¿"	Relevant text deleted in rewrite.
Manfred Orgis (Ministry of Environment)	SPM	10	13	10	13	-	-	-	It is suggested to substitute "about" by "but". Otherwise the sentence does not make sense.	Relevant text deleted in rewrite.
Muhammad Mohsin Iqbal (Global Change Impact Studies Centre (GCISC))	SPM	10	13	-	-	-	-	-	It may be checked if the word ""about"" needs to be replaced with word ""but"".	Relevant text deleted in rewrite.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Nico Bauer (Potsdam Institute for Climate Impact Research)	SPM	10	13	10	14	-	-	-	Last sentence unclear and where in undrlying chapter? Not covered by 1.3.1.1	Relevant text deleted in rewrite.
Frank Mastiaux (EON Climate & Renewables)	SPM	10	13	-	-	-	-	-	Wording of sentence is inccorect	Relevant text deleted in rewrite.
United Kingdom (Department of Energy and Climate Change)	SPM	10	15	-	-	Solutions	-	.	Insert " . . . and resource availability. " after the words " . . environmental sustainability".	Relevant text deleted in rewrite.
China (China Meteorological Administration)	SPM	10	-	10	-	3	SPM 1	-	In figure, the ¿Ocean Energy" should be connected to ¿Thermal conversion¿. And if possible, it suggested that this figure should be deleted because it does not show much information.	Figure substantially revised for clarity. Includes suggestion.
Oluf Ulseth (Statkraft AS)	SPM	10	-	-	-	3	SPM 1	-	The 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 has been revised to DROP HYDROGEN
Frank Mastiaux (EON Climate & Renewables)	SPM	10	-	-	-	-	1	-	Picture is not fully clear. There is no legend explaining what the dotted line means. Why are not all grey boxes at the same level?	Figure substantially revised for clarity.
Japan (the Japanese Ministry of Foreign Affairs)	SPM	10	-	-	-	-	1	-	The diagram is not sufficiently comprehensive. For example, you cannot find traceable path for certain technologies. Examples of such technologies are solar cooling(that uses solar thermal energy directly to heat up the refrigerant), gas refrigerator	Figure substantially revised for clarity.
Sweden (Swedish Environmental Protection Agency)	SPM	10	-	12	-	-	-	-	Figures SPM1 to SPM 3 are all relatively complex to be incldued in a summary for policy makers. To some extent thay all display similar things (the conversion of primary to secondary energy (but they emphasize different aspects of the energy system). I think that it would be helpful if a similar structure/layout is used for all these three figures. Then it would be easier to follow for the reader. SPM 1 provides the basic structure, SPM2 adds real numbers to this basic structure, and SPM 3 adds the resulting emission pathways.	Figure SPM 1 substantially revised for clarity and SPM 3 dropped from SPM.
Babacar Sarr (ENERTEC-SARL)	SPM	10	-	-	-	-	SMP 1	-	Wind energy comes from Solar Radiation & Earth rotation. / Heat source of electricity. / Mechanical work source of electricitty	SOLAR HEATING IS THE ENERGY SOURCE FOR WIND
Antoine BONDUELLE (E&E Consultant)	SPM	10	-	-	-	-	SPM 1	-	Figure SPM1 does not give much information but brings confusion (not readable). Most of the information is already in Table SPM1. Maybe a paragraph could be enough.	Figure substantially revised for clarity.
Helmut Haberl (Institute of Social Ecology, Vienna)	SPM	10	-	-	-	-	SPM 1	-	In my view this graph is not consistent in ist lower parts. In my view it needs a much clearer distinction between final energy, useful energy and energy services.	Figure substantially revised for clarity.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	10	-	-	-	-	SPM 1	-	Several very important (a.o. solar energy) paths are missing: you cannot call PV an example of thermal conversion. It is fundamentally different with a fundamentally higher efficiency potential. This is simplifying too far or drawing a picture which is based on technologies of the past. Also the direct (photochemical) route from solar to fuels is missing.	Figure substantially revised for clarity and in consideration of this point.
John Twidell (AMSET Centre)	SPM	10	-	-	-	-	SPM 1	-	2nd row down, 'nuclear energy' has no output arrows. Suggest arrow to red 'thermal conversion' box, or, in practice, to 'electricity' box.	Figure substantially revised.
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	SPM	10	-	-	-	-	SPM 1	-	Entire figure should be amended. (e.g.) It should be added a line from solar energy to electricity, from nuclear energy to electricity and mechanical work, and lines can drawn from every source to hydrogen energy. <reference>Annual Energy Report 2010"(Agency for Natural Resources and Energy ; JPN) http://www.enecho.meti.go.jp/topics/hakusho/2010/2.pdf	FIGURE substantially revised - THANKS FOR REFERENCE
¿vind Christophersen (Climate and Pollution Agency)	SPM	10	-	-	-	-	SPM 1	-	Geothermal may also, in the same manner as solar energy provide heating directly and also cooling. Fore completeness, this should be shown in the figure.	Figure substantially revised.
Steve Sawyer (Global Wind Energy Council)	SPM	10	-	-	-	-	SPM 1	-	I'm confused about a number of the lines on this chart. But first and foremost, what does nuclear fission have to do with geothermal energy? I don't find the word 'fission' in the geothermal chapter, and the only references to 'nuclear' are for nuclear power. Is someone gathering energy from underground nuclear test sites, and if so, are we sure that they're garnering heat from fission bombs rather than uranium bombs? Also, I would argue that gravitational forces have a significant effect on the distribution of wind resources via the coriolis effect, among other things.	HEAT OF EARTH IS NATURAL NUCLEAR FISSION
United Kingdom (Department of Energy and Climate Change)	SPM	10	-	-	-	-	SPM 1	-	It is unclear why electro-chemical storage is given special status over other energy stores.	INCLUDES BATTERIES AND HYDROGEN
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	10	-	-	-	-	SPM 1	-	similar as fig1.6 and TS1.2 Figure is rather messy, repositioning some boxes may help. An arrow from "hydrogen energy" to "thermal conversion" is missing.	Figure substantially revised. Hydrogen energy removed.
United Kingdom (Department of Energy and Climate Change)	SPM	10	-	-	-	-	SPM 1	-	The thermo-chemical production of hydrogen from nuclear fission is omitted as a pathway.	ELECTRICITY IS CONNECTED TO CHEMICAL CONVERSION
United Kingdom (Department of Energy and Climate Change)	SPM	10	-	-	-	-	SPM 1	-	There should be a line between heat and cooling at the bottom of the chart (as can get cooling from heat via absorption chillers)	Figure substantially revised, cooling box eliminated, now reads 'heat-based energy services'.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
United Kingdom (Department of Energy and Climate Change)	SPM	10	-	-	-	-	SPM 1	-	While appliances such as washing machines are a combination of heating and mechanical, it might be easier to have a category of appliances to cover hybrids. Strictly speaking, services include washing, cleaning, cooking, entertainment, communications, security, ventilation etc	Figure revised to recategorize energy services.
Italy (Institute for Environmental Protection and Research (ISPRA))	SPM	11	10	11	10	3	-	-	At the end of the line, insert "reduction of dependence from energy imports" (this is a priority issue for many countries)	Energy security is discussed in depth in Section 5 of the new draft. Relevant sentence here has been removed.
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	SPM	11	10	-	-	3	-	-	Is the abb for MDG given somewhere?	Spelled out where occurs in new draft.
Frank Mastiaux (EON Climate & Renewables)	SPM	11	-	-	-	-	2	-	Very good picture. Some crossings in the lines could be prevented by reshuffling the order (i.e. the losses in grey)	Figure removed from SPM FD
Nico Bauer (Potsdam Institute for Climate Impact Research)	SPM	11	18	10	19	-	-	-	¿damage to land from mining, subsidence and oil spill."" not in undelying chapter	Sentence removed from text in rewrite.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	11	15	11	15	-	-	-	Although factually correct, the sentence in bold leads the reader to the conclusion that all RE technologies avoid air pollution. Also, many of the pollutants do not remain local. I suggest to rephrase the sentence in bold to read: "With the exception of bioenergy, RE technologies avoid the pollution that is usually associated with energy production based on combustion."	Sentence removed from text in rewrite.
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	SPM	11	17	11	19	-	-	-	Amend the sentence as follows; [original] "RE technologies have significant benefits for reducing air and water pollution, and damage to land from mining, subsidence and oil spills.[1.1.6]. [proposed amendment] "Some RE technologies have significant benefits for reducing air and water pollution, and damage to land from mining, subsidence and oil spills. However, no energy technologies are free from environmental burdens. Even RE technologies potentially have negative impact to the environment. [1.1.6]. <reason> Bioenergy and geothermal can be at risk for land or air pollution.	Sentence removed from text in rewrite. Environmental impacts are now covered in Section 5 on SD in which air pollution is a topic covered specifically.
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	SPM	11	15	-	-	-	-	-	Amend the sentence as follows;[original] "RE generation replaces conventional energy generation that may create local pollutants" [proposed amendment] "RE generation can contribute to reduce local pollutants" <reason> It depends on social and giographical situation of each country, cost of technologies and status of development whether RE can replace conventional generating systems. Because when conventional energy generation is operated properly, local pollution can be limited into little effective level, and some RE generation method can cause local pollution (e.g. For wind power generation, it can cause deforestation), so that description should be amended.	Sentence removed from text in rewrite.

Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table Info	Comments	Consideration by the writing team
United Kingdom (Department of Energy and Climate Change)	SPM	11	15	11	19	-	-	-	But renewables in turn may "create local pollution," such as land use change, biodiversity, local water quality impact etc. - hence need to have LCA viewpoint	Sentence removed from text in rewrite. Benefits of RE techs are now covered systematically including an LCA analysis in Section 5.
United Kingdom (Department of Energy and Climate Change)	SPM	11	15	22	19	-	-	-	Given that the diagram shows that combustion is the largest RE energy process, this paragraph is hard to interpret. More care needs to be taken in describing the actual pollution profile of energy supply, especially as many large combustion processes are fitted with abatement equipment.	Sentence removed from text in rewrite. Air pollution effects are covered in a systematic way in Section 5.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	11	12	11	14	-	-	-	I suggest replace "drivers, opportunities and benefits" by "arguments and opportunities for, and benefits of,". Technologies will develop over time and be of influence on the arguments and opportunities for, and benefits of RE. Shouldn't it be mentioned here?	Sentence removed from text in rewrite.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	11	17	11	19	-	-	-	In practice, the drainage necessary for oil palm cultivation on tropical peat soils leads to substantial subsidence (e.g. Verwer, c.s. 2009) through oxidation of the organic matter, and importantly to emissions that may exceed 1% of total GHG emissions. The current sentence of cause intends to refer to subsidence caused by emptying gas and oil fields, but I am afraid quotes will be misused. I suggest to delete ", subsidence".	Sentence removed from text in rewrite.
Several experts 0 (Ministry of the Indutry, Tourism and Trade)	SPM	11	17	-	-	-	-	-	it seems advisable to write: In general terms RE technologies "have significant benefits¿.." since some RE applications can lead to air pollution (e.g. biomass combustion) or land use impacts	Sentence removed from text in rewrite. Benefits of RE techs are now covered systematically in Section 5.
Canada (Environment Canada)	SPM	11	8	11	12	-	-	-	Other drivers may include: increasing imbalance between energy supply and demand, energy reliability, and existing infrastructure reliability.	Relevant text has been removed in rewrite. Sentiments now covered in Section SPM 5 under access to energy and energy security.
Frank Mastiaux (EON Climate & Renewables)	SPM	11	15	11	19	-	-	-	RE technologies are able to reduce other forms of pollution, but this is certainly not true in general: Biomass e.g. used for wood fire cooking can have a serious impact if not harvested in a sustainable manner. Production of solar PV is a rather energy intense process, also several acids are needed for its production ¿ hence sustainable production of PV cells depends strongly on strict environmental rules.	Sentence removed from text in rewrite. Environmental benefits now covered in a systematic way in Section 5.
United States (U.S. Department of State)	SPM	11	15	-	-	-	-	-	Replace bold sentence on line 15 with final sentence in paragraph on lines 17 - 19.	Sentence removed from text in rewrite. Environmental benefits now covered in Section 5.
¿vind Christophersen (Climate and Pollution Agency)	SPM	11	15	-	-	-	-	-	Substitute ¿replaces¿ with ¿can replace¿. The mentioned benefits of RE occur only if RE substitute conventional energy generation based on fossil fuels and not always either.	Sentence removed from text in rewrite.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Finland (Finniah Meteorological Institute)	SPM	11	17	-	-	-	-	-	Suggested addition: RE technologies generally have... (the logic: e.g. local air pollution can be caused by burning biofuels)	Sentence removed from text in rewrite. Air pollution effects (also from bioenergy) is covered in Section 5.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	11	8	11	12	-	-	-	The listed issues are arguments, not drivers. In addition to poverty reduction, the MDGs also cover e.g. improved health, education and environmental living conditions. I suggest to rephrase this sentence to read: "The key arguments for RE policies are: enhanced access to energy services, in particular for the poor, improved health, education and environmental living conditions, reliable energy supply at stable prices, more diversity in energy sources, economic development and more local jobs. As such, RE policies may substantially contribute to the realisation of the MDGs and sustainable development."	Sentences removed from text in rewrite.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	11	6	11	8	-	-	-	The sentence in bold seems a circle. I suggest to rephrase to read: "RE may have economic, environmental and social benefits that can provide governments and other actors with additional arguments to facilitate, stimulate and implement these technologies.".	Sentence removed from text in rewrite.
¿vind Christophersen (Climate and Pollution Agency)	SPM	11	6	-	8	-	-	-	The text is an example of sentences that can be made shorter and easier to understand, eg: ¿Economic, social and ecological benefits are motivating governments and individuals to adopt RE, because they can contribute to realize several sustainable development goals at the same time¿	Sentence removed from text in rewrite.
Nico Bauer (Potsdam Institute for Climate Impact Research)	SPM	11	12	-	-	-	-	-	There is no reference to technological spill-overs	Too detailed for SPM.
United Kingdom (Department of Energy and Climate Change)	SPM	11	15	-	16	-	-	-	This statement only indirectly (via figure SPM 3) mentions that RE does have its own pollution causing technologies (bioenergy). It is important throughout the document, and especially in this Summary for Policy makers, to make a full and balanced comparison of RE against competing technologies, considering the complete range of potential impacts and benefits. This document should an assessment of the relative merits, not a commercial piece promoting the merits of RE.	Sentence removed from text in rewrite. Environmental benefits now covered in a systematic way in Section 5.
¿vind Christophersen (Climate and Pollution Agency)	SPM	11	6	-	19	-	-	-	We think this is about drivers and should be moved to ch 1	Detailed discussions about environmental and social benefits now appear in Section 5 SD, and also in Section 7 Policy.
Helmut Haberl (Institute of Social Ecology, Vienna)	SPM	11	-	-	-	-	SPM 2	-	It is unfortunate that this figure does not include useful energy flows. This masks the huge losses there. Also, there seem to be no losses in the bioenergy conversion stream, seems thermodynamically not possible.	Figure removed from SPM FD
Emmanuel Branche (Electricité de France)	SPM	11	-	11	-	-	SPM 2	-	Losses presented in this figure SPM2 (value = 6.2 EJ) appear very big in comparison to the total electricity value of 16.5 EJ ?	Figure removed from SPM FD

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Emmanuel Branche (Electricité de France)	SPM	11	-	11	-	-	SPM 2	-	Number presented in this figure SPM2 for Primary Energy Supply are not consistent with the Table 2 of this SPM. For instance different numbers for Geothermal 2.1 or 0.39 EJ ?	Figure removed from SPM FD
¿vind Christophersen (Climate and Pollution Agency)	SPM	11	-	-	-	-	SPM 2	-	We find this figure difficult to understand/read.How does it relate to Table SPM 2? For e.g geothermal energy figures seems to be very different.	Figure removed from SPM FD
United Kingdom (Department of Energy and Climate Change)	SPM	11	-	-	-	-	SPM 2.	-	This figure is hard to understand. The sum of primary energy supply doesn't equal the sum of the total final consumption and losses - they are off by 0.3 ej which is significant since the input of some sources is less than that. In addition, Table SPM2 notes that SRREN will have consistent data in terms of primary energy throughout the report. In this figure, the sum of the primary energy sources is 3 ej more than the number given in the aforementioned table.	Figure removed from SPM FD
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	11	1	11	1	-	SPM 2	-	In the centre, just below the flow of 33.7 EJ between "Combustible Biomass and Wastes", and "Other Sectors" there is a value of 0.002 that does not seem attached to any flow.	WILL CONNECT REVISING FIGURE in underlying text. Removed fro mSPM FD.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	11	1	11	1	-	SPM 2	-	It is not clear from the figure, its heading or the explanation that it does not include thermal losses.	THERMAL LOSSES ARE INCLUDED, though figure removed from SPM FD.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	11	-	-	-	-	SPM 2	-	similar as fig 1.10 and TS 1.3 Given the large share of biomass used for cooking and heating purposes, it would be insightful to differentiate "other sectors" to show biomass use in the residential sector	Figure removed from SPM FD
¿vind Christophersen (Climate and Pollution Agency)	SPM	11	-	-	-	-	SPM 2	-	The numbers for Geothermal in this figure are not consistent with the numbers in Table SPM2.	Figure removed from SPM FD
United Kingdom (Department of Energy and Climate Change)	SPM	11	8	-	-	Solutions	-	-	Insert "resource depletion" after the words "climate change mitigation".	Sentence removed from text in rewrite. Resource depletion addressed in part under energy security in Section 5 of new draft.
United Kingdom (Department of Energy and Climate Change)	SPM	11	14	-	-	Solutions	-	-	There needs to be a discussion on how much fossil fuel is required to produce or manufacture renewable energy solutions.	LCA GHG emissions study has been included in Section 5.
Frank Mastiaux (EON Climate & Renewables)	SPM	12	-	-	-	-	3	-	Picture contains more boxes / circles than it needs. Why not centralize the pollutants?	Figure removed from SPM FD.
Sung-Hee Shim (Korea Energy Economics Institute)	SPM	12	12	-	-	-	-	-	Details of the most significant environmental social and impact topics ? Details of the most significant environmental and social impact topics.	Sentence removed from text in rewrite.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
¿vind Christophersen (Climate and Pollution Agency)	SPM	12	12	-	-	-	-	-	Incert comma after environmental	Sentence removed from text in rewrite.
Modesto Fernandez Diaz-Silveira (Ministry of Science, Technology and Environment)	SPM	12	4	-	-	-	-	-	TO include in text, after land clearance: "and increased water usage (in the case of bioenergy production from crops)"	Sentences removed from text in rewrite; water usage now discussed in Section 5
Several experts 0 (Ministry of the Indutry, Tourism and Trade)	SPM	12	2	12	5	-	-	-	Visual impact is a major impact, specially in populated developed countries. Although this impact is common to fossil fuels, nuclear energy and RE it seems advisable to include it	Visual impacts are discussed as 'landscape' impacts and included in revised draft.
Helmut Haberl (Institute of Social Ecology, Vienna)	SPM	12	-	-	-	-	SPM 3	-	Figure missing	Figure removed from SPM FD.
Andreas Fischlin (Systems Ecology, IBZ, ETH Zurich)	SPM	12	-	12	-	-	SPM 3	-	I am missing here again forestry/fuel wood. "Biofuel crop cultivation" does AFAIK not include fuel wood production. This makes me actually very concerned, whether authors have not systematically left an important component out of this report and might have introduced a serious bias. My concerns here need very careful consideration and I hope that we have not as serious an omission as it appears from reading the SPM up to this point. Negligence of considering properly the role of forests in energy production together with all related impliciations, given the double-role of forests or forested lands as sources of GHG as well as sinks might have far-reaching consequences for the report.	Figure removed from SPM FD.
Emmanuel Branche (Electricité de France)	SPM	12	-	12	-	-	SPM 3	-	Inputs "Nuclear Fuel Production" and "Biofuel Crop Cultivation" are used for "Thermal Electricity Production", and the output is "Fossil Fuel Electricity Delivery" which is contradictory according to me ?	Figure removed from SPM FD.
Juan Jose Sanchez (Ministry of the Environment, and Rural and Marine Affairs)	SPM	12	-	-	-	-	SPM 3	-	The concept ""Fossil Fuel Electricity Delivery"" in the figure is not correct as this flow comes not only from fossil fuel, but also from nuclear and biofuel crop cultivation	Figure removed from SPM FD.
¿vind Christophersen (Climate and Pollution Agency)	SPM	12	-	-	-	-	SPM 3	-	we think it is very difficult to grasp the main messages this figure is meant to give	Figure removed from SPM FD.
Canada (Environment Canada)	SPM	12	-	-	-	-	SPM 3	-	Diagram is difficult for readers to interpret. Suggest considering other formats to present this information.	Figure removed from SPM FD.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	SPM	12	-	-	-	-	SPM 3	-	Entire figure should be amended after correcting mistakes below; -"Thermal electricity production" should be separated into two items of "Nuclear Power Electricity Production" and "Fossil Fuel Electricity Production", and an arrow as output from "nuclear Power Electricity Production" should be directed at only "Radioactive Waste". -An arrow as output from "Fossil Fuel electricity Production" should be directed at only "Air and Water Pollution" and "CO2". -Two side of parenthetical expression of "Fossil Fuel Electricity Derivery" and "Renewable Electricity Delivery" into "Electricity Demand" should be rephrase as "Electricity Delivery". -It is technologically difficult to distinguish "Nuclear Fuel Production" or "Fossil Fuel Production" from "Processing and Transport". -"Thermal Electricity Production" should be separated into "Nuclear Power Electricity Production" and Fossil Fuel Electricity Production", and items of emission of each electricity production should be clear. -It is irrelevant that there is no arrow as input into "Processing and Transport". (e.g. "Energy", "Water") -"Water" and "Energy" input is required for "Geothermal". -"Geothermal" can cause environmental pollution such as emissions of deleterious contaminant (e.g. mercury, arsenic) and stink. <reason> It lacks the precision remarkably.	Figure removed from SPM FD.
United Kingdom (Department of Energy and Climate Change)	SPM	12	-	-	-	-	SPM 3	-	It isn't clear what this figure is trying to convey (especially when you consider the detail in Table SPM3)	Figure removed from SPM FD.
John Twidell (AMSET Centre)	SPM	12	-	-	-	-	SPM 3	-	Serious omission. CO2 is an INPUT to biofuel, as well as an output. Thus, longterm, there is no added CO2 to the atmosphere. The public often finds this difficult to understand; it is the added carbon dioxide from fossil fuels that is harmful.	Figure removed from SPM FD.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	12	-	-	-	-	SPM 3	-	Similar as fig 1.5 and TS 1.4 The message of this figure is incomprensible, the caption doesnt 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 from SPM FD.
United Kingdom (Department of Energy and Climate Change)	SPM	12	-	-	-	-	SPM 3	-	This figure could usefully precede the discussion on pollution. It would be helpful to include the production of nitrogen oxides from bio-mass production. Also the production of methane from both the fossil fuel and bio-fuel chains could be mentioned. The habitat and bio-diversity effects of RE should also be mentioned in the text.	Figure removed from SPM FD.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	SPM	12	-	-	-	-	SPM 3	-	What does this figure tell me? I have no clue¿	Figure removed from SPM FD.
Leonidas Osvaldo GIRARDIN (Fundación Bariloche)	SPM	12	-	-	-	-	SPM 3	-	Why nuclear fuel energy production appears emitting CO2? (the arrow seems to be indicating that). In the case of biofuel crop cultivation, may also be emissions of other GHG but CO2 (N2O, for example), depending on the land use practices. In biofuel crop cultivation could be also soil degradation.	Figure removed from SPM FD.
Germany (Federal Ministry for the Environment, Nature Conservation and Nuclear Safety)	SPM	13	4	14	17	3	-	-	first time adverse impacts are mentioned. Does this relates to the minus boxes? Please, clarify. Some but not comprehensive ways to mitigate them are described. It gives the impression that adverse effects can always easely be avoided, what is not the case. For the SPM it is sufficient to mention that are ways to mitigate adverse effects, but concentrate on the most important adverse effects with regard to climate change issues like GHG emissions from land clearings and drainage.	Rewritten for SPM FD. Table and text removed here. Discussion centered in Section 5 and focused more on GHG emissions.
China (China Meteorological Administration)	SPM	13	-	13	-	3	-	SMP3	In column ¿Ocean Energy¿, sentence "Ecological Modification from barrages" should be "Ecological Modification from barrages, sea bottom cables and change in electromagnetic field".	Table removed from SPM FD and underlying text
Garcia Javier (Garcia Monge Consultant)	SPM	13	-	13	-	3.	-	SPM 3	4th row, 5th column (Geothermal): Geothermal projects have atmospheric emissions as CO2, hidrogen sulphides and others.	Table removed from SPM FD and underlying text
Garcia Javier (Garcia Monge Consultant)	SPM	13	-	13	-	3.	-	SPM 3	5th row, 9th column (nuclear): add ""Hot water discharge in water bodies""	Table removed from SPM FD and underlying text
Garcia Javier (Garcia Monge Consultant)	SPM	13	-	13	-	3.	-	SPM 3	7th row, 6th column: add: ""slope management and risk of remotion on hill-channels and small amount of deforestation.""	Table removed from SPM FD and underlying text
Richard Taylor (International Hydropower Association)	SPM	13	-	-	-	3	-	SPM 3	Delete table. Seemingly random and by no means comprehensive of list of positive and negative effects - it does not justice to the complexity of these issues for the various energy technologies	Table removed from SPM FD and underlying text
Richard Taylor (International Hydropower Association)	SPM	13	-	-	-	3	-	SPM 3	If table is not deleted then in relation to the hydropower column: Insert "increase in biodiversity for some sites" in the plus row of "Ecosystem and Biodiversity"; delete "air" from the minus row of and "odor in isolated case" in the plus row of "Human Health"; insert "multipurpose water" after "new" and before "infrastructure" in the plus row of and delete "impacts from induced occupation" in the minus row of "Built Environment"	Table removed from SPM FD and underlying text
Italy (Institute for Environmental Protection and Research (ISPRA))	SPM	13	-	-	-	-	-	3	Add a reference to the increase in emissions of particulate matter and PAHs resulting from increasing use of biomass in low efficiency domestic boilers, by inserting "particulate matter and PAH emission from low efficiency domestic boilers" in table SPM3 under Bioenergy/Air and Water/Concerns" (Caserini, S. et al., 2010, LCA of domestic and centralized biomass combustion: The case of Lombardy (Italy) Biomass and Bioenergy, Volume 34, Issue 4, April 2010, Pages 474-482).	Table removed from SPM FD and underlying text

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Frank Mastiaux (EON Climate & Renewables)	SPM	13	-	-	-	-	-	3	Difference between onshore and offshore is large in both benefits and concerns (e.g. noise pollution)	Table removed from SPM FD and underlying text

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Oluf Ulseth (Statkraft AS)	SPM	13	-	-	-	-	-	3	The benefit/concern list on hydropower has only partially been completed and lacks important aspects both on the positive and negative side. A major positive contribution to land use/population is flood and drought control, as well as inland navigation which should be listed explicitely in this rubric, whereas under Air/Water the reference to the same "impounded water can be used for..." should be deleted to avoid redundnancy. However under the same category should be added instead "emits no toxic air pollutants" and "offers increased options for integrated water management in terms of quantity and quality" (e.g. increasing oxygen levels in polluted rivers by spilling water over the dam). Moreover, the following benefits to ecosystems and biodiversity have been disregarded: stabilisation of groundwater levels, improved wetland conservation and enhanced control mechanisms for invasive species. If the space allows it would also be important to highlight under this rubric that especially in nordic climates the replacement of an terrestrial environment by an aquatic one through the creation of a reservoir increases the overal biological productivity of this area (see governmental studies from Québec, Canada). In addition under the Human health benefits should not only be mentioned that water supply from reservoirs can contribute through improved health "and food quality". (The protein of fish produced in the reservoir is of much higher nutritional quality than the crops which might have been grown there before). Under the built Environment section it is important to specify in addition "socio-economic benefits from new infrastructure and flood/drought protection". For the negative aspects under the land use rubric is important to nuance that not all hydropower does involve population displacements or impacts on cultural heritage. For example the whole hydropower generating fleet of Canada (74 000 MW installed capacity and about 355 TWh/yr) has involved no involuntary displacement. Therefore, it would be more accurate to state "may involve" here. Furthermore, under negative contributions to ecosystems should be mentioned "may increase sedimentation" (as this is not the case for all areas - i.e. areas with predominat granit ground). The forumlation of the negative contribution under built environment"existing infrastructure dammage due to inundation" is somewhat ambigous and requires clarification. Does it mean the infrastructure which has been impounded through reservoir creation? Than it is necessary to nuance that "may flood existing infrastructure if storage is required" as not all hydropower projects come with a reservoir. However this deems not very relevant since this infractructure has to be replaced at a market value basis. Then it would be more accurate to specify "might submerge/displace existing infrastructure in impoundment areas". Otherwise, dams with reservoirs are more likely to prevent inundations and damage to infrastructure due to enhanced capacity of water absorbtion.	Table removed from SPM FD and underlying text

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
¿vind Christophersen (Climate and Pollution Agency)	SPM	13	-	-	-	-	-	3	The benefit/concern list on hydropower seems partial, and important aspects as for example flood and drought controll is not included	Table removed from SPM FD and underlying text
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	13	-	-	-	-	-	3	there are certainly more benefits and negative effects to the different RE sources than listed in this table; at the very least adjust the title to reflect that.	Table removed from SPM FD and underlying text
Taishi Sugiyama (Central Research Institute of Electric Power Industry (CRIEPI))	SPM	13	-	13	-	-	-	3	This figure is very important, but need more works. Address costs, intermittency and stabililty of supply. Add WEHAB benefits of large hydro. Compare with fossile fuel and nuclear.	Table removed from SPM FD and underlying text
United Kingdom (Department of Energy and Climate Change)	SPM	13	8	13	8	-	-	-	"sustainability frameworks": this could be made more specific and strengthened by stating "sustainability assessment frameworks"	Particular sentence removed from text, but sustainability frameworks discussed in more detail in Box on Land Use Change in revised draft.
United Kingdom (Department of Energy and Climate Change)	SPM	13	4	13	4	-	-	-	"There are options to mitigate the adverse impacts of RE technologies, making them sustainable". Either delete the phrase after the comma or state 'more sustainable'. Stating that they are 'sustainable' is categorical and would be difficult to justify: it begs many questions about the nature of sustainability and its measurement.	Sentence removed from text in rewrite.
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	SPM	13	4	13	5	-	-	-	Add the sentence as follows; "There are options to mitigate the adverse impacts of RE technologies, making them sustainable [9].However, the economy of RE often deteriorates by adopting these options."	Sentence removed from text in rewrite.
Finland (Finniah Meteorological Institute)	SPM	13	4	14	17	-	-	-	Bullets should be used in listing different ways of mitigating adverse impacts (lines 6-14). This would make it easier to grasp what the para contains.	Sentences removed from text in rewrite.
Several experts 0 (Ministry of the Indutry, Tourism and Trade)	SPM	13	-	-	-	-	-	-	Hydropower is considered as RE up to a certain installed power and then known as minihydraullic. Only minihydraulic systems must be considered	"Renewable" is a non size-dependent attribute. International Conference for Renewable Energies (Bonn, 2004) and other United Nations organised conferences clearly confirmed hydropower (whatever the size) as a RES. Chapter 5 of this IPCC/SRREN substantiates the reasons behind not classifying hydropower projects according to size, but rather according to type and use.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	13	4	13	6	-	-	-	I would prefer to avoid using the word 'mitigate' in an other meaning than 'mitigate the anthropogenic causes of climate change', and therefore suggest to replace "mitigate" by "reduce" or "lessen", and "mitigating" by "reducing".	Sentence removed from text in rewrite.
Manfred Orgis (Ministry of Environment)	SPM	13	-	-	-	-	-	-	Table SPM 3: This table is appreciated. However, it should be clarified that all relevant issues related to the life cycle (from the "cradle to the grave") associated with the renewable energy sources considered, are addressed in table SPM 3.	Table removed from SPM FD and underlying text
Wim Sinke (Energy research Centre of the Netherlands (ECN))	SPM	13	-	-	-	-	-	SPM 3	"Concerns" for solar land use are not for urban areas, because installations there generally employ "multiple use of physical space". In the contrary: integrating PV in urban areas (small and large systems) is a way to deal with raising concerns about land use (see Germany, for instance). It seems that "(social) concern" is confused with "(physical) limitation"?	Table removed from SPM FD and underlying text
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	13	-	-	-	-	-	SPM 3	"Concerns" for solar land use are not for urban areas, because installations there generally employ "multiple use of physical space". In the contrary: integrating PV in urban areas (small and large systems) is a way to deal with raising concerns about land use (see Germany, for instance). It seems that "(social) concern" is confused with "(physical) limitation"?	Table removed from SPM FD and underlying text
¿vind Christophersen (Climate and Pollution Agency)	SPM	13	-	-	-	-	-	SPM 3	Bioenergy, Air and water: Add ¿GHGs and ammonia from fertilizer production and use¿. The combustion of biomass emits air pollutants similar to fossil fuels. Whether they will be lower or higher depend on both fuels and application. Nuclear energy, Land use and population or Human health: The development and use of nuclear energy will also increase the risk of proliferation of nuclear weapons. This could be mentioned.	Table removed from SPM FD and underlying text
Rory Gilsenan (Natural Resources Canada)	SPM	13	-	-	-	-	-	SPM 3	Bioenergy: Air and Water; negative row: indicates "risk of fires" It is unclear to me how harvesting for bioenergy increases the risk of fires? In fact, harvesting is often used to decrease the risk of fire. It should be indicated in the positive column, since performing management tasks like thinning and removing slash piles would decrease fire risk and can be used for bioenergy. For example this is done in California "Integrating Bioenergy Harvesting with Silviculture" (http://www.forestencyclopedia.net/p/p1333)	Table removed from SPM FD and underlying text
Germany (Federal Ministry for the Environment, Nature Conservation and Nuclear Safety)	SPM	13	-	-	-	-	-	SPM 3	Colum: bioenergy, line: water and air , add under GHG emissions after land clearing: , and draining, as well as from fertilisation, and tilling; Rationale those management activities lead N2O and CO2 emissions, especially draining can lead to high emissions	Table removed from SPM FD and underlying text

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Germany (Federal Ministry for the Environment, Nature Conservation and Nuclear Safety)	SPM	13	-	-	-	-	-	SPM 3	Column "Geothermal" vs. "Human Health" - Delete the current text "hot water for spa resorts"; Maybe 10% if not less of the global population have access to spa resorts, so this seems not a key issue here, and could be interpreted at being unduly focussed on rich societies. Alternatively rephrase to say "hot water for public baths" or similar.	Table removed from SPM FD and underlying text
Germany (Federal Ministry for the Environment, Nature Conservation and Nuclear Safety)	SPM	13	-	-	-	-	-	SPM 3	Column "Nuclear" vs. "Human Health": After "Very significant from potential accidents;" please add "as well as risks from mining, decommissioning and storage sites as well as proliferation"	Table removed from SPM FD and underlying text
Emmanuel Branche (Electricité de France)	SPM	13	-	13	-	-	-	SPM 3	From "Air and water" on "Hydropower" in "concerns", proposition to remove "high" in the sentence as it is too vague. Furthermore current quantification show when in cases where methane can occur, they represent GHG emissions extremely low (1 or 2 times less than a thermal unit). Reference to section 5.6	Table removed from SPM FD and underlying text
Emmanuel Branche (Electricité de France)	SPM	13	-	13	-	-	-	SPM 3	From "Ecosytem and Biodiversity" on "Direct Solar", positive and negative impacts are not consistent. Indeed it is written on positive that there are "no harm and some benefits" and in the cell just below "risks from large scale projects" ¿	Table removed from SPM FD and underlying text
Emmanuel Branche (Electricité de France)	SPM	13	-	13	-	-	-	SPM 3	I am not sure that there is no negative "built environment" for Direct solar ... (for electricity and/or heat use, solar panel on roofs have a visual effect), and the costs are very high. Proposition to add such elements on that point as high costs of this technology compared to the alternatives may have negative consequences in terms of social-economic (increased electricity prices for instance)	Table removed from SPM FD and underlying text
Helmut Haberl (Institute of Social Ecology, Vienna)	SPM	13	-	-	-	-	-	SPM 3	I suggest to replace "positively intensified land use" with "Reclamation of degraded land". The risk category below should also refer to land degradation. Below, bioenergy/air and water, negative: GHG emissions can also result from land use, not only from land clearing.	Table removed from SPM FD and underlying text
Frank Mastiaux (EON Climate & Renewables)	SPM	13	-	-	-	-	-	SPM 3	Land use does not take into account the land use for electricity grids, gas pipelines etc. Hence decentralized generation is certainly only then environmentally beneficial, in case the energy consumers are close to the generation, which is not always the case.	Table removed from SPM FD and underlying text
Emmanuel Branche (Electricité de France)	SPM	13	-	13	-	-	-	SPM 3	Proposition to add "Creation of possible corridor/areas for nature conservation, as well as high-value ecosystems such as Ramsar reservoirs" as a positive impact for hydropower in the field Ecosystem & Biodiveristy. Such a conservation program/ sanctuary (wildlife park) was created for Nam Theun 2 project in Laos as an example. Several hydropower reservoir are also categorised as Ramsar (ref chap 5 and SPM p14).	Table removed from SPM FD and underlying text

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
¿vind Christophersen (Climate and Pollution Agency)	SPM	13	-	-	-	-	-	SPM 3	Some findings indicate that offshore wind power foundations could work as an artificial reef, which could lead to increased local abundances of various species.	Table removed from SPM FD and underlying text
Finland (Finniah Meteorological Institute)	SPM	13	-	-	-	-	-	SPM 3	Table cells on "Bioenergy-Human Health" is far too optimistic compared to research results. Emissions from bioenergy (including biofuels; see http://www.stanford.edu/group/efmh/jacobson/es062085v.pdf) can be highly toxic and have negative impact on air quality. Increasing use of bioenergy and -fuels may well increase toxic emissions. There is certainly not sufficient research to support claim "lower and toxic air pollutant emissions improving human health".	Table removed from SPM FD and underlying text
Emmanuel Branche (Electricité de France)	SPM	13	-	13	-	-	-	SPM 3	This table is very interesting and important. However I think that it could be important to associate mitigation measures to this table which highlights only impacts (+ or -), otherwise a standalone use of such a table may be too discriminant for RE (whatever the technology). Even if the paragraph below present these mitigation measures ...	Table removed from SPM FD and underlying text
Canada (Environment Canada)	SPM	13	2	13	2	-	-	SPM 3	Under Ocean Energy: The benefits and concerns seem to generally focus on effects on the local environment. With regard to tidal energy extraction there can sometimes be far field effects. For example, modelling studies have shown that placement of a tidal barrage in the Bay of Fundy can lead to a significant modification in the tides as far away as Boston. See: Greenberg, D. A. (1979). A numerical model investigation of tidal phenomena in the Bay of Fundy and Gulf of Maine. Marine Geodesy, 2, 161¿187.	Table removed from SPM FD and underlying text
United Kingdom (Department of Energy and Climate Change)	SPM	13	-	-	-	-	-	SPM 3.	This table summarises information very well and the same table can be found later in the text with accompanying sections (which include citations) that relate directly to the information found in the table. The information on nuclear and fossil fuels, however, isn't backed up in the same manner that the RE technologies are (they aren't mentioned in the breakdowns later in the report). As mentioned previously, it is important that RE and competitors be treated with equal rigour, at least in the Summary for Policy makers, because most policy makers will not be reading the document simply to determine whether RE is feasible, but rather how it compares to the technologies RE might be disrupting.	Table removed from SPM FD and underlying text
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	SPM	13	-	-	-	-	-	SPM3	[Air and Water] It is necessary to evaluate "GHG emissions" and other "atmospheric emissions" separately. <reason> For intelligible explanation.	Table removed from SPM FD and underlying text

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	SPM	13	-	-	-	-	-	SPM3	[Built Environment] Nuclear, Fossil Fuels "+" Specify "high level socio-economic benefits" and add "employment generation in local area".	Table removed from SPM FD and underlying text
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	SPM	13	-	-	-	-	-	SPM3	[Built Environment] The mentions of "Socio-economic benefits" by every source requires to clarify what the benefits are.	Table removed from SPM FD and underlying text
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	SPM	13	-	-	-	-	-	SPM3	[Ecosystem and Biodiversity] Nuclear "+" Delete "no or little impact under normal operation" <reason>The other souces are evaluated "under nomal operation". It is biased and unfair to add evaluation in such case only to nuclear.	Table removed from SPM FD and underlying text
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	SPM	13	-	-	-	-	-	SPM3	[Human Health] Bioenergy "+" Delete "lower and less toxic air pollutant emissions improving human health" <reason>"Lower and less toxic air pollutant emissions" is based on relative evaluation, so what it goes by is obscure. And it is unidentified what "improving human health is leaded by.	Table removed from SPM FD and underlying text
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	SPM	13	-	-	-	-	-	SPM3	[Human Health] Geothermal "+" Delete "cleaner air and improved public health: hot water for spa resorts" <reason>The benefit is not generalized. Especially, benefit on "spa resort" is inadequate because it depends on regional and cultual circumstances.	Table removed from SPM FD and underlying text
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	SPM	13	-	-	-	-	-	SPM3	[Human Health] Wind Energy "-" Add a discription of "possible health hazard by low-frequency wave. <reason>There are several legal cases in Japan on that issue.	Table removed from SPM FD and underlying text
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	SPM	13	-	13	-	-	-	SPM3	Add discription into the field of "build environment" of "direct solar" as below; "Potential effect on neighbors by reflected light from solar panel."	Table removed from SPM FD and underlying text
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	SPM	13	-	13	-	-	-	SPM3	Add the comment "Decrease of forests" in Concerns(-) of bioenergy - Land use and Population.	Table removed from SPM FD and underlying text
John Twidell (AMSET Centre)	SPM	13	-	-	-	-	-	SPM3	Air and water. Cooling water for CSP is listed, but not cooling water for other thermal plant (nuclear and fossil in particular) which is a major impact.	Table removed from SPM FD and underlying text

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Jörn Scharlemann (United Nations Environment Programme World Conservation Monitoring Centre (UNEP-WCMC))	SPM	13	-	-	-	-	-	SPM3	Benefits from ecosystem and biodiversity for bioenergy: unclear what the benefits of bioenergy could be in terms of ""integration between crops"" and for ""bio-corridors/conservation units"". Be more explicit what is meant here	Table removed from SPM FD and underlying text
Jörn Scharlemann (United Nations Environment Programme World Conservation Monitoring Centre (UNEP-WCMC))	SPM	13	-	-	-	-	-	SPM3	Benefits from ecosystem and biodiversity for dorect solar: contradiction between ""no harm"" shown in benefits but concerns raised in the next cell	Table removed from SPM FD and underlying text
Leonidas Osvaldo GIRARDIN (Fundación Bariloche)	SPM	13	-	-	-	-	-	SPM3	Bioenergy (related to land use) may increase degradation of those lands over-exploited. It also exists a risk of monoculture if opportunity costs of fuel rises faster. There is no economic impacts included within social impacts? What about the increase in prices of land because of the pressures for finding new land in which produce biofuels originated in crops?	Table removed from SPM FD and underlying text
Australia (0)	SPM	13	-	-	-	-	-	SPM3	Bioenergy column: add 'deforestation' as negative to land use and population. Direct solar column: add 'large installations' to built environment negative.	Table removed from SPM FD and underlying text
Japan (the Japanese Ministry of Foreign Affairs)	SPM	13	-	-	-	-	-	SPM3	Chart should include impact on marine use (e.g. conflict with fishery rights) for wind power, and conflict with water concessions for hydropower.	Table removed from SPM FD and underlying text
Ichiro Maeda (Federation of Electric Power Companies, Japan)	SPM	13	-	-	-	-	-	SPM3	Consider including under "Concerns": construction of new fossil-fuel plants for backup generation for RE sources.	Table removed from SPM FD and underlying text
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	SPM	13	-	13	-	-	-	SPM3	Delete "virtually no pollution." <reason>Definition of "virtually no pollution" is not clear. You should avoid conceptual expression within authoritative report..	Table removed from SPM FD and underlying text
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	SPM	13	-	-	-	-	-	SPM3	For the table on the whole, If no items fit into a field, it is necessary to fill "none". <reason> In this table which evaluate possitive and negative aspects, it is necessary to specify "none" in order to evaluate that there is no positive/negative aspect on the source.	Table removed from SPM FD and underlying text
Japan (the Japanese Ministry of Foreign Affairs)	SPM	13	-	-	-	-	-	SPM3	Have the authors intentionally distinguished blank boxes from those that say "-"?	Table removed from SPM FD and underlying text
John Twidell (AMSET Centre)	SPM	13	-	-	-	-	-	SPM3	I am surprised that under nuclear there is no mention of 'waste disposall', especially that there is no proven longterm method of dealing with highly-radioactive waste. Likewise, there is no mention of links to nuclear weapons proliferation, say listed as a health hazard.	Table removed from SPM FD and underlying text
Australia (0)	SPM	13	-	-	-	-	-	SPM3	It is not clear how bioenergy will increase the risk of fires.	Table removed from SPM FD and underlying text

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
John Twidell (AMSET Centre)	SPM	13	-	-	-	-	-	SPM3	Nuclear: top box 'low land use from power plants", poor language ('low') and wrong. The land area of a nuclear plant is probaly larger than the land area of a coal plant, and certainly more than a gas plant. Correct comment is 'Power plant land area per unit of power capacity is small"	Table removed from SPM FD and underlying text
Michael Jack (Scion (NZ Forest Research Institute))	SPM	13	-	-	-	-	-	SPM3	On the negative impacts of bioenergy on air and water this should also mention (i) reduction in water yield (ii) polution from production processess (e.g. biofuel production)	Table removed from SPM FD and underlying text
Michael Jack (Scion (NZ Forest Research Institute))	SPM	13	-	-	-	-	-	SPM3	On the negative impacts of bioenergy on land use we should also add the potential impacts of direct and indirect land use change	Table removed from SPM FD and underlying text
¿vind Christophersen (Climate and Pollution Agency)	SPM	13	-	-	-	-	-	SPM3	The chapter which is listing the benefits and concerns of hydropower has only partially been completed and lacks important aspects both on the positive and negative side. A major positive contribution to land use/population is flood and drought control, as well as inland navigation. This should be listed explicitely in this rubric.	Table removed from SPM FD and underlying text
Canada (Environment Canada)	SPM	13	2	13	3	-	-	SPM3	Under Direct Solar / Built Environment: It could be argued that large-scale ground mounted solar installations also have negative visual aspects.	Table removed from SPM FD and underlying text
Canada (Environment Canada)	SPM	13	2	13	3	-	-	SPM3	Under Direct Solar / Ecosystem and Biodiversity: It doesn't make sense to say "no harm" in the "+" and then to show negative impacts directly below. Suggest removing "no harm and" from the text.	Table removed from SPM FD and underlying text
Canada (Environment Canada)	SPM	13	2	13	3	-	-	SPM3	Under Direct Solar / Human Health: Suggest changing "virtually no pollution" in the positive box to "virtually no pollution during operation", since the text below in the negative section indicates that there is pollution/waste when the full life cycle is considered.	Table removed from SPM FD and underlying text
Roberto Acosta Moreno (CITMA)	SPM	13	-	-	-	Last row	-	SPM3	I suggest to add as negative effect(yellow): "" possible impacts on biodiversity"" Comments: e.g substitution of forest or other natural land covers by plantations to produce biofuels could lead to biodiversity loss.	Table removed from SPM FD and underlying text
Roberto Acosta Moreno (CITMA)	SPM	13	-	-	-	Row 5	-	SPM3	I suggest to delete: ""GHG emissions from land clearing"". Comment: the use of biomass as bioenergy does not imply necessarily that land needs to be cleared and GHG emissions will be emited. This is a land management practice that can be changed.	Table removed from SPM FD and underlying text
Roberto Acosta Moreno (CITMA)	SPM	13	-	-	-	Row 9	-	SPM3	I suggest to delete: ""from crop burning practices (e.g. sugarcane)"". Comment: the use of biomass as bioenergy does not imply necessarily that crops (e.g. sugarcane) need to be burned. This is a crop management practice that can be changed.	Table removed from SPM FD and underlying text

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
United Kingdom (Department of Energy and Climate Change)	SPM	14	1	-	17	-	-	-	The way in which this paragraph is written doesn't really set down a framework for mitigating the adverse impacts of RE technology. It only mentions a dozen different adverse effects - selected somewhat randmly from amongst the many that would be considered in a technology risk assessment - and how they can all be solved with better planning techniques. What sort of planning needs to be happening and can anything be done to solve these problems after the planning stage? This particular part of the report is too cursory of an assessment to guide policy makers. Unfortunately, the body of the report also fails to provide the level of detail required to assess the adverse effects of technologies and determine how to mitigate these.	Sentences deleted from SPM text in rewrite. Environmental impacts discussion moved to new Section 5 on SD.
Andreas Fischlin (Systems Ecology, IBZ, ETH Zurich)	SPM	14	1	14	1	-	-	-	Which bioenergy? All or just some of it? Forestry, wood considered?	Say "to mitigate the negative impacts of bioenergy derived from some types of feedstock"
Manfred Treber (Germanwatch e.V.)	SPM	14	1	14	17	-	-	-	why is there no mentioning of biomass in connection with CCS (i.e. negative emissions)?	More on Bio CCS will be added
Frank Mastiaux (EON Climate & Renewables)	SPM	14	2	-	-	-	-	-	Water for solar may be also used from desalting plants in case solar is near the coastline. That would ease the limit on water a little, but also driving costs up.	Sentences deleted from SPM text in rewrite. Environmental impacts discussion moved to new Section 5 on SD.
Jörn Scharlemann (United Nations Environment Programme World Conservation Monitoring Centre (UNEP-WCMC))	SPM	14	3	14	4	-	-	-	minimized by relying on otherwise-unused land, already-disturbed land"". Unclear what is meany by ""otherwise-unused land"". Most land on this planet is used for something, however the use might not be for human benefit or gain, hence there is no ""unused land"" on this planet.	Sentences deleted from SPM text in rewrite. Environmental impacts discussion moved to new Section 5 on SD.
Helmut Haberl (Institute of Social Ecology, Vienna)	SPM	14	3	-	-	-	-	-	Replace "land usage" with "land use"	Sentences deleted from SPM text in rewrite. Environmental impacts discussion moved to new Section 5 on SD.
United States (U.S. Department of State)	SPM	14	4	14	7	-	-	-	replace sentence starting "For hydropower,¿" with the following: " Hydropower impacts can be minimized by constructing the best-available fish ladders or elevators, installing fish-friendly and aerating turbines, and designing environmental flow requirements that protect and restore downstream ecosystems."	Relevant text deleted in rewrite.
Sung-Hee Shim (Korea Energy Economics Institute)	SPM	14	6	-	-	-	-	-	hydropower projects can provide an opportunity for the protection and creation of high-value ecosystems -> Difficult to understand how hydropower projects can protect and create high-value ecosystem. It might be interpreted that the environment can be proactively regarded as a new growth engine to revitalize the worsening global economy.	Relevant text deleted in rewrite.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Jörn Scharlemann (United Nations Environment Programme World Conservation Monitoring Centre (UNEP-WCMC))	SPM	14	6	14	7	-	-	-	What is meant by ""high-value ecosystem""? High value for whom or what? For biodiversity, for humans, or?	Relevant text deleted in rewrite.
Richard Taylor (International Hydropower Association)	SPM	14	8	14	8	3	-	-	Insert ""Introduction of strong sustainability frameworks, better planning on river basin and project scale, and adaptive management for continuous improvement"" after ""concerns.""	… but rather in the beginning of the sentence (e.g. before "close involvement")
Frank Mastiaux (EON Climate & Renewables)	SPM	14	11	14	17	-	-	-	If not included in table 3, the difference between benefits and concerns for offshore and onshore wind should be clearly explained in this section.	If space allows, we will seek to add some distinctions where appropriate. As the section and table changes structure, we will need to look for appropriate places to do so.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	14	14	14	17	-	-	-	I would prefer to avoid using the word 'mitigate' in an other meaning than 'mitigate the anthropogenic causes of climate change', and in this case the phrase "and mitigate" is redundant, so I suggest to delete it.	Relevant text deleted in rewrite.
Germany (Federal Ministry for the Environment, Nature Conservation and Nuclear Safety)	SPM	14	18	14	19	3	-	-	delete "are common" and insert instead "have to bedealt with" rationale: Activities mentioned are unfortunately not common but often missing.	Relevant text deleted in rewrite.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	14	18	14	19	-	-	-	I would prefer to avoid using the word 'mitigating' in an other meaning than 'mitigating the anthropogenic causes of climate change', and in this case the phrase "and mitigating" is redundant, so I suggest to replace "Assessing, minimizing and mitigating..." by "Assessing and minimizing...".	Sentence deleted from SPM text in rewrite.
¿vind Christophersen (Climate and Pollution Agency)	SPM	14	18	-	-	-	-	-	Propose to change "these various impacts" to "the various impacts".	Relevant text deleted in rewrite.
¿vind Christophersen (Climate and Pollution Agency)	SPM	14	18	-	-	-	-	-	Replace ¿are¿ with ¿should be¿. The sentence gives the impression that the situation is satisfactionary, which is often not the case. Planning, siting and permitting processes are practised differently, not always securing that the possible negative impacts of RE are minimized and mitigated sufficiently. The sentence should underlin the importance and necessity of this to the policy makers.	Relevant text deleted in rewrite.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	SPM	14	20	14	21	-	-	-	Amend "are able to" to "need to". [original]"The output of some RE technologies is variable (dependent, for example, on natural energy flows), whereas other technologies are able to offer controllable output." [proposed amendment] "The output of some RE technologies is variable (dependent, for example, on natural energy flows), whereas other technologies need to offer controllable output."	The point is that RE technologies are able to offer controllable output.
Supachai Panitchpakdi (United Nations Conference on Trade and Development)	SPM	14	20	14	26	-	-	-	For some countries, especially developing countries, grid infrastructure is a major point of concern. Solutions such as regional planning / grid infrastructure may allow for greater use of RE.	Rewritten for SPM FD and relevant sentences deleted; RE for rural energy supply is now discussed in Section 5.
United Kingdom (Department of Energy and Climate Change)	SPM	14	20	14	26	-	-	-	Many commentators and researchers on smarter grids talk about the fact that they could allow the 'demand side' to play a more active role in ensuring the system can clear and in so doing reduce system margins etc. How is this thinking embedded in this section? It currently reads as though the assumption is that the answer to variation in demand is always to generate more electricity or put more standby capacity into the system.	Sentence deleted from text in rewrite. Portfolio of options including demand side management presented in Section 4.
Haroon Kheshgi (ExxonMobil Research and Engineering Company)	SPM	14	20	14	26	-	-	-	This paragraph outlines what is possible regarding managing intermittent sources of power, however, it does not describe the added cost, level of investment, and maturity of these possible actions. Suggest that sound quantitative information be given to help assess which in this sea of possibilities are likely dominant near-term investments.	Though most of this text is deleted in rewrite, a more thorough focus on this discussion presented in Section 4.
Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	SPM	14	20	14	26	-	-	-	This whole paragraph needs careful rewriting. As it is, too many exceptions can be pointed out: for instance, it leaves out variability of rain / river flows; ignores hydro storage, which is not very expensive; suggests unduly that it is effective to control hybrid systems without storage; and it applies basically to electricity, not to heat.	Rewritten for SPM FD
Ladislaus Rybach (Geowatt AG Zurich (company))	SPM	14	21	-	-	-	-	-	The text should read ¿¿..(See Box SPM 1). Geothermal sources provide base-load power whereas some RE systems are variable¿¿	Sentence deleted from text in rewrite. Base-load power nature of geothermal to be discussed in Box - on geothermal specifics.
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	SPM	14	22	14	23	-	-	-	Add the sentence as follows; "Short term wind, solar and wave power variations can be managed by better forecasting, flexible grids and inter-connections but still need to have storage system and/or backup power units to secure electricity supply."	Energy storage is one option of several. To avoid policy prescriptive language, it is discussed in a portfolio of options in Section 4. Relevant sentence deleted here.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	SPM	14	22	14	23	-	-	-	Proposed altered text:"Short term wind, solar and wave power variations can be managed by better forecasting, flexible power generation, storage plants, demand side management and inter-connections." Comment: "Grids" (cables, transformers, etc.) cannot store or regulate energy. Generation and demand has to become more flexible. Storage plants in form of hydro storage (reservoirs) or pumped hydro storage are well known and worldwide distributed. New technologies like adiabatic compressed air energy storage (A-CAES) are expected to become commercially available around 2020.	Sentence deleted from text in rewrite. Portfolio of options presented in Section 4.
Several experts 0 (Ministry of the Indutry, Tourism and Trade)	SPM	14	23	-	-	-	-	-	A mention to super grids as systems that will help RE management would be interesting	Discussion too detailed for SPM. Contents discussed in more depth in Ch. 8.
Juan Jose Sanchez (Ministry of the Environment, and Rural and Marine Affairs)	SPM	14	23	-	-	-	-	-	I would further complete the sentence: ""¿by better forecasting, flexible and sufficient grids (including tools such as demand side management, real-time monitoring mechanisms, pumping storage and other storage devices, etc.) and inter-connections	Sentence deleted from text in rewrite. Portfolio of options presented in Section 4.
Emmanuel Branche (Electricité de France)	SPM	14	23	14	23	-	-	-	Replace "inter-connections" by "interconnections"	Sentence deleted from text in rewrite.
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	SPM	14	24	14	25	-	-	-	It is written that energy storage is an option, but usullay costly. If RE should be deployed in a large share, storage is a must. Therefore, the sentence should be rewritten to ¿"energy storage must play a part to ensure security of supply, but it is costly".	Energy storage is one option of several. To avoid policy prescriptive language, it is discussed in a portfolio of options in Section 4.
Richard Taylor (International Hydropower Association)	SPM	14	25	14	25	3	-	-	Insert ""Some RE types, such as hydropower, can offer storage services to more variable sources"" after ""costly""	Sentence deleted from text in rewrite. Nonetheless, a short discussion on complemenatary RE generation appears in Section 4.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	14	25	-	-	-	-	-	1.2.2 says nothing on minigrids, storage nor costs	Sentence deleted from text in rewrite.
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	SPM	14	25	14	26	-	-	-	Amend the sentence as follows; [original] "Integrating several types of RE into a hybrid system can, with suitable controls, provide controllable electric power. [8.2.1]" [proposed amendment] "Integrating several types of RE into a hybrid system may, with suitable controls and storage system with adequate backup power units, provide controllable electric power. [8.2.1]	This from Introduction Chapter 1. To check duplication

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
¿vind Christophersen (Climate and Pollution Agency)	SPM	14	25	-	-	-	-	-	Incert full stop efore "Integrating"	Sentence deleted from text in rewrite.
United States (U.S. Department of State)	SPM	14	26	-	-	-	-	-	Insert "and resource availability" after "controls".	As above
Gunnar Luderer (Potsdam Institute for Climate Impact Research)	SPM	14	27	-	31	-	-	-	"RE electricity generation ¿ has similar transmission and distribution requirements as any other large fossil or nuclear power plant" - I disagree with this statement. How is it substantiated? What is the underlying literature? Due to temporal fluctuations in supply and large geographical gradients in the resource base, electricity from RE seems to be qualitatively different from conventional power.	Sentence deleted from text in rewrite.
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	SPM	14	27	14	28	-	-	-	Amend the sentence as follows; [original] "RE can be deployed at the point of use (decentralized) in rural and urban environments, and can be employed within large (centralized) energy networks." [proposed amendment] "RE can be deployed at the point of use (decentralized) in rural and urban environments, and can be employed within large (centralized) energy networks on the premise of adoption of storage system that ensure the energy network stability and smart-grid with backup-system.	Storage systems are not the only option to stabilize electricity networks with large shares of RE. A full range of options is presented in Section 4.
Nico Bauer (Potsdam Institute for Climate Impact Research)	SPM	14	27	14	31	-	-	-	The text is written as a defense not an assessment. An assessment refers to the various possibilities and outcomes and in this case may argue for the site region specifi conditions that may lead to the one or the other result. It should also be noted that large scale deployment of RE may be achieved best with high transmission built-up because it allows to match the best RE sources with high demand centers, which reduces the material demand that would be need if high demand centers would be required to stay self-sufficient on their domestic RE potentials.	Rewritten for SPM FD. Discussion here condensed to 1 sentence presenting the range of integration possibilities.
Nico Bauer (Potsdam Institute for Climate Impact Research)	SPM	14	28	-	-	-	-	-	¿ (centralized) energy networks. Centralized RE electricity¿	Centralized systems can also be used for REHC.
France (MEEDDM (Ministry of Ecology, Energy, Sustainable Development and the Sea))	SPM	14	28	-	-	-	-	-	Add at the end of the title ""provided adequate infrastructure is set up""	Some RE technologies can be integrated into centralized networks without additional infrastructure. This depends on the amount and the specific technology.
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	SPM	14	28	14	30	-	-	-	Change from "large wind farms" to "large wind farms with storage systems." -Delete "concentrating solar power or PV systems" -Insert ", if the variation of electric power output can be offset by some countermeasures." after "... RE resource availability."	Sentence deleted from SPM text in rewrite.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Frank Mastiaux (EON Climate & Renewables)	SPM	14	30	-	-	-	-	-	I doubt that RES have similar grid requirements that fossil fuels since grid with large parts of RES must be very flexible and supply side management is more sophisticated than with central power units.	Sentence deleted from SPM text in rewrite.
Nico Bauer (Potsdam Institute for Climate Impact Research)	SPM	14	31	-	-	-	-	-	"¿but may be more remote based on the RE resource availability" not in underlying chapter; Reference to section missing as well	Sentence deleted from SPM text in rewrite.
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	SPM	14	32	-	-	-	-	-	Add the sentece below; "Concentrating solar power or PV systems and wind power without storage system need special treatment when integrating into existing grid."	Sentences deleted from SPM text in rewrite.
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	SPM	14	32	14	34	-	-	-	Delete the all sentence. <reason> We could not find the reference of this sentence in any other parts of this draft.	Deleted.
United Kingdom (Department of Energy and Climate Change)	SPM	14	32	-	38	-	-	-	How are these conclusions about PV reached? Shouldn't the issue of 'solar rights' be addressed, especially when urban settings are such a large focus for PV integration in the report? Blocking of access to solar is an significant issue in cities.	Sentences deleted from SPM text in rewrite.
Emmanuel Branche (Electricité de France)	SPM	14	32	14	34	-	-	-	The sentence "Building integrated ... highly suitable for urban settings" should be rewritten in order to reflect current reality according to me, as it seems in contradiction with the current need of big cities. At present most oflarge cities/megalopole are energised through large scale centralised energy infrastructures For existing buildings (except maybe PV) is not possible to integrate in an efficient way distributed RE. However for new building, it is possible to design them will several RE distributed technologies, and even to have "positive energy" buildings	Sentences deleted from SPM text in rewrite.
Manfred Orgis (Ministry of Environment)	SPM	14	32	14	33	-	-	-	The wording "construction of minimal transmission and distribution infrastructure" is unclear. A better wording might be: "construction of additional transmission and distribution infrastructure that is however minor compared to already existing infrastructure".	Sentences deleted from SPM text in rewrite.
Nico Bauer (Potsdam Institute for Climate Impact Research)	SPM	14	33	-	-	-	-	-	ch1, p. 16, l. 23 speaks of "no" "minimal" infrastructure needs;	Sentences deleted from SPM text in rewrite.
Nico Bauer (Potsdam Institute for Climate Impact Research)	SPM	14	33	14	37	-	-	-	highly suitable for urban settings¿high investment costs"" as well as ""installed soon after delivery to a construction site"" not in underlying section	Sentences deleted from SPM text in rewrite.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Emmanuel Branche (Electricité de France)	SPM	14	34	14	36	-	-	-	The sentence "Distributed RE ¿ investments costs" is not correct. Indeed at the moment it is unfortunately cheaper to develop diesel generators, which lead to GHG emissions, in developing countries rather than other RE technologies.	Sentence deleted from SPM text in rewrite.
¿vind Christophersen (Climate and Pollution Agency)	SPM	14	39	14	39	4	-	-	Substitute ¿work¿ with ¿should work¿. This to stress the importance of striving to this synergy,	Relevant text deleted in rewrite.
Taishi Sugiyama (Central Research Institute of Electric Power Industry (CRIEPI))	SPM	14	39	14	44	-	-	-	delete this paragraph - not substanciated.	Deleted.
United States (U.S. Department of State)	SPM	14	39	14	40	-	-	-	For clarity, and to fit better with the RE focus of the report, replace the first sentence with: "The lower power density of RE may require reducing energy system demands to match those of RE supply. This may best be accomplished through synergistic approaches to both RE and energy efficiency solutions."	Relevant text deleted in rewrite.
¿vind Christophersen (Climate and Pollution Agency)	SPM	14	39	-	-	-	-	-	Substitute ¿work¿ with ¿should work¿	Relevant text deleted in rewrite.
Japan (the Japanese Ministry of Foreign Affairs)	SPM	14	41	-	-	-	-	-	"suitable system solutions" should consider not only technical or operational solutions but also financial solutions, especially because in many developing countries one of the main barriers that hinder the deployment of renewable energy technologies is the lack of finacial resources.	THIS IS IMPORTANT BUT IS DISCUSSED ELSEWHERE
David Clubb (European Environment Agency)	SPM	14	41	14	41	-	-	-	Do not use the word 'disadvantage', but use 'characteristic' instead.	Relevant text deleted in rewrite.
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	SPM	14	42	-	-	3	-	-	what is meant by "energy requirements". Is it demand reduction?	Relevant text deleted in rewrite.
Gerrit Hansen (TSU)	SPM	14	44	-	-	-	-	-	reference missing for section	Relevant text deleted in rewrite.
Australia (0)	SPM	15	1	15	10	4	-	-	Need to be explicit on what is meant by 'potential'. Special Report needs to be rigorous and standardised on whether referring to technical potential or actual potential.	the specific focus is here on potential deployment, that is the amount of renewable energies that is used within future paths described in scenarios, the general comment is not related only to chapter 10 it is relating to the whle SRREN, mitigation potential shall be defined in the glossary as well as other potential terms

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
¿vind Christophersen (Climate and Pollution Agency)	SPM	15	1	18	16	4	-	-	Nothing is said in chapter 4 about the mitigation potential in tons of CO2-emissions reduced, compared to base line. This should be a relevant information in a chapter about mitigation potentials with respect to adressing climate change	a specific figure will be included in the text
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	15	1	18	17	4	-	-	Some, often mentioned barriers for the large scale deployment of specific RE technologies are not addressed in this section, such as the limited resources of rock phosphate for biomass production and of rare metals for photovoltaics. I think this issue would merrit a specific statement in section 4 of the SPM.	that is to specific for a general mitigation potential chapter
Sampo Soimakallio (VTT Technical Research Centre of Finland)	SPM	15	1	17	22	4	SPM 4	-	Figure SPM 4 under section 4 (Mitigation Potentials) gives a misleading view of the climate mitigation potentials of different RE sources, because the primary energy consumption does not correlate with the GHG savings. For eaxmple, Fig. 10.3.8 and 10.3.9 show that the constribution of hydro to emission mitigation is much larger than that of bioenergy. Besides appraisal of the mitigation potentials of bioenergy are highly uncertain. In worst case large bioenergy programmes could even increase the emissions. Some bad bioenergy options do have much higher emissions than their fossil fuel based competitors due to direct land use changes or they could indirectly cause land use change and high emissions from terrestrial C stocks. Even sustainable use of forest biomass (""forestry surplus"") can have an impact on the existing land sink in temperate and boreal regions so that bioenergy is not carbon neutral. Thus estimation of GHG mitigation potential of bioenergy based on the primary energy consumption is very difficult. This should be clearly stated in SPM.	the specific discussion of the mitigation potential of biomass which in deed varies significantly is not the task of this integrative section, but should be addressed in chapter 2; nevertheless in this section the interaction between RE and CO2 willl be discussed more in depth
Ladislaus Rybach (Geowatt AG Zurich (company))	SPM	15	1	-	-	-	-	-	The general remark on the chapter ¿Summary for Policymakers¿ about the difference between CO2 emission reduction and avoidance applies here too.	the comment is not clear
Japan (the Japanese Ministry of Foreign Affairs)	SPM	15	2	-	6	-	-	-	Co-benefits, including new economic growth, the creation of new industries and job creation are also important drivers of deploying low-carbon energy technlogies in developed countries, where there is high expectations towards green innovation as a solution to the twin issues of climate change and the economic stagnation. (e.g. Japan has included green innovation as an important strategy in its "New Growth Strategy" endorsed by the Cabinet on June 18, 2010.)	it is already addressed in the paragraph and in the introductory part of the SPM

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
United States (U.S. Department of State)	SPM	15	2	15	6	-	-	-	This sentence is self-evident and does not adequately capture the meaning of the rest of the paragraph. Replace the first two sentences with: "The potential role of RE in addressing climate change depends on future energy demand, energy policy choices, mitigation goals, and the cost-effectiveness of RE technologies relative to other low-carbon energy technologies. Fundamental drivers of energy demand include population and economic growth, and the evolution of technologies to provide energy services."	Relevant text deleted in rewrite.
Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	SPM	15	2	15	9	-	-	-	While the opening paragraph in bold is correct, the explanation ignores RE resource availability differences between countries, which also influences mitigations targets and options (as well as economic capacity, by the way). Also it assumes that population (and economy) will always grow, which is not correct for certain regions, like Europe in the short-term, but as well for other regions in the long-term horizon typical of climate change considerations.	Relevant text deleted in rewrite.
Taishi Sugiyama (Central Research Institute of Electric Power Industry (CRIEPI))	SPM	15	2	15	10	-	-	-	You must address costs, intermittency, and stability of supply in the first place. These three are the key barries of RE.	will be done in the revised
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	15	3	15	6	-	-	-	I would prefer replacing the unusual words "evolution and emergence" in relation to technology by " development and deployment".	Relevant text deleted in rewrite.
Juan Jose Sanchez (Ministry of the Environment, and Rural and Marine Affairs)	SPM	15	4	-	-	-	-	-	I would say: ""Deployment of low-carbon energy technologies are based on natural resources availability, energy policy choices, ¿""	Relevant text deleted in rewrite.
¿vind Christophersen (Climate and Pollution Agency)	SPM	15	5	15	6	-	-	-	Suggest to end the sentence after "energy demand", and start a new sentence; "These fundamental drivers include population growth, ¿."	Relevant text deleted in rewrite.
United Kingdom (Department of Energy and Climate Change)	SPM	15	5	-	-	Mitigation potentials	-	-	Insert "resource depletion" after the words "economic growth".	Relevant text deleted in rewrite.
John Twidell (AMSET Centre)	SPM	15	6	-	-	-	-	-	There is no mention of energy price and cost saving in the market place. Even without support mechanisms, renewables are particualry price attractive for building heat (passive solar, biomass) and for autonomous power (remote, traffic signs etc). With support mechanisms, or with charges for pollution and carbon on fossils, renewables are definitely cost effective.	no space to go into that detailed discussion

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Finland (Finniah Meteorological Institute)	SPM	15	7	-	-	-	-	-	Please change the text accordingly: ...depends on _the strength of efforts to reduce GHG emissions_ and the particular manner in which each country...	the current text is already clear
Kristie Ebi (Department of Global Ecology)	SPM	15	10	15	15	2.1	-	-	Climate changea and sustainable development interact on may different scales. The last line is unclear.	Unclear to which text comment refers.
United Kingdom (Department of Energy and Climate Change)	SPM	15	10	-	-	Mitigation potentials	-	-	Rollout also needs to correlate with the depletion of key fossil fuels. With respect to electricity generation this would need to focus on coal and with respect to fossil fuels it would need to be aligned with oil depletion projections.	the focus in the paragraph is climate change as driving force, nervertheless the role of fossil energy prices will be mentioned as determining factor of the relative competitiveness of RE in comparision to CCS
United Kingdom (Department of Energy and Climate Change)	SPM	15	10	-	-	Mitigation potentials	-	-	Rollout cannot wait for the depletion of key fossil fuels. With respect to electricity generation this would need to focus on coal and with respect to fossil fuels it would need to be aligned with oil depletion projections. It would be best to explicitly state what the assumptions were for reductions in fossil fuel availability in these scenarios.	this report is about the interaction of RE and mitigation targets, in that context climate change is the limiting factor and not depletion of fossil fuels (there is much more coal available as can be used considering climate mitigation targets)
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	SPM	15	11	-	-	4	-	-	it should be very briefly said here, what "published scenarios" mean: these are model results, often cost-minimizing models.	Accepted.
¿vind Christophersen (Climate and Pollution Agency)	SPM	15	12	15	14	-	-	-	This sentence is unnecessary, and could be deleted.	Accepted.
¿vind Christophersen (Climate and Pollution Agency)	SPM	15	14	-	15	-	-	-	Consider the last part of the sentence, "and low-carbon energy makes up part og the gap". Is the meaning that low-carbon energy makes up a larger part of the energy supply?	Relevant text deleted in rewrite.
Finland (Finniah Meteorological Institute)	SPM	15	14	-	-	-	-	-	Please add: As the stringency of a long-term climate goal in the scenarios increases,	Relevant text deleted in rewrite.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Germany (Federal Ministry for the Environment, Nature Conservation and Nuclear Safety)	SPM	15	14	15	15	-	-	-	The sentence: "As the stringency of a long-term climate goal increases, CO2 emissions tend to decrease, and low-carbon energy makes up part of the gap" should be rephrased to "If lower long-term climate goals shall be achieved in order to avoid more climate change impacts, less cumulative CO2 emissions are 'allowed', and scenarios suggest that low-carbon energy can play a dominant role in reducing energy-related CO2 emissions.". Reason: The current formulation is unclear when stating that "CO2 emissions tend to decrease" whether this is a scenario feature, a logical consequence, or a coincidence, and futhermore, it is not 100% clear what gap is meant here.. Thus, this clarification builds on the finding that for long-term climate targets, it is CO2 emissions that are dominant (as other gases have finite, shorter, lifetimes - with the exception of some PFCs etc.), and that it is cumulative emissions that determine long-term temeperature and CO2 concentration response (Matthews et al. 2009, Allen et al. 2009, Zickfeld et al. 2009, Meinshausen et al. 2009).	sentence will be reworded
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	15	15	-	-	-	-	-	"CO2 emissions tend to decrease" should be replaced by "CO2 emitting energy sources tend to decrease" for consistency with the second part of the sentence	text will be revised
United States (U.S. Department of State)	SPM	15	15	-	-	-	-	-	Replace "tend to" with "will" and replace "makes" with "will make".	text will be revised
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	15	15	15	18	-	-	-	This sentence is more complicated than it needs to be. I suggest to rephrase it to read: "The large uncertainty in projected primary energy consumption among scenarios means there is a large variation in low carbon energy required to meet any long term goal.".	text will be revised
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	15	17	-	-	-	-	-	¿there is a large variation (add: in the potential amount of) low-carbon energy required to...	text will be revised
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	15	18	15	19	-	-	-	Sentence; "There is also variation in projected RE deplyment¿" is very unclear. Perhaps it is meant: "There is also uncertainty about the role of RE in a portfolio of low-carbon options, which results in varying projections of RE deployment."	text will be revised
¿vind Christophersen (Climate and Pollution Agency)	SPM	15	19	15	21	4	-	-	Could the figures of 2-400 EJ/yr from RE in 2050 be compared with the total projected energy production in 2050 in these scenarios?	that seems to be not reasonable for the huge range of scenarios in the figure as the absolute energy demand varies siginificantly between the scenarios (it is not automatically the scenario with the highest energy demand which comes out with the highest absolut RE contribution), however the issue is addressed in the chapter

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Gunnar Luderer (Potsdam Institute for Climate Impact Research)	SPM	15	28	-	32	-	-	-	"Bioenergy is shown to have a higher potential deployment than any other technology" - This statement is contingent on the accounting method. The direct equivalent method tends to understate the role of electricity from wind, solar and hydro, as these substitute a much higher quantity of fossil primary energy.	aspect will be addressed, a caveat will be added
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	SPM	15	29	15	31	-	-	-	After this sentence, insert ", although it should be noted that the figures include traditional biomass which contributes close to 40 EJ in the base year with a modest decline over time in most scenarios."(*)cited from Chap10-21/89-Line28 <reason> There are no reference and condition of the figures in this part. A result of calculation often drastically depends on it. Include it.	will be done, we will make a caveat
Australia (0)	SPM	15	29	15	30	-	-	-	Reference to technical potential is confusing and conflicted. By definition 'technical potential' does not deal with the range of real world limitations.	the part is about potential deployment (which is a result of the sceanrios) and not about technical potential
Japan (the Japanese Ministry of Foreign Affairs)	SPM	15	29	-	31	-	-	-	The report seems to take an overly optimistic approach towards biomass. Japanese experience not only points to competition with food supply, delays in the development of second-generation options, high procurement costs for bioenergy resources (especially in the domestic context), energy security issues in relation with imported bioenergy, the need for subsidies for the continued promotion of bioenergy and the absence of adequate assessment of its sustainability.	the report quotes only given scenario results and does not provide own assessments, however a better explaination about biomass will be given and caveats added
United States (U.S. Department of State)	SPM	15	29	15	31	-	-	-	The statement "bioenergy is shown to have a higher potential deployment over the coming 40 years than any other RE technology" is questionable and the supporting analysis needs to be evaluated critically. This may very well be due to the inclusion of traditional biomass in the total biomass value, in which case this conclusion is misleading regarding increases in modern biomass technology.	meaning of traditionell biomass will be made clear, additionally a caveat will be made
Japan (the Japanese Ministry of Foreign Affairs)	SPM	15	29	-	31	-	-	-	This sentence is misleading. It should be noted that the figures for biomass do not represent only modern biomass use, but include traditional biomass (as stated in 10.2.2.5), the application of which can be carbon-intensive.	meaning of traditionell biomass will be made clear
Finland (Finniah Meteorological Institute)	SPM	15	30	15	31	-	-	-	However, the deployment of bioenergy can decrease or even strongly increase GHG emissions in the short run in individual projects due to direct and indirect land use changes causing release of carbon from terrestrial ecosystems. Even sustainable use of forest biomass can have a declining impact on the existing carbon sink on land and is thus not carbon neutral with respect to the baseline. Large scale bioenergy programmes can increase the risk of utilization of options of bad climate impacts. The primary energy figures in Fig SPM 4 do not correspond the relative GHG or climate mitigation potentials of different renewable energy sources (cf. Fig 10.3.8 and 10.3.9).	yes that's right but not relevant for chapter 10, the discussion of the specific GHG mitigation potential of different biomass applications is the task of chapter 2, here only scenario results (in energy numbers) are presented

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
France (MEEDDM (Ministry of Ecology, Energy, Sustainable Development and the Sea))	SPM	15	30	-	-	-	-	-	To what extent do the chapters conclusions support the asumptions of the published scenarios ?	this statement is not clear
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	SPM	15	30	15	31	-	-	-	We assess the deployment potential of wind energy as higher than that of biomass. This is also due to the food-versus-fuel debate and landchange.	the report quotes only given scenario results and does not provide own assessments
France (MEEDDM (Ministry of Ecology, Energy, Sustainable Development and the Sea))	SPM	15	31	-	-	-	-	-	""assumed"" rather than ""shown""	wording will be fixed
Manfred Orgis (Ministry of Environment)	SPM	15	32	15	34	-	-	-	The last sentence is not very informative. It seems important to highlight in this context the role of the legal framework including the tariff structure and the role of other policies and instruments that will ultimately determine the market share in the real world.	we will re-wirte
Kristie Ebi (Department of Global Ecology)	SPM	15	38	15	41	2.2	-	-	This should be much more explicit in stating that there can be adverse societal and health impacts.	Unclear to which text comment refers.
China (China Meteorological Administration)	SPM	15	-	-	-	4	SPM 4	-	Source (where is the figure 4 from)?	will be added
Frank Mastiaux (EON Climate & Renewables)	SPM	15	-	-	-	-	4	-	Reference to today´s situation with either a line or table with numbers would be useful	we will add information on current status
Taishi Sugiyama (Central Research Institute of Electric Power Industry (CRIEPI))	SPM	15	-	15	-	-	4	-	This diagram is highly missleading. 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.	figure 4 is a good way to present the content, SPM gives no option to go into further details
Juan Jose Sanchez (Ministry of the Environment, and Rural and Marine Affairs)	SPM	15	-	-	-	-	SPM 4	-	A different scale would help to better see the differences between technologies (maybe biomass could be separated)	SPM has a clear space limit, thereofre there is not the place to go into that detail
Emmanuel Branche (Electricité de France)	SPM	15	-	15	-	-	SPM 4	-	It is not possible to differentiate the "black line" for hydro and biomass technology. Furthermore the source of this Figure SPM4 is not mentioned	all lines are black, but we use diifferent colours for different technologies; biomass is green and hydro blue
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	15	-	-	-	-	SPM 4	-	Since it is unclear which scenarios have been included and which not (which makes all the difference), interpretation of this figure is difficult. One may easily draw wrong conclusions.	a specific comment will be included

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
United Kingdom (Department of Energy and Climate Change)	SPM	15	-	-	-	-	SPM 4.	-	Why are the uncertainties so high for biomass supplies, and why are they so much higher for biomass than other forms of RE? There is little justification in the body of the report for these estimates of error bounds, and there is no technical uncertainty analysis performed.	the figure presents only sceanrio results, it is a clear signal from the scenario that they assess the potetnial role of biomass quite different
United Kingdom (Department of Energy and Climate Change)	SPM	15	-	-	-	-	SPM 4	-	This chart might be easier to read if the two charts were An1 and Nan1 and 2030/2050 were next to each other on each chart, ie reverse Annexe and Year in the ordering.	we will try to make figure more readible
Sweden (Swedish Environmental Protection Agency)	SPM	15	-	-	-	-	SPM 4	-	This figure is also hard to follow exaclty, not the least since it not explained what each boxplot represents. Are these, for instance different scenarios? Moreover, the text should explain briefly why we see thee large differences in the overall RE penetration. At present the text comments on the variations in the relative share of different RE sources, but it does not address why some scenarios overall show more total RE penetration. For instance, do the different scenarions assume different climate stabilization targets?	it will be made clearer that the figure shows scenario results
United Kingdom (Department of Energy and Climate Change)	SPM	15	-	-	-	-	SPM 4	-	This figure needs some work - at it currently stands the main thing that jumps out is how big the error bars are (i.e. how uncertain the data and analysis is)	that is already an important message from the scenario survey, furthermore the relative meaning of the RE options can be seen (explained in the text)
United Kingdom (Department of Energy and Climate Change)	SPM	15	-	-	-	-	SPM 4	-	Would it be possible to add a line explaining the meaning of 'an1' and 'na1'? The meaning won't be obvious to someone reading only the SPM.	will be done
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	16	5	16	6	-	-	-	"barrier" needs to be in plural "barriers".	paragraph will be revised
John Twidell (AMSET Centre)	SPM	16	21	-	-	-	-	-	add phrase to become '.. the most proactive actions with institutional support mechanisms, e.g. feed-in tariffs' [the term 'frame conditions' is not in common parlance, so explanation is needed with an example]	text will be revised
John Twidell (AMSET Centre)	SPM	16	30	-	-	-	-	-	Add sentence. 'Modern developmental tidal current generators of 100 kW to 1 MW capacity are operational in the UK' [ref SeaGen, Northern Ireland; Atlantis, Orkney, Scotland 1 MW]	may be refering to an other chapter, to specific for SPM
¿vind Christophersen (Climate and Pollution Agency)	SPM	16	7	-	8	-	-	-	Add why some RE technologies evolve independent of climate targets. According to ch 1 this should be due to the other driver, namely energy security, but it is not fully clear if this is what is behind this statement.	will be done
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	16	19	16	28	-	-	-	Again, the paragraph's heading (RE deployment dependent on frame conditions?) does not reflect it's content (RE deployment dependent on starting date of mitigation action)	heading will be revised
Antoine BONDUELLE (E&E Consultant)	SPM	16	29	16	34	-	-	-	Competition of RE with nuclear and CCS brings less RE. This obvious result does not need a figure, especially with no indication of the conditions of the competition and costs evolutions.	figure will be deleted

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
France (MEEDDM (Ministry of Ecology, Energy, Sustainable Development and the Sea))	SPM	16	22	-	-	-	-	-	Delete ""on climate"". Actions on climate can concern other tools than RE and RE could be developped for other reasons than climate mitigation.	text will be modified
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	SPM	16	6	16	8	-	-	-	Delete "wind" from "(e.g. wind, hydro, direct use of bioenergy?". <reason> It is a fact that, the existence of climate target leads to the measure of economic (e.g, RPS,FIT) and regulation (e.g, priority access, priority electricity supply) method, and as a result, the amount of wind energy deployment has increased. Moreover, as line 6 and 7 in SPM 25/32, large deployment needs reasonable effort. Therefore, I suppose that the cause and effect between climate target fluctuate up to the estimated amount of deployment.	it is not relevant to the scenaris. However paragraph will be revised
¿vind Christophersen (Climate and Pollution Agency)	SPM	16	30	16	31	-	-	-	Energy efficiency could not only be improved at end use but also at the production and transmission stages.	text will be revised
John Twidell (AMSET Centre)	SPM	16	7	-	-	-	-	-	I suggest '.. Techniologies (e.g. wind,¿passive solar buildings)'. [add 'passive solar buildings', which are sensible and welcome in their own right]	most of the scenarios don't show specific results for passive solar buildings, as the sentence refers to the scenario it can not be included
John Twidell (AMSET Centre)	SPM	16	5	-	-	-	-	-	I suggest 'driving forces (e.g. ¿¿¿institutional support mechanisms) [i.e. add 'institutional support mechanisms' as a driving force - these are very significant drivers, especially feed-in tariffs. This point is emphasized in the paragraphs below, but should not be left out here]	paragraph will be revised
Juan Jose Sanchez (Ministry of the Environment, and Rural and Marine Affairs)	SPM	16	19	-	-	-	-	-	I would change the term ""real-world conditions"" or ""real-world context"" by something like ""actual current conditions"". Those other conditions analysed on the text are also ""real-world conditions"" as they are possible plausible future scenarios.	text will be modified
Nico Bauer (Potsdam Institute for Climate Impact Research)	SPM	16	29	16	34	-	-	-	Is this good or bad? Twist it the other way around: the better RET the more RE deployment and the less of the others.	text will be revised
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	16	30	16	31	-	-	-	It is unusual to say technologies "produce GHG reductions", and I suggest to replace the phrase by "reduce GHG emissions".	will be done
¿vind Christophersen (Climate and Pollution Agency)	SPM	16	19	-	28	-	-	-	Please indicate the costs of delaying actions to mitigate climate change	Studies on this topic are investigated to a limited extent in underlying text. Not one of the main findings of the SRREN, so ina ppropriate for the SPM.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Emmanuel Branche (Electricité de France)	SPM	16	6	16	9	-	-	-	Reading chapter 10.2, this sentence is not correct. Indeed, assuming high CO2 reduction targets, wind hydro and bioenergy, will be developed more than the BaU scenario (e.g. in absolute value). It is true that other non mature technologies will develop more (e.g. absolute and negative) in such ambitious scenarios, but the sentence should be rewritten according to me.	text will be revised
United States (U.S. Department of State)	SPM	16	30	-	-	-	-	-	Replace "produce GHG reductions" with "reduce GHGs".	will be done
Haroon Kheshgi (ExxonMobil Research and Engineering Company)	SPM	16	1	16	9	-	-	-	Suggest that ¿(including cost)¿ be added after ¿barriers¿ as cost is a notable barrier to most RE sources and is often not lumped in with barriers. Also, I find the discussion of maturity to be overly simplistic. For example, bioenergy and solar both span a range of maturities from some technologies that have been used for millennia to technologies that are still under research.	text will be revised
Canada (Environment Canada)	SPM	16	29	16	34	-	-	-	Suggest that this section (or alternately section 7) could benefit from discussion of impact of subsidies/incentives for other sources of energy. This is relevant and timely as it links to the G20 work on reducing fossil fuel subsidies.	the role of subsidies should be stressed in chapter 11 (policies)
Finland (Finniah Meteorological Institute)	SPM	16	6	-	-	-	-	-	The changing climate will also have a substantial impact on resources of RE varying in different regions. Especially sensitive can be hydro and biomass potentials.This should be addressed clearly in the text.	sceanrios do not include CC impacts on RE
Germany (Federal Ministry for the Environment, Nature Conservation and Nuclear Safety)	SPM	16	32	16	32	-	-	-	The current text of this paragraph together with Figure SPM5 might wronlgy suggest that RE deployment might be limited due only due to different competitiveness of other energy sources. Thus, please replace the words "if other options are more competitive" with something like "if other options are given priority by policies or - due to their competitiveness - by markets".	text will be revised
Germany (Federal Ministry for the Environment, Nature Conservation and Nuclear Safety)	SPM	16	25	16	28	-	-	-	The last sentence in the paragraph gives the wrong impression that a delay of mitigation action until 2050 in some regions of the world is a alternative possibility to reach climate goals, while the underlying EMF-22 (Clarke et al. 2009) studies actually showed that in particular for the lower climate targets, the technological feasibility is lost with such a delay of mitigation action. Thus, add a clarifying sentence like "However, lower climate targets, such as stabilisation at 450ppm CO2eq or staying below 2C maximal warming will not be feasible under scenarios with a delay of mitigation action for multiple decades."	will be done
Brazil (Ministry of Science and Technology)	SPM	16	7	-	-	-	-	-	The ordering of the mature technologies shown between parentheses should follow their relative weight in the global energy mix. Therefore, the list should read as follows: ""(eg. direct use of bioenergy, hydro, wind)"".	to specific

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	16	10	16	18	-	-	-	The paragraph's heading (saying that RE distribution depends on policy structure) does not reflect the paragraph's content (which says that the RE distribution could depend on cost-efficiency and growth in energy demand)	heading will be revised
Frank Mastiaux (EON Climate & Renewables)	SPM	16	19	16	28	-	-	-	The regional difference for economic situations of countries seems to be neglected. This paragraph describes the importance of early action. In addition regional differences (e.g. a description of the specific factors in Annex I versus non-Annex I countries) could be helpful.	text will be modified
Haroon Kheshgi (ExxonMobil Research and Engineering Company)	SPM	16	19	16	28	-	-	-	This paragraph seems oblivious to the fact that the bulk of current RE is for traditional uses of biomass. This raises the question: if there is a transition from traditional biomass to other technologies, what is the fraction of demand that goes to other RE sources and what fraction goes to non-RE sources. Suggest that this topic be assessed and that drivers and the depiction of such a transition in the scenarios be assessed be presented.	this is to specific for this section
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	16	6	16	9	-	-	-	This sentence is too complicated. I suggest to rephrase it to read: "In various scenarios, some RE technologies (e.g. wind, hydro, direct use of bioenergy) are shown to occur independent of climate policies, while others (e.g. solar, geothermal, commercial biomass) are deploying as a result of policies driven by mitigation targets. This is the result of assumptions on the maturity of the different technologies.".	text will be revised
Modesto Fernandez Diaz-Silveira (Ministry of Science, Technology and Environment)	SPM	16	3	-	-	-	-	-	TO include text, after ¿mature of the technologies: "although biofuels still impose a challenge to human food production and food security in the world, mostly to developing countries".	resource competition is part of the barriers listed as driving force in the paragraph, the general discussion about the specific biomass aspect is part of chapter 2
United Kingdom (Department of Energy and Climate Change)	SPM	16	8	-	9	-	-	-	Where is the data that show that certain RE technologies will be driven by the market vs those whose deployment will be driven in attempts to reach mitigation goals? There is little doubt that some are more market-driven and others more regulatory-driven. But the reader is not provided justification for the particular claims in this part of the report.	we refer here to scenario results, the statements are therefore backed by the literature
Haroon Kheshgi (ExxonMobil Research and Engineering Company)	SPM	16	10	16	18	-	-	-	While RE deployment is dependent on policy it is even more dependent on cost which is why most deployment requires policy support. Suggest that this paragraph be preceded by a paragraph on cost and how it factors into the extent of deployment shown in scenarios in figure 4.	the relevance of cost will be stressed in one of the previous paragraphs
¿vind Christophersen (Climate and Pollution Agency)	SPM	16	7	16	9	-	-	-	With reference to page 19 line 6-13, "hydrothermal" and "shallow geothermal" should be included in the parantheses in line 7. "geothermal" in line 8. should be changed to "enhanced geothermal systmes"/"EGS", or "unconventional geothermal".	aspect is to specifc, the analyzed sceanrios do not support this request, moreover many of the scenarios don't show specific results for these technologies

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Antoine BONDUELLE (E&E Consultant)	SPM	16	16	18	28	-	-	-	Wording should be more precise (three times ""ambiguous""). The meaning is ""RE development is dependant on local conditions and framework"". Thus most of the paragraph is meaningless and should be skipped.	we will re-wirte
Taishi Sugiyama (Central Research Institute of Electric Power Industry (CRIEPI))	SPM	16	10	16	18	-	-	-	You must address costs, intermittency, and stability of supply in the first place. These three are the key barries of RE.	will be done in one of the other paragraphs
¿vind Christophersen (Climate and Pollution Agency)	SPM	17	2	17	6	4	SPM 5	-	Figure is not easy to understand. Needs more explanation	figure will be deleted
China (China Meteorological Administration)	SPM	17	-	-	-	4	SPM 5	-	Source (where is the figure 5 from)?	selection of scenarios, however, figure SPM 5 will be deleted
Frank Mastiaux (EON Climate & Renewables)	SPM	17	9	-	-	-	-	-	And missing	text will be revised
Manfred Orgis (Ministry of Environment)	SPM	17	-	-	-	-	-	-	Figure SPM 5, caption: the term	figure SPM 5 will be deleted
Germany (Federal Ministry for the Environment, Nature Conservation and Nuclear Safety)	SPM	17	13	17	13	-	-	-	Insert "in combination with fossil fuels" after "CCS"	text will be revised
France (MEEDDM (Ministry of Ecology, Energy, Sustainable Development and the Sea))	SPM	17	21	17	22	-	-	-	Is it true that a drastic reduction in the solar cells costs would not be a major factor in the development of photovoltaic energy ? Are technological breakthrough excluded ?	Unclear to which text comment refers.
United States (U.S. Department of State)	SPM	17	20	-	-	-	-	-	It is not clear what "assuming that the current dynamic in the sector can be maintained" means. Perhaps "assuming RE deployment continues to increase at current rates"?	yes, text will be revised
Michael Jack (Scion (NZ Forest Research Institute))	SPM	17	20	17	22	-	-	-	Sentence starting ""Even without¿"" should read ""None of the scenarios in the literature found technical potenitals to be the limiting factors for the exmpasion of RE.""	will be done
¿vind Christophersen (Climate and Pollution Agency)	SPM	17	20	-	22	-	-	-	Suggest to remove this sentence as the explanation of which factors that are more likely to be limiting are not listed before on page 20, ine 6-8.	will be done
Dave Renne (National Renewable Energy Laboratory)	SPM	17	-	-	-	-	-	-	Technical potential is first mentioned here, but is not defned.	In the SPM considering the limited space no detailed defintions can be given, technical potential is defined in the glossary

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Keigo Akimoto (Research Institute of Innovative Technology for the Earth (RITE))	SPM	17	19	17	20	-	-	-	The ""optimistic application path for RE assuming that the current dynamic in the sector can be maintained"" is unclear. The source should be added.	will be done
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	17	21	17	22	-	-	-	The choice of wording is not the best, the sentence sounds like stating the obvious.	text will be revised
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	17	8	17	11	-	-	-	There is a small typo here: "¿energy systems(economic growth, ¿"	text will be revised
Haroon Kheshgi (ExxonMobil Research and Engineering Company)	SPM	17	21	17	22	-	-	-	This statement is true only for general classes of RE for large regions. For example if one were to consider the scope of a biofuel such as biodiesel from plant oil from a small country with high population density, the domestic potential would be very low. Such a sweeping statement is not justified ¿ suggest that it be removed as a more detailed statement appears later in the SPM.	text will be revised
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	17	15	-	-	-	-	-	what is meant by "regiona breakdown for the scope of future RE deployment"? Scope?	text will be revised
Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	SPM	17	15	17	22	-	-	-	When I read this paragraph I first interpreted it as ""technological limits"" = ""exploitable RE resource availability"", but on a second and a third reading the meaning of ""technological"" became less and less clear¿ does it refer to current or future tech, does it account for competition with other options, does it consider RE resource variation due to changing demography, land use, climate, etc.? In contrast in the TS handles this more clearly, there it is mentioned the ""theorethical"" and the ""technical"" potential.	text will be revised
Antoine BONDUELLE (E&E Consultant)	SPM	17	-	-	-	-	SPM 5	-	Figure SPM5 seems to be there only to illustrate the mitigation chapter with not information added to the text. None of the data is very useful, and the text is already complete. The caveat in the legend ("large spread") is not enough to show the wide uncertainties described in chapter 10. The simple mention in the text (e.g. p.15 l.9-10) plus the relevant paragraph p;16 should be enough to tell this.	figure SPM 5 will be deleted
¿vind Christophersen (Climate and Pollution Agency)	SPM	17	-	-	-	-	SPM 5	-	Include an explanation for "Standard"	figure SPM 5 will be deleted

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
United Kingdom (Department of Energy and Climate Change)	SPM	17	-	-	-	-	SPM 5.	-	What exactly does this graph show? The y-axis is particularly difficult to understand given the rather cursory description in the figure heading. It is particularly improtant to clarify the meaning of the term "baseline". Also, the information would be greatly improved by discussing some measure of variance between the results, so the policy maker can understand whether that variation is 25%, 100%, 500%, etc. This would inform the judgment of uncertainty.	figure SPM 5 will be deleted
John Twidell (AMSET Centre)	SPM	17	-	-	-	-	SPM 5	-	diagram lables not correct. The 4th category is now labled 'no CCS + nuclear', this should be 'no CCS + no nuclear'? Likewise in the caption. Even so, the first 4 studies have zero renewables under this scenario, which is clearly nonsense. The comment in the caption should therefore include "the scenario 'no CCS + no nuclear' was not considered in all the studies".	figure SPM 5 will be deleted
Sweden (Swedish Environmental Protection Agency)	SPM	17	-	-	-	-	SPM 5	-	In this figure it shouold be clearly spelled what, for instance, "No CCS" means in practice (i.e., a scenarion where the contribution of CCS as a CO2 mitigation option has been restricted to zero).	figure SPM 5 will be deleted
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	17	1	17	1	-	SPM 5	-	It is not self-evident that for ReMind ADAM, DNE21, MESSAGE and POLES that without both CCS and nuclear the projected share of RE is not 0%, but that no-CCS+no nuclear was not modeled. I suggest to delete the no-CCS+no nuclear bars for those models from the figure, or else to explain in the caption.	figure will be deleted
¿vind Christophersen (Climate and Pollution Agency)	SPM	18	16	18	17	4	SPM 6	-	Figure is not easy to understand. Neither the preceding text on p 17 nor the text under the figure are sufficient.	figure will be changed
Antoine BONDUELLE (E&E Consultant)	SPM	18	16	18	28	-	SPM 6	-	Figure SPM6 gives a good view of the range of potential RE developments	thank you
Babacar Sarr (ENERTEC-SARL)	SPM	18	18	20	8	5	-	-	For each technology should mention % of the world's total electricity generation (different from worlwide electricity demand).	In redraft, figures are presented for the contribution of each RE source to total global primary energy supply.
United Kingdom (Department of Energy and Climate Change)	SPM	18	18	19	-	-	-	-	This section gives the reader some background information on where the technology has come from, how it has grown, and its current production. To make it easier for the reader to compare the various technologies, the authors should structure each paragraph with the same format and bring more consistency with units (ej, gw, and mw are all used in this section). Also try to include the current growth rates for these technologies for an easier comparison. Additionally try to consistently show where each technology presently stands, shown as a percentage of global or regional energy production.	Section rewritten and moved into a Box in revised draft with a similar structure for each paragraphs. RE contribution to total primary energy supply is presented in a figure.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Manfred Orgis (Ministry of Environment)	SPM	18	19	18	19	-	-	-	It is suggested to add "RE" before "source". The sentence should read: The technical and market development status of renewable energy varies by RE source and technology.	Sentence has been removed from text in rewrite. Comment no longer relevant.
United States (U.S. Department of State)	SPM	18	20	18	21	-	-	-	Suggest deleting "are technically mature and" since this may imply that further improvements are not necessary.	By stating that a technology is mature, authors do not believe that this implies that further improvements to the technology are not possible and/or warranted.
Several experts 0 (Ministry of the Indutry, Tourism and Trade)	SPM	18	23	-	-	-	-	-	Bioenergy includes a wide range of technologies. A definition of what is considered bioenergy would be useful (e.g. European Directive 2009/28 includes a definition for "biomass")	Definition will be in glossary
United Kingdom (Department of Energy and Climate Change)	SPM	18	23	18	38	-	-	-	Given the level of discussion it has generated is it worth putting in an equivalent figure for palm oil for transport fuel?	Rewritten for SPM FD with an effort to condense text. This would be too detailed for the revised paragraph.
Manfred Treber (Germanwatch e.V.)	SPM	18	23	19	40	-	-	-	like comment on Box SPM.1: It is more instructive and much better for the lay reader to make the ordering of the different technologies NOT in alphabetical order but in the order of importance (potential or real contributions, maybe Fig SPM.4 could give an advise for the ordering)	Order of technologies presented in the order of the chapters, which was mandated by the IPCC plenary.
Brazil (Ministry of Science and Technology)	SPM	18	23	18	24	-	-	-	Liquid biofuels should be included among mature bioenergy technologies, and should be ordered according to their relative weight in the global energy mix. Threfore, the list between parentheses should read as follows: ""(liquid biofuels, small and large scale boilers, domestic pellet based heating systems).	To include sentiments of this comment, 'ethanol production from sugar and starch' has been included.
United Kingdom (Department of Energy and Climate Change)	SPM	18	25	18	25	5	-	-	algue' instead of 'algae' - french spelling.	Accepted.
Australia (0)	SPM	18	25	18	25	-	-	-	As per comment on same Table TS 1.1, note 'Range of Estimates' not limited to a date of result.	Can you be more clear in your comment?
United States (U.S. Department of State)	SPM	18	26	18	26	-	-	-	Insert "early" between "at" and "stages". Replace "Many" with "Some"	Replaced with 'in the R&D phase'
United States (U.S. Department of State)	SPM	18	27	18	38	-	-	-	This is an example of where it is helpful to break out the bioenergy category into components so that one is able to see the small contribution of modern bioenergy relative to traditional biomass. This gives a clearer view of bioenergy technology.	Relevant text deleted in rewrite.
John Twidell (AMSET Centre)	SPM	18	31	-	-	-	-	-	Add sentence 'It is noteworthy that heating with wood, especially in stoves, is socially respected in many developed countries''. [Note to authors: The US, Canada, Scandinavia, Austria etc are notworthy for the social and practical acceptance of wood stoves and modern biomass. It is very misleading to imply, as in the sentence before, that 'wood is for the poor'.	Relevant text deleted in rewrite.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	18	31	18	34	-	-	-	Forest residues are remains of forests. That is not what is meant here. I suggest to replace "forest" by "forestry".	Relevant text deleted in rewrite.
¿vind Christophersen (Climate and Pollution Agency)	SPM	18	33	18	33	5	-	-	Inform how much 2 EJ of heat is in percentage of the total global heat generation	Relevant text deleted in rewrite.
Michael Jack (Scion (NZ Forest Research Institute))	SPM	18	35	18	35	-	-	-	To be explicit this should read: ""Transport biofuels¿"" rather than just ""Biofuels ¿	Relevant text deleted in rewrite.
Modesto Fernandez Diaz-Silveira (Ministry of Science, Technology and Environment)	SPM	18	38	-	-	-	-	-	To include text, after the end of the line: ", although still under scrutiny for the challenges imposed to human food production, when using those food crops, and the incidence on world food prices, making it more difficult mainly to developing countries to obtain the food they need, as well as challenging food security schemes. This would require still more adjustments to ensure the balance in each country and in each region, to ensure not affecting food accession from people".	Relevant text deleted in rewrite.
China (China Meteorological Administration)	SPM	18	-	-	-	4	SPM 6	-	Source (where is the figure 6 from)?	references will be given
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	SPM	18	-	19	-	5	-	-	this list is not readable at all. For each technology, very different indicators are given so that they are not comparable. The text should be provided in an overview table so that the numbers can be compared.	Rewritten for SPM FD with a focus on shortening and comparability.
Frank Mastiaux (EON Climate & Renewables)	SPM	18	-	-	-	-	6	-	Legend, unclear that the RE ER scenario is from IEA as well	Figure replaced with one presenting the four illustrative scenarios in 10.3. Legend expanded to more clearly present information.
¿vind Christophersen (Climate and Pollution Agency)	SPM	18	-	-	-	-	SPM 6	-	The figure shows that the two senarios differ more in the assumptions on primary energy demand than anything else. Please add assumptions for the so-called ER senario, and also explain the ER abbreviation in the text. Also, how is the figures in PJ/a in ths figure related to the figures in table SPM 4 in EJ/y. It seems that the black bars add up to the IEA forcast of 868 EJ/y?	there is no room for discussion of assumptions in SPM
Helmut Haberl (Institute of Social Ecology, Vienna)	SPM	18	-	-	-	-	SPM 6		Convert PJ (y axis) to EJ	text will be modified
United Kingdom (Department of Energy and Climate Change)	SPM	18	-	-	-	-	SPM 6.	-	The figure heading isn't detailed enough for somebody to interpret the graph without going through other parts of the document. The y-axis should specify the units.	Figure replaced with one presenting the four illustrative scenarios in 10.3. Caption expanded to more clearly present information.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Emmanuel Branche (Electricité de France)	SPM	18	-	18	-	-	SPM 6	-	According to me in the IEA WEO 2008, projections are analysed to 2030 (and not 2050). The reference to IEA WEO 2008 may not be the appropriate one ? Maybe rather IEA Energy Technology Perspectives - 2008 : Scenarios and Strategies to 2050 ?	reference will be added
Canada (Environment Canada)	SPM	18	-	18	-	-	SPM 6	-	Since the "IEA Reference" and "Energy Revolution" scenarios are not explained in the text of the SPM, suggest using more general language or a more detailed caption to ensure that non-specialized audiences can understand the information being conveyed in this figure. Suggest also that "primary demand" and "total RE" columns be beside each other for both IEA and ER.	Figure replaced with one presenting the four illustrative scenarios in 10.3. Caption expanded to more clearly present information.
¿vind Christophersen (Climate and Pollution Agency)	SPM	19	4	19	4	5	-	-	CSP ? Explain	the term will be explained in Glossary
Richard Taylor (International Hydropower Association)	SPM	19	22	19	22	5	-	-	Redraft. Comment: Transboundary projects have and are being developed in many other regions.	suppress reference South-East Asia
John Twidell (AMSET Centre)	SPM	19	36	-	-	-	-	-	Add example 'while off-shore wind energy is beginning to expand (e.g. in the UK 1041 MW installed by mid 2010)'.	The SPM is already too long; adding country specific details on offshore wind growth is unnecessary.
Several experts 0 (Ministry of the Indutry, Tourism and Trade)	SPM	19	14	-	-	-	-	-	As mentioned, only minihydraulic must be considered	"Renewable" is a non size-dependent attribute. International Conference for Renewable Energies (Bonn, 2004) and other United Nations organised conferences clearly confirmed hydropower (whatever the size) as a RES. Chapter 5 of this IPCC/SRREN substantiates the reasons behind not classifying hydropower projects according to size, but rather according to type and use.
United Kingdom (Department of Energy and Climate Change)	SPM	19	40	-	-	-	-	-	Clarify what the term 'electric capacity additions' means. In what forms are these additions being attributed (new wind farms, better efficiency, better coefficients of performance, etc)?	Relevant text deleted in rewrite.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	19	24	19	26	-	-	-	contradicts chapter 6 which states that many wave and tidal stream devices are at the pre-commercial stage and that some wave devices have been sold in a commerical project.	Noted. Effort will be made to improve consistency.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	19	6	19	8	-	-	-	EGS is not a well known acronym. I suggest to replace "EGS" by "Enhanced Geothermal System (EGS){footnote X}", where the text for this footnote could be: "Enhanced Geothermal Systems (EGS) inject cold water in dry and non-porous rock, capturing the heat of the rock until it is forced out of a second borehole as very hot water, which is converted into electricity".{wikipedia}	Chapter 4 defines EGS in detail on page 6, after introducing EGS in less detail on page 5 and in the Executive Summary. Acronym is also explained in Annex I. There is not space in the SPM to explain the details of the technology.
Kaija Hakala (MTT Agrifood Research)	SPM	19	1	19	1	-	-	-	Explain what is GWth	Noted.
Emmanuel Branche (Electricité de France)	SPM	19	14	19	23	-	-	-	For hydropower it could be interesting to precise that it is the first RE-electrical (and represent 16% of total electricity generation or 2.3% of the total primary energy source) and the second RE (after biomass)	will be included only if enough space is available
Nico Bauer (Potsdam Institute for Climate Impact Research)	SPM	19	5	19	8	-	-	-	I am missing a reference to the use of water for cooling of thermal power stations. Increasing temperatures of rivers affects negatively the output of thermal power plants.	Rewritten for SPM FD; water use discussed in Section 5
Sweden (Swedish Environmental Protection Agency)	SPM	19	41	-	45	-	-	-	I think it is pretty obvious that the technical potential globally will not limit market growth for RE. It is hardly worth spending space on this. Do we know of any energy or land use where the technical potential is a restricting factor. Does it not suffice to say that the technologies work and their penetration is limited mainly by costs and (lack of) policy?	Authors find this point important to highlight to policymakers. Sentence appears at end of paragraph on limiting factors.
Juan Jose Sanchez (Ministry of the Environment, and Rural and Marine Affairs)	SPM	19	5	-	-	-	-	-	I would say ""700 MW (just in Spain, 432 MW are already installed by mid-2010), with more than 1500 MW of additional capacity under construction (although in Spain, there are more than 2300 MW already officialy registred to enter before 2013, 700 MW of them being in an advanced construction phase)""	We are only mentioning installed or actually under construction. Planned are not considered (USA and Japan also have a lot planned
United States (U.S. Department of State)	SPM	19	7	19	7	-	-	-	Insert "early" in front of demonstration.	No problem with adjective, 'early"
¿vind Christophersen (Climate and Pollution Agency)	SPM	19	18	-	-	-	-	-	It might be better to change the wording "energy needs" to "demand" or "needs and demand".	replace by "needs" by "demand"
Juan Jose Sanchez (Ministry of the Environment, and Rural and Marine Affairs)	SPM	19	3	-	-	-	-	-	It should say ""by government policy in Europe (specially in Germany and Spain), the United States and Japan""	the European Union has a policy for getting 20% reduction

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
United Kingdom (Department of Energy and Climate Change)	SPM	19	6	19	13	-	-	-	It would be worth being more explicit in splitting this into high and low enthalpy geothermal. At present they sit together uncomfortably in this section and in most subsequent sections the discussion appears to be all about high enthalpy geothermal.	Have used high vs low temperature (not enthalpy) to classify geothermal resources in Chapter 4, Will edit Chapter 4 to avoid confusion re Enthalpy (as follows) In SPM this section substantially reduced in rewrite. No space to discuss high and low enthalpy geothermal separately.
Canada (Environment Canada)	SPM	19	41	19	41	-	-	-	Please define "technical potential" here or in glossary.	Accepted.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	19	26	-	-	-	-	-	suggest delete "marine biomass" as it is not mentioned in chapter 6	Accepted.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	19	27	19	29	-	-	-	Suggest to delete this sentence on potential tidal barrages as this is not sufficiently referenced in chaper 6 and is not very relevant here in this summary.	Accepted.
Ladislaus Rybach (Geowatt AG Zurich (company))	SPM	19	8	-	-	-	-	-	The text should read ¿¿.offshore submarine energy is starting the research and development stage¿.	No problem with defining offshore geothermal as in research phase
Japan (the Japanese Ministry of Foreign Affairs)	SPM	19	1	-	-	-	-	-	The unit GWth does not make sense.	Noted.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	19	4	19	5	-	-	-	This sentence is strangely worded. I suggest to rephrase it to read: "By the end of 2009, the cummulative capacity of CSP installations was roughly 700 MW, with more than 1,500 MW under construction.".	will be changed
Gian-Kasper Plattner (IPCC WGI TSU, University of Bern)	SPM	19	4	-	-	-	-	-	what does the abbreviation "CSP" stand for? I couldn¿t find it explained anywhere in the SPM.	spelled out in revised text and appears in acronyms list.
United Kingdom (Department of Energy and Climate Change)	SPM	19	14	19	23	-	-	-	Would it be correct to argue that another trend is to see more emphasis on developing a pumped storage capability as part of hydro schemes?	Relevant text deleted in rewrite.
¿vind Christophersen (Climate and Pollution Agency)	SPM	20	26	20	26	5	-	-	Solar, wind, hydro, biomass and also ocean energy are more or less dependant on the climate. The word "some" should therefor be replaced with "a number of", "several" or "many"	Accepted.
Richard Taylor (International Hydropower Association)	SPM	20	-	-	-	5	-	SPM 4	Comment: The credibility of this table is compromised by over-reliance on limited (only two!) sources. The table should be reworked to be made consistent with technical potentials for respective RES in Chapters 2-7.	Table information converted to a figure, and technology chapter references on technical potential have been included.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
China (China Meteorological Administration)	SPM	20	-	20	-	5	-	SPM4	This table only refers to technical potential without any reference to cost and investment related to realizing such potential. This table misled that the technical potential is not meaningful if there is no reference to cost and investment. It is suggested this section not only refer to technical potential but also refer to economic potential and market potential, which are closely related to mitigation cost and much interesting and useful for policy makers.	Technical potential information is followed directly by cost information and learning curve information. This attempt provides economic information to supplement potentials.
¿vind Christophersen (Climate and Pollution Agency)	SPM	20	-	20	-	5	SPM 4	-	Some of the figures seem to be strange; hydropowers technical potential in 2020 and 2050 is almost the same, as well as the low and high rang of estimates. Ocean power has tech potential increasing from 66 EJ/year in 2020 increasing to 331 in 2050 whilst the low and high range of estimates is resp 330 and 331 EJ. Almost the same.Also for wind on shore there seem to be differences in figures a bit difficult to understand. see	Table replaced with figure in revised draft for readability. Numbers were supplemented with additional literature to make them more complete. Projected estimates were removed.
Frank Mastiaux (EON Climate & Renewables)	SPM	20	-	-	-	-	-	4	Observation: Interesting numbers, but not found in the text. Hydropower, the most mature RE technology seems to have one of the smallest technical potentials.	Information presented here was supplemented with additional information from chapters in revised version.
Finn Gunnar Nielsen (Statoil)	SPM	20	-	-	-	-	-	4	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.	Wind figures in SPM FD combined, and presented in Figure. Authors welcome updated references.
Brazil (Ministry of Science and Technology)	SPM	20	5	-	-	-	-	-	After the word ""deployment"", include the following sentence: ""including through international trade in energy carriers such as electricity and bioenergy"". Source: SPM page 24, line 20.	Rejected.
Jorge Martínez Chamorro (Agencia Canaria de Desarrollo Sostenible y Cambio Climático)	SPM	20	25	21	16	-	-	-	As it has been stated in this section, climate change will have impacts on renewable energy but it could also be included here that renewable energy can also be used as adaptation strategies (Chapter 9, page9, paragraph 1 to 3), to reinforce the important role that renewables can play in climate change adaptation.	Adaptation discussion out of the scope of the SRREN SPM. Will be considered in underlying text.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Andreas Fischlin (Systems Ecology, IBZ, ETH Zurich)	SPM	20	25	21	8	-	-	-	Have authors here made really good use of AR4 WGII report? Statements are vague and seem to have considered only WGI results, while chapter 3 of AR4 WGII Kundzewicz et al., 2007) should be fully considered in this context too. Kundzewicz, Z. W. & Mata, L. J., 2007. Freshwater resources and their management. In: Parry, M. L., Canziani, O. F., Palutikof, J. P., van der Linden, P. J., & Hanson, C. E. (eds.). Climate change 2007: Impacts, adaptation and vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel of Climate Change (IPCC). Cambridge University Press: Cambridge a.o. 173-210. (http://www.ipcc.ch). Moreover, the total amount of precipiation is not the only thing that matters in this context, although statements at the begin of this para give this impression. But IPCC WG I and WG II make statements about extreme events and an increase in frequency of intensive precipication events. Seasonal runoff projections could also be included here and may play a significant role for hydropower and other energy producing plants, such as nuclear power plants (summer 2003 head wave resulted in shut down in Europe of 6 nuclear power plants). Such effects need to be considered here as well. To sum up: The arguments presented here are made from a too narrow consideration.	Space restrictions limit authors ability to incorporate additional text. Nonetheless, all efforts will be made to assure proper consideration of AR4 results.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	20	5	20	6	-	-	-	I suggest to delete "absolute size of the" since it is redundant.	Noted.
United States (U.S. Department of State)	SPM	20	10	-	-	-	-	-	In table SPM 4, the row labeled Wind Off-shore: Label should read: "Wind Off-shore (shallow)" On the rightmost cell of this row, , after "Leutz et al (2001)", add: "; for medium depth, high estimate is 427 EJ/y (Lu et al 2009)"	We do not dinstinguish between shallow and deep overtly in the wind chapter. Nonetheless, we will review the citation for possible inclusion, and will also consider changing the table label, but only if the literature would allow such a change, and if we are then able to make the necessary related changes to the wind chapter.
Denis Aelbrecht (EDF)	SPM	20	25	21	16	-	-	-	In this section about climate change effects, there are no words about the opportunities that climate variability or change might offer for new water storage facilities and thus for hydropower development. This is particularly relevant for those regions with a potentially high exposure to climate impacts on their water resources systems.	Noted.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	20	25	21	16	-	-	-	Inconsistent paragraph: for hydro, wind and solar, the link between potential CC effects and the resource potential is indicated, whereas for biomass it only says there will be an effect and it is poorly understood (that may be the case, however, the general link between changes in rainfall and biomass production is sufficiently clear to be able to mention it here)	Effort made to make presentation of CC effects on different RE technologies more consistent.
Supachai Panitchpakdi (United Nations Conference on Trade and Development)	SPM	20	6	20	8	-	-	-	It is correctly emphasized that "regional resource limitations, sustainability concerns, system integration/infrastructure constraints, economic factors, and other issues are more likely to limit the future use of RE technologies" than the technical potential would suggest. Yet there is insufficient elaboration on these constraints and how to overcome them.	Challenges and solutions elaborated in cost discussion and in Sections 4 and 5
Taishi Sugiyama (Central Research Institute of Electric Power Industry (CRIEPI))	SPM	20	25	20	26	-	-	-	It is true, but equally importantly, we do not know how the CC impacts RE in details as a lot of uncertainty assosciated with how CC emerges.	Accepted.
Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	SPM	20	25	21	16	-	-	-	It must be pointed out somewhere that the energy demand is also impacted by climate change, e.g. temperature deltas for water heating, electrical losses, cooling demands, etc.	Noted.
Gunnar Luderer (Potsdam Institute for Climate Impact Research)	SPM	20	25	21	16	-	-	-	It should be noted that also non-RE conventional power technologies are affected by climate change.	Detail not appropriate for SPM. Here discussion is focused only on output of technology chapters.
Manfred Orgis (Ministry of Environment)	SPM	20	-	-	-	-	-	-	Table SPM 4: It would be very informative to link the technical potential for biomass as RE source also with the potential of this RE source to reduce the CO2 concentration in the atmosphere, e.g. in terms of negative emissions per year or in terms of reduction of CO2 concentration in ppm per year.	The information presented here is only on technical potential. Mitigation potential is covered in Section 6.
¿vind Christophersen (Climate and Pollution Agency)	SPM	20	30	21	10	-	-	-	The text about the effects of climate change is very similar for bio, hydro and wind. And could e replaced by a shorter text such as: ¿The technical potentials of these energy sources are influenced by and interact with climate change, but the mechanics and details of those impacts are still poorly understood. Changes in temperature, precipitation and wind patterns may significantly (or strongly?) change the potential for utilization of bio energy, hydro energy and wind energy particularly on a regional level, however so far the overall impact on the global level is likely to be relatively small on a global basis, but strong regional differences can be expected [2.5, 2.8] [5.2].¿ This will also take care of the imbalance in the draft text. The predictions related to wind patterns are more uncertain than changes in temperature and precipitation.	Revised to shorten and condense text.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	20	3	20	5	-	-	-	This sentence is difficult to understand. I think it means, and if correct suggest to rephrase it to read: "Even in regions with a relatively small technical RE potentials, most often there are good opportunities for a major growth in RE."	Slightly reworded for clarity.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Helmut Haberl (Institute of Social Ecology, Vienna)	SPM	20	-	-	-	-	-	SPM 4	Not fully consistent with chapter 2 (which is not really conclusive, see above). In particular the values for biomass residues seem much too high.	Range of potentials was updated with information from Ch 2 in revised draft. Presented as a figure rather than in table format.
¿vind Christophersen (Climate and Pollution Agency)	SPM	20	-	-	-	-	-	SPM 4	Please add the total renewables estimate before IEA forecast of demand	Scenario information removed from figure on potentials in revised draft.
Finland (Finniah Meteorological Institute)	SPM	20	-	-	-	-	-	SPM 4	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.	Range of potentials was updated with information from Ch 2 in revised draft. Presented as a figure rather than in table format.
Emmanuel Branche (Electricité de France)	SPM	20	-	20	-	-	-	SPM 4	Why to add different values that the one provided by Krewitt et al. (2009) in the column "sources for Range of Estimates"? According to me only Krewitt et al. (2009) values should be provided, and the column "Sources for Range of Estimates" should be delated (potential is not the problem/limitation for RE deployment, as it is stated in many chapters). However references to the relevent technical chapters for accurate data should be mentioned	As Krewitt was only one source of information, to present a balanced representation of the technical potentials in the literature, additional sources from technology chapters were added.
United Kingdom (Department of Energy and Climate Change)	SPM	20	-	-	-	-	-	SPM 4.	Why are the highs and lows so far apart for some of the technologies and so precise on others (e.g. ocean)? There is a citation here, but that paper also does not explain these wide differences in confidence intervals, nor does the body of this report. This table requires significantly more work to be informative.	Table removed from SPM FD and replaced with a figure to facilitate comparability. Additional resources added to give a full range of potentials for each technology.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	20	11	20	11	-	-	SPM4	It is unclear what year the collumn 'Range of Estimates' refers to (probably 2050). It may help a layman reader to add the word "demand" to the cell 'BAU Primary Energy'.	Table removed from SPM FD. Figure replacing the table is clear that the range refers to 'techniical potentials'.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	20	-	-	-	-	-	SPM4	Similar as table 1.3 and TS 1.1 It is confusing that for some values, the range of estimates does not include the values given as technical resource potential.	Table rreplaced with figure in revised draft for clarity. Technical resource potential is not a term used in the SRREN.
Canada (Environment Canada)	SPM	20	-	-	-	-	-	SPM4	Suggest that labelling and explanation for Table SPM4 be improved. For example, for what year(s) does the "Range of Estimates" apply?	Table replaced with figure in revised draft to help clarify labels and categories.
Antoine BONDUELLE (E&E Consultant)	SPM	20	-	-	-	-	-	SPM4	Table SPM4 gives information on many studies and is thus very useful. Maybe a global figure of the relative scale of RE potentials and energy demands could be useful.	Table replaced with figure in revised draft according to suggestion.
¿vind Christophersen (Climate and Pollution Agency)	SPM	21	17	21	17	5	-	-	"levelized cost" should be explained	Detailed explanation now appears in Glossary.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Richard Taylor (International Hydropower Association)	SPM	21	15	21	15	5	-	-	Delete ""and climate"". Comment: There is no such thing as a ""climate event"". Delete ""instable"" and replace with ""changing"".	Sentence removed from text in rewrite.
Richard Taylor (International Hydropower Association)	SPM	21	10	21	10	5	-	-	Insert "", but significant regional changes are possible"" after "" energy"". Comment: Wind energy will be affected like hydropower at a regional level.	The text already describes changes to the geographic distribution of the resource, so it is unclear what additional is gained by mentioning regional impacts when those are already implied. To be more clear, we can simply more directly state that global climate change may/will change regional wind resource conditions. Any change made here will also influence the body of Ch7.
¿vind Christophersen (Climate and Pollution Agency)	SPM	21	-	21	-	5	SPM 7	-	On the horizontal axis of the figure "US-cent/kWh" should be inserted	X-axis label included on LCOE figure inserted into FGD text.
Frank Mastiaux (EON Climate & Renewables)	SPM	21	-	-	-	-	7	-	Important that onshore and offshore is stated seperately	Noted.
Taishi Sugiyama (Central Research Institute of Electric Power Industry (CRIEPI))	SPM	21	17	-	-	-	7	-	Include SRREN_Draft2_Review_Sugiyama_Taishi_Material_12 as a data source.	Noted.
Taishi Sugiyama (Central Research Institute of Electric Power Industry (CRIEPI))	SPM	21	17	-	-	-	7	-	This graph is good, but more revision requred. LCOE range of conventional tech is too large - keep baseloads alone, then the range will shift downward. Devide hydro into large ones and small ones.	Conventional range removed from figure. Hydropower is not deliniated into large and small in underlying text.
Australia (0)	SPM	21	7	-	-	-	-	-	An explanation is needed for the 3 real discount rates.	Authors assume comment relates to Table SPM 5, which has been deleted from SPM.
Frank Mastiaux (EON Climate & Renewables)	SPM	21	29	-	-	-	-	-	Carbon price assumption for what year? Stable price? Average?	figure will be modified
¿vind Christophersen (Climate and Pollution Agency)	SPM	21	15	-	-	-	-	-	Change "we well as" to "as well as"	Sentence removed from text in rewrite.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Gian-Kasper Plattner (IPCC WGI TSU, University of Bern)	SPM	21	2	21	5	-	-	-	Comment by Simon Allen, Science Officer WGI TSU, University of Bern: the statement here about a "decrease in SOME sub-tropical" regions does not correctly reproduce the wording from the executive summary of AR4 WGI Chapter 10, and the AR4 WGI SPM, which both refer to a decrease in "MOST sub-tropical regions".	Relevant text deleted in rewrite.
¿vind Christophersen (Climate and Pollution Agency)	SPM	21	10	21	14	-	-	-	Consider to merge these two sentences. The conclutions seems to be quite similar.	Sentences are specific to different technologies and are therefore necessarily separated.
Denis Aelbrecht (EDF)	SPM	21	4	21	8	-	-	-	For highly snow melt-driven basins, the impacts of global warming might be of importance, modifying intensity and timing of inflows hydrographs, and thus affecting water use for power generation. Emphasis is given in the following section on precipitation change effects, which is very important, but effects of temperature would deserve a specific statement.	needs to be added also in ch.5
Sweden (Swedish Environmental Protection Agency)	SPM	21	23	-	-	-	-	-	here it is stated that Figure SPM 7 displays costs for varying discount rates, but from the text beneath the figure only a 10 percent discount rate should be used. I think it is fair to note that not seldom do RE-sources loose competitive ground from the use of realtively high rate-of-return requirements (e.g., wind power due to high share of capital costs out of total LCOE).	Accepted.
Atle Harby (SINTEF Energy Research)	SPM	21	17	22	11	-	-	-	How are costs of not being able to regulate the RE production to consumption, market or other requirement included? Or costs of not delivering a certain amount of MW or kWh? Storage Hydro, bio, geothermal have the ability to store energy as water and to regulate the production to a certain degree, while other RE do not have this possibility.	Intermittency challenges discussed in Section SPM 4. Methodology for LCOE calculation presente in Annex II Methodology.
Taishi Sugiyama (Central Research Institute of Electric Power Industry (CRIEPI))	SPM	21	17	22	11	-	-	-	In most occasions fossil fuel, nuclear, and large hydro is cheaper than RE and small hydro. You must face reality.	Conventional range removed from figure.
Canada (Environment Canada)	SPM	21	17	21	17	-	-	-	Please define "levelized costs of energy" here or in glossary.	Detailed explanation now appears in Glossary.
France (MEEDDM (Ministry of Ecology, Energy, Sustainable Development and the Sea))	SPM	21	19	-	-	-	-	-	Recall the definition of levelized cost of energy that is likely not familiar to most SPM readers. Moreover, this term should be included in the glossary	Detailed explanation now appears in Glossary.
Emmanuel Branche (Electricité de France)	SPM	21	15	21	15	-	-	-	Replace "we" by "as"	Sentence removed from text in rewrite.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Australia (0)	SPM	21	17	-	-	-	-	-	Replace heading with "The levelized costs of electricity (LCOE) are higher for the majority of RE technologies than for fossil fuel-based electricity including where a carbon price of US$30/tCO2 is assumed (See notes on Figure SPM 7)."	Heading reworded for clarity. Details of assumptions remain in Figure notes.
¿vind Christophersen (Climate and Pollution Agency)	SPM	21	15	-	-	-	-	-	Substiture" we" with "as"	Sentence removed from text in rewrite.
Ladislaus Rybach (Geowatt AG Zurich (company))	SPM	21	17	-	-	-	-	-	The ¿levelized cost of energy (LCOE)¿ needs to be defined here or at least included in Annex I/Glossary.	Detailed explanation now appears in Glossary.
Simon Allen (IPCC WGI TSU, University of Bern)	SPM	21	2	21	5	-	-	-	the statement here about a "decrease in SOME sub-tropical" regions does not correctly reproduce the wording from the executive summary of AR4 WGI Chapter 10, and the AR4 WGI SPM, which both refer to a decrease in "MOST sub-tropical regions".	Relevant text deleted in rewrite.
Manfred Orgis (Ministry of Environment)	SPM	21	14	21	16	-	-	-	The wording in line 15 should be: .. as well as instable ¿ Furthermore it seems relevant to indicate that climate-induced extreme weather events might reduce the technical potential indicated in table SPM 4.	Sentence removed from text in rewrite.
Taishi Sugiyama (Central Research Institute of Electric Power Industry (CRIEPI))	SPM	21	17	22	11	-	-	-	This information is very important and has to appear much earlier in SPM.	Accepted.
France (MEEDDM (Ministry of Ecology, Energy, Sustainable Development and the Sea))	SPM	21	15	-	-	-	-	-	Typo : last but four word of the line, replace we by as	Sentence removed from text in rewrite.
Frank Mastiaux (EON Climate & Renewables)	SPM	21	15	-	-	-	-	-	Wording is incorrect ´we well´	Sentence removed from text in rewrite.
Jänicke Martin (Environmental Policy Research Centre)	SPM	21	25	-	-	-	SPM 7	-	Add: "Present" ((Present Cost-competitiveness; to underline the role of learning costs))	text will be modified
¿vind Christophersen (Climate and Pollution Agency)	SPM	21	-	-	-	-	SPM 7	-	As far as we understand this figure is meant to be a simplified picture of column 5 in the table SPM 5, but in different units (cents instead of dollars). Please point out this relateion in the text.	text will be clarified

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	21	-	-	-	-	SPM 7	-	As usual, the scale of the figure had to be extended to include the upper part of the PV range. In this case, however, the picture is too pessimistic. The recent IEA PV Roadmap (May 2010) gives an LCoE range of 0.24-0.72 $/kWh (for power plants and residential and for 1000 - 2000 kWh/kWp per year) for 2008. This can be translated to 2010 levels: typically 0.20-0.60 or something similar. I expect, though, that the ranges for a few other technologies may wider than suggested here (if one includes the whole application range, like in PV).	figure will be revised based on technology chapters
Andreas Fischlin (Systems Ecology, IBZ, ETH Zurich)	SPM	21	23	21	30	-	SPM 7	-	This graph is quite incomplete and may not give an adequate picture of the situation. Solar thermal production including OTEC are AFAI can see not covered or not well covered and may change the overall impression readers get from this graph. I recommend to consider this and possibly extend the graph accordingly.	these technologies are to specific
Emmanuel Branche (Electricité de France)	SPM	21	-	21	-	-	SPM 7	-	What are the assumptions (coal price, gas price, etc.) used for conventional technologies (e.g. shaded area) ? 140 USD/MWh is very high with a carbon price of only 30 USD/tCO2 ! What is the reference year for those scenarios (is the cost in USD 2005 ?) WEO2009 provides cost for 2020, with a CO2 de 50$/tCO2, nuclear= 75$/MWh, coal= 95$, and CCGT = $90 (page 228, IEA WEO 2009). Proposition also to add "uc$/kWh" in the figure	conventional technology comparison deleted
¿vind Christophersen (Climate and Pollution Agency)	SPM	21	-	-	-	-	SPM 7	SPM5	"PV roof" is placed at customer. There is hence no associated distribution transmission/distribution cost. Makes the comparison more favourable than it appears from the figure/table. Should be commented.	Table removed from SPM FD
Manfred Treber (Germanwatch e.V.)	SPM	21	-	-	-	-	SPM .7	-	On the x-axis the unit (probably US-cents /kWh) is missing	X-axis label included on LCOE figure inserted into FGD text.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	21	-	-	-	-	SPM 7	-	Different values than in table SPM 5	SPM 7 is based on additional (IEA) data sources
Canada (Environment Canada)	SPM	21	-	21	-	-	SPM 7	-	Figure requires labelling.	Accepted.
United Kingdom (Department of Energy and Climate Change)	SPM	21	-	-	-	-	SPM 7	-	Need to ensure that the reference for this figure is to a really respected source as relative LCOE figures nearly always stimulate 'lively debate'	will be done based on technology chapters
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	21	-	-	-	-	SPM 7	-	what units?	Accepted.
Canada (Environment Canada)	SPM	21	-	23	-	-	SPM 7	SPM5	There is inconsistency between units on these three pages: US$/kWh vs US$/MWh vs UScent/kWh	Table removed from SPM FD

Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table Info	Comments	Consideration by the writing team
United Kingdom (Department of Energy and Climate Change)	SPM	21	23	-	-	Renewable energy technologies	-	-	Higher levelised costs of energy for renewable energy technologies may be true for large scale projects but not for small scale domestic, or community scale projects.	Accepted. More emphasis will be put on how the LCOE of non-renewable alternatives are affected by local conditions. The changes to the statement will more accurately reflect the nature of the non-renewable benchmark it refers to as well as the conditions under which it appears appropriate.
United Kingdom (Department of Energy and Climate Change)	SPM	21	23	-	-	Renewable energy technologies	-	-	This section is not sufficiently nuanced as it does not have a sensitivity analysis that would define the boundaries of where the statement it is making holds true.	Accepted: In fact, the section on LCOE does emphasize that there are a variety of factors affecting the attractiveness of a particular renewable energy technology in comparison with alternatives. It explicitly mentions i.a. regional differences in resource quality, infrastructure, and particular cost components. However, a sensitivity analysis will be added in the body of the report where appropriate and a reference to these more detailed cost assessments will be added to the SPM
China (China Meteorological Administration)	SPM	22	12	22	13	5	-	-	Since cost of biofuel heavily depends on the feedstock cost, and feedstock price in future is uncertain, it is suggested to change "The costs of energy generated by renewable energy technologies have declined over time and are expected to decline further" into "The production costs of energy generated by renewable energy technologies have declined over time and they are expected to decline further".	Noted.
¿vind Christophersen (Climate and Pollution Agency)	SPM	22	12	23	39	5	-	-	The description of the cost development of the different technologies could be written in a more comparable way. This would be helpful for the Policy Makers	Accepted.
Richard Taylor (International Hydropower Association)	SPM	22	-	-	-	5	-	SPM 5	Define the term ""Learning Rate""	Definition now included in glossary.
¿vind Christophersen (Climate and Pollution Agency)	SPM	22	-	22	-	5	-	SPM 5	Does "LCOE at 3 %" mean levelized costs at 3 % interest rate? Explain	Yes, though table deleted from SPM in FD.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Australia (0)	SPM	22	-	-	-	5	-	SPM5	LCOE comparisons should stand alone to enable comparisons, as: -policy interventions in LCOE artificially disorts prices from market to market, better to eliminate policy interventions to enable clear comparisons; -if policy makers know the 'stripped-out' LCOE of specific RE technologies they can make a judgement on which are suitable in a particular circumstance in the context of cost reductions over time and determine a required carbon price for that technology to accelerate market deployment.	Table deleted from SPM FD.
Frank Mastiaux (EON Climate & Renewables)	SPM	22	-	22	-	-	-	5	Offshore cost seem to be fairly understimated (for comparison: german tariffs covers about 20 cent7kWh excluding grid connection)	The commenter should review our assumptions on capital cost, O&M, and performance, on which these resultant LCOE's derive. We will review our input assumptions again, but they appear to present a reasonable range. Note also that the figure that we present are in 2005$, and in real dollar terms, which make comparisons to the existing German tariff rather complex; in addition, we use relatively low discount rates as established by cross-chapter IPCC guidelines, and we base our estimates on recently completed projects. We will make it clear that our figures are based on existing projects, and may not apply to future projects that may have different characteristics. We may also add a footnote noting that our figures are based on cost, not feed-in tariffs.
Frank Mastiaux (EON Climate & Renewables)	SPM	22	-	-	-	-	-	5	What does the table add versus figure 7? The % fir LCOE´s is not explained	Table removed from SPM FD
¿vind Christophersen (Climate and Pollution Agency)	SPM	22	12	-	-	-	-	-	Change "energy generated by renewable energy technologies" to "renewable energy"	Accepted.
Canada (Environment Canada)	SPM	22	14	22	16	-	-	-	International technology partnerships could also be included as a driver of technology advancement.	Accepted. Authors recognize additional drivers and therefore have reworded sentence to better reflect additional drivers.
Japan (the Japanese Ministry of Foreign Affairs)	SPM	22	12	-	14	-	-	-	It should also be noted that theoretical efficiency issues and constraints in production technology can hinder further cost reductions at a certain point. Cost reductions are sometimes supported by investments in R&D as stated in Line 18 on Page 59 of Chapter 10.	Noted, though may be too detailed for SPM text.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
massimo tavoni (FEEM and CMCC)	SPM	22	16	-	-	-	-	-	Lately, experience curves have been subject to considerable criticism, especially when used for projecting the evolution of technologies forward in time. For example, in a recent paper William Nordhaus has questioned the statistical validity of learning curves.	Noted.
Japan (the Japanese Ministry of Foreign Affairs)	SPM	22	22	23	2	-	-	-	Not only does the sentence contradict with Chapter 2 Page 49 Line 4-6, it is also unclear what its means by "smaller scale biogas". Considering regional possibilities of limited access to biomass resources and environmental impact, the circumstances for such successful application should be describe.	Sentence has been removed from text in rewrite. In Ch2 main text we report one attempt that failled.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	22	4	22	4	-	-	-	O&M is not a well known acronym. I suggest to replace "O&M cost" by " Operation and Maintenance Costs (O&M cost){footnote X}", where the text for this footnote could be: "Operation and maintenance (O&M) costs may constitute a sizeable share of the total annual costs. For a new windturbine, O&M costs may be up 20-25% of the total levelised cost per kWh produced over the lifetime of the turbine. O&M costs consist of insurance, regular maintenance, repair, spare parts, and administration."{http://www.wind-energy-the-facts.org/en/part-3-economics-of-wind-power/chapter-1-cost-of-on-land-wind-power/operation-and-maintenance-costs-of-wind-generated-power.html}	Table and footnotes removed from SPM FD
Chile (CONAMA)	SPM	22	-	23	-	-	-	-	Regarding the costs of technologies associated to each type of renewable energy, an effort to unify the units is recommended to facilitate comparison among them; sometimes they are given in euro / MWh others in U.S. $ / MWh, and U.S. $ / Barel. (Comment by Maritza Jadrijevic)	Rewritten for SPM FD - all cost information has been compiled in a Figure that allows comparability across technologies.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	22	14	-	-	-	-	-	replace "as" with "while"	Relevant text deleted in rewrite.
Gunnar Luderer (Potsdam Institute for Climate Impact Research)	SPM	22	12	23	39	-	-	-	The cost information given in this section is very valuable. It would serve nicely as a basis for a figure depicting current costs and future cost reduction potential, or could alternatively be integrated in Fig SPM 7.	Accepted. Learning curve figures introduced in SPM FD.
Taishi Sugiyama (Central Research Institute of Electric Power Industry (CRIEPI))	SPM	22	12	22	14	-	-	-	The RE costs may decrease, hopefully. However, you have to mention that the future of costs are highly specularive. Furthermore, the integration costs of RE to energy systems increase as RE penetrates more. There is no guarantee that RE is getting cheaper. Learning curve is NOT realiabe tool for future cost projection.	Text does not claim guarantee that RE will decrease .
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	22	17	227	18	-	-	-	The sentence makes it sound as if cost reductions directly allow GHG reductions; the intermediate step of lowering costs allowing for greater deplyment of RE should be made more explicit.	Reworded for SPM FD

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Nico Bauer (Potsdam Institute for Climate Impact Research)	SPM	22	16	-	-	-	-	-	The term learning rate is not introduced previsouly.	Noted.
United Kingdom (Department of Energy and Climate Change)	SPM	22	-	23	-	-	-	-	This is another section where the reader should be able to compare the different technologies more systematically. If each technology's paragraph were formatted in the same consistent way, it would be much easier for comparisons to be made. This might be easier if the qualitative statements (such as those in the hydropower section) were turned into quantitative statements with percentages and other numerical data, as is the case for some of the other technologies. Each section should have exactly the same information.	Rewritten for SPM FD to remove detailed technology paragraphs and facilitate comparability across technologies simply with a figure of costs.
Modesto Fernandez Diaz-Silveira (Ministry of Science, Technology and Environment)	SPM	22	22	-	-	-	-	-	To include text, after ...at a competitive prices.: "Although those prices are lower from the point of view of energy production, biofuel production increased the costs of cereals and all food crops for human consumption, something that should be considered when making decisions in this way"	There is no consensus that bioenergy increased the cost of food. At most we can state that bioenergy may increase....
Emmanuel Branche (Electricité de France)	SPM	22	-	22	-	-	-	SPM 5	Figures/values presented with a discount rate of 10% are not consistent with the figure SPM7 (wind, hydro, CSP).	Accepted. Data corrected for consistency.
Gian-Kasper Plattner (IPCC WGI TSU, University of Bern)	SPM	22	-	-	-	-	-	SPM 5	some of the abbreviations are not given in the table legend (PV, CSP) or are given in the legend, but not introduced (O&M costs). Explicitly define abbreviation LCOE (Levelized Cost of Energy) in header or legend.	Table deleted from SPM FD.
Several experts 0 (Ministry of the Indutry, Tourism and Trade)	SPM	22	-	-	-	-	-	SPM 5	The information of the table is useful. However it would be very interesting to complete it with similar figures for fossil fuels and nuclear sources	Table deleted from SPM FD.
Wim Sinke (Energy research Centre of the Netherlands (ECN))	SPM	22	-	-	-	-	-	SPM 5	Without explicit information on the values of all (hidden) parameters used, this tabel is not useful. Discount rate is just one!	Table deleted from SPM FD.
United Kingdom (Department of Energy and Climate Change)	SPM	22	-	-	-	-	-	SPM 5.	Where are this data for this table coming from, and will the reader take the time to interpret this table? As it stands, the table is not an effective tool allowing the reader to understand where investments should be made to bring about the most beneficial outcome in the most cost-effective manner. This appears to be a table where the authors have not fully thought through how investment decisions on energy technologies are taken.	Table deleted from SPM FD.
United Kingdom (Department of Energy and Climate Change)	SPM	22	-	-	-	-	-	SPM5	Cost data for PV with concentration does not appear to be included	Table deleted from SPM FD.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	22	-	-	-	-	-	SPM5	Different values than in fig SPM 7	Accepted. Data corrected for consistency.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	22	1	22	1	-	-	SPM5	I note that n.a. here probably means not available, and not as more usual not applicable. I suggest to write it out.	Table removed from SPM FD
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	22	1	22	1	-	-	SPM5	I think this table would be more informative when for reference a fossil fuel (such as coal or natural gas) would be added.	Table removed from SPM FD
Sweden (Swedish Environmental Protection Agency)	SPM	22	-	-	-	-	-	SPM5	It needs to spelled out here what the costs include in terms of infrastructure. For instance, in the case of offshore wind, does the cost include electric installation to the central grid onshore (this cost can often represent up to 20 percent out of total investment costs).	Table deleted from SPM FD.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	22	-	-	-	-	-	SPM5	It would be good to also show the LCOE of conventional sources at different discount rates.	Table deleted from SPM FD.
United Kingdom (Department of Energy and Climate Change)	SPM	22	-	-	-	-	-	SPM5	Most of these costs are location specific and the location factors that have been assumed should be included for reference.	Table deleted from SPM FD.
Canada (Environment Canada)	SPM	22	-	-	-	-	-	SPM5	Table SPM5 is very technical and is difficult for a non-specialized audience to understand. Suggest including further description and definition of terms (e.g., "learning rate") to accompany the table or removing the table from the SPM while elaborating on its main conclusions in the preceding paragraph.	Table deleted from SPM FD.
United Kingdom (Department of Energy and Climate Change)	SPM	23	4	23	5	-	-	-	Do we have a definition of a second generation biofuel? It is often a term that is not consistently applied. In addition there is often confusion as to how such terms apply when talking about biomass feedstocks or conversion processes	Included in the glossary
¿vind Christophersen (Climate and Pollution Agency)	SPM	23	5	23	5	5	-	-	does this include a certain carbon price ? In case, which?. If not, this should be specified.	Relevant text deleted in rewrite.
Gerrit Hansen (TSU)	SPM	23	6	-	10	-	-	-	information missing on solar thermal	Solar thermal costs have been added to LCOE cost comparison.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	23	6	23	10	-	-	-	The exclusive focus on modules (i.e. not turn-key system = modules + BoS) is undesirable and misleading, since low-cost PV electricity generation also requires low-cost BoS, low O&M, long lifetime, etc. This is far from trivial and needs more attention.	Sentences have been removed from text in rewrite.
Gunnar Luderer (Potsdam Institute for Climate Impact Research)	SPM	23	6	-	10	-	-	-	The section on solar energy should also provide ranges for long-term LCOE and/or investment cost estimates.	already included in table SPM 5

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
¿vind Christophersen (Climate and Pollution Agency)	SPM	23	11	23	11	5	-	-	Earlier the cost unit dollar or dollar cent/kWh has been used. The introduction of dollar per MWh makes comparison difficult. In the whole SPM a consequent use of one unit should be maintained. The same applies to line 28-29	Agree with common units for comparison
Ladislaus Rybach (Geowatt AG Zurich (company))	SPM	23	11	-	16	-	-	-	Capital cost of power generation (US$ per installed MWe) needs to be added here [4.7.4].	Carry in from Annex 3 which has US$/kWe (and make unit conversion)
United Kingdom (Department of Energy and Climate Change)	SPM	23	11	23	16	-	-	-	This is a section on geothermal which does not mention low enthalpy/heat pump applications.	Sentences have been removed from text in rewrite.
Richard Taylor (International Hydropower Association)	SPM	23	17	23	17	5	-	-	Add ""and already highly cost-efficient"" after ""mature"" and before ""technology""	Noted.
Gerrit Hansen (TSU)	SPM	23	17	-	22	-	-	-	information provided in footnote 7 does not appear in chapter 5 text. Please consider to amend the text of chapter 5 accordingly, and give a source for this information.	needs to be added in ch.5 (as a "personal communication from major manufacturers")
United Kingdom (Department of Energy and Climate Change)	SPM	23	17	23	22	-	-	-	The climate change text above also highlights a potentially greater role in water/flood management for hydro schemes.	valid point, but not relevant to this part of the text which deals with technical improvements. Will consider adding this in section 5.10 ot the main text
United Kingdom (Department of Energy and Climate Change)	SPM	23	23	23	32	-	-	-	Wording here could perhaps be made more clear (especially 1st two sentances)	Sentences have been removed from text in rewrite.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	23	28	2	29	-	-	-	These costs for wave and tidal are directly from a carbon trust study. They are in chapter 6, but it is important to be clear here in the SPM that they are forecasts specifically for early wave and tidal farms in the UK only. They are not longer term forecasts. Without giving a timeframe,location or installed capacity to give context it seems strange to just quote these figures here as a 'forecast'.	Sentence has been removed from text in rewrite.
¿vind Christophersen (Climate and Pollution Agency)	SPM	23	29	23	29	5	-	-	OTEC ?	Acronym now spelled out in text.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	23	29	23	31	-	-	-	OTEC is not a well known acronym. I suggest to replace "OTEC" by " Ocean thermal energy conversion (OTEC){footnote X}", where the text for this footnote could be: "Ocean thermal energy conversion (OTEC) uses the temperature difference that exists between deep and shallow waters to run a heat engine. The greatest efficiency and power is produced with the largest temperature difference, which is generally in the tropics."{wikipedia}	Acronym now spelled out in text. Full explanation of term appears in Ch 6.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	23	29	-	-	-	-	-	This OTEC cost range seems to just be one study (Cohen, 2009), it does not reflect the range of costs given in table 6.3	In revised draft cost information was taken from all studies that conformed to comparitive indicators.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	23	30	29	31	-	-	-	These salinity costs do not seem to match with anything in chapter 6 and contradict table 6.3 and section 6.7.5	Cost information in revised draft was taken strictly from Ch 6 references to assure consistency.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	23	31	-	-	-	-	-	Why only niche? Seems to contradict with the discussion in chapter 6 that some OECD countries are setting targets for ocean technologies to become a significant contributor to RE targets?	Sentence has been removed from text in rewrite.
United Kingdom (Department of Energy and Climate Change)	SPM	23	33	23	39	-	-	-	When it comes to off-shore wind systems there is scope for step change innovation.	The text indicates that "Even greater technical advancement possibilities", and thereby already notes the potential for greater advancements offshore. The cost reduction range, in percentage terms, presented later in the paragraph confirms this. The use of the term "even" perhaps minimizes those possibilities, however, so we will remove that term.
China (China Meteorological Administration)	SPM	24	1	25	12	5	-	-	The barriers section should be organized based on policy barriers not on RE technologies. The reason for that is simple, most RE technologies share the same policy barriers. The current text is not clear for policy makers to understand common barriers faced in RE technologies and has no direct linkage with policy section.	Rewritten for sPM FD; Section 7 how has comprehensive bullet on barriers and market failures. Technological barriers are discussed in detail here.
Australia (0)	SPM	24	1	24	2	-	-	-	Change to read "Technical and regulatory barriers, and market failures, will need to be addressed¿"	Sentence has been reworded to be specific about technological barriers here, as market failures and regulatory barriers are covered later in the SPM.
¿vind Christophersen (Climate and Pollution Agency)	SPM	24	1	24	2	-	-	-	The bold text should address the need for a	Comment incomplete.
United Kingdom (Department of Energy and Climate Change)	SPM	24	1	-	11	-	-	-	There is a need here to relate this discussion to policy instruments such as the Clean Development Mechanism, and to mention how the emerging Copenhagen Accord wil drive decisions in the commercial sphere that must in the end deliver on most of these technologies.	The interplay between policies targeting CO2 emission reduction and RE policies is now covered in Section 7.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
United Kingdom (Department of Energy and Climate Change)	SPM	24	1	25	12	-	-	-	There is no mention of whether markets have enough capital or manufacturing capacity to deploy these technologies. Some assessment is needed of the ability to deliver, or at least the degree to which investment capital and manufacturing and deployment capacity will need to be increased (2x, 10x, 100x?). Does the world currently offer the production capacity to deliver on these technologies, or will policy makers have to wait until those markets are more mature to deploy (e.g. do we have marine vessels capable of installing future off shore wind farms?).	Noted.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	24	1	24	12	-	-	-	Using the example of hydro power in this paragraph is not the best choice because there are not many technical and market barriers to its deployment, as mentioned in the text, it is more the case that it is approaching its technical potential in some regions, which is quite a different issue.	Sentence has been removed from text in rewrite.
Ladislaus Rybach (Geowatt AG Zurich (company))	SPM	24	2	-	3	-	-	-	The general remark on the chapter ¿Summary for Policymakers¿ about the difference between CO2 emission reduction and avoidance applies here too.	Specific nature of the interplay between RE and CO2 emissions is discussed in depth in Ch 1. Too detailed a discussion for the SPM.
Juan Jose Sanchez (Ministry of the Environment, and Rural and Marine Affairs)	SPM	24	5	-	-	-	-	-	It should say: ""Regionally, economic development, technology maturity and regulatory frameworks¿""	Sentence has been removed from text in rewrite.
United States (U.S. Department of State)	SPM	24	5	-	-	-	-	-	The sentence beginning "Regionally¿" is not true, at least not in the case of hydropower being limited in OECD countries -- there still remain significant opportunity to both develop new, undeveloped resources, especially at non-powered dams and small sites, and in improving the environmental performance of existing projects.	Sentence has been removed from text in rewrite.
Emmanuel Branche (Electricité de France)	SPM	24	7	24	7	-	-	-	Replace "exhausted" by "harnassed". Indeed the remaining potential is not equal to zero for OECD countries (ref chapter 10). Furthermore the term "exhausted" doesn't match with renewable definition ¿ according to me	Sentence has been removed from text in rewrite.
Manfred Orgis (Ministry of Environment)	SPM	24	10	24	11	-	-	-	The last sentence is to open and needs further specification. E.g. with regard to the specific RE technologies, integration into what? (the grid?), what kind of supply chain considerations? Limits in raw materials? Limits in production capacity? Lack of human resources? Lack of capital?	Sentence has been removed from text in rewrite.
United Kingdom (Department of Energy and Climate Change)	SPM	24	12	-	-	Renewable energy technologies	-	-	Discussion on market barriers should note the influence of lobbying efforts for fossil fuels on renewable energy policy, if any analysis of this has been done.	Market barriers are discussed to the extent possible in Section 7. Detailed discussions on leveling the playing field, etc. can be found in Ch 11.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Helmut Haberl (Institute of Social Ecology, Vienna)	SPM	24	13	24	23	-	-	-	I believe that this para should also discuss the interrelation between bioenergy volumes and GHG emissions per unit of bioenergy produced, as discussed in several comments above.	Paragraph reduced to one sentence in rewrite for space considerations. No additional room to include further discussions.
Brazil (Ministry of Science and Technology)	SPM	24	13	24	15	-	-	-	Many forms of bioenergy, such as domestic pellet based heating systems, sugar-cane ethanol and sugar-cane bagasse power generation are already cost competitive. Other technologies will be come economically viable in the near future. Therefore, the sentence in lines 13 to 15 should read as follows: ""Though sometimes still uncertain, competitiveness of biomass use for fuels and feedstock materials is expected to strongly improve over time, providing a push for biomass into energy markets in the short, medium and longer term"".	Relevant text deleted in rewrite.
Sampo Soimakallio (VTT Technical Research Centre of Finland)	SPM	24	13	24	23	-	-	-	Social concerns should be explicitly mentioned. Cf. Chapter 2, section 2.5.5, p. 73, lines 31-35.	Social and land-use concerns relevant to bioenergy highlighted in a Box in revised SPM.
Several experts 0 (Ministry of the Indutry, Tourism and Trade)	SPM	24	13	23	-	-	-	-	Standardization in the biofuel sector will be a major issue. International standards must be drafted on: fuel quality; sustainable production of biomass (these standards would establish the requirements for a certification scheme on sustainable production for biomass intended to energy uses)	Standards not discussed here!!!
United Kingdom (Department of Energy and Climate Change)	SPM	24	13	24	23	-	-	-	The text seems to me to underplay the fact that there is considerable scope to improve conversion technologies and hence increase the range of feedstocks and the efficiency with which they are converted to 'final useful energy form'	Paragraph reduced to one sentence in rewrite for space considerations. No additional room to include further discussions. In technology box, differing maturity levels are highlighted, which relates to these sentiments.
Andreas Fischlin (Systems Ecology, IBZ, ETH Zurich)	SPM	24	13	24	23	-	-	-	Very unbalanced paragraph seems to be entirely missing out on forestry aspects. See comments I made previously.	Add forestry when referring to agriculture
United Kingdom (Department of Energy and Climate Change)	SPM	24	15	-	17	-	-	-	We don't agree that all that well functioning sustainability frameworks are a precondition. Producing and processing biomass sustainabily is a precondition - there is little evidence that this will be achieved with sustainability frameworks or that these are an essential prerequisite. It is one possible method of addressing the issue, but its efficacy or effectiveness is far from proven.	It is an important condition for international trade.
Helmut Haberl (Institute of Social Ecology, Vienna)	SPM	24	17	-	-	-	-	-	Include after "developments": ", and use possible synergies between food and fuel production".	Food and fuel discussion now covered separately in a Box in Section SPM 5.
Modesto Fernandez Diaz-Silveira (Ministry of Science, Technology and Environment)	SPM	24	17	-	-	-	-	-	To include text, after ...and socioeconomic developments.: "Ethical considerations will be necessary, to ensure food demands from population, mainly from poor populations in developing countries, are not hampered by increasing biofuels production. Balance will be the key word for this use"	Social and land-use concerns relevant to bioenergy highlighted in a Box in revised SPM.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	SPM	24	24	24	30	-	-	-	A further obstacle to solar applications, not mentioned in the paragraph, is the long lifetime of buildings. For instance in the case of Europe and Japan, construction of new buildings is declining to very low figures, posing a big problem for the deployement of solar systems.	Paragraph reduced to one sentence in rewrite for space considerations. No additional room to include further discussions.
Gerrit Hansen (TSU)	SPM	24	24	-	30	-	-	-	decentralized solar energy is not mentioned in 3.9, but only very short in 3.5.2. Equally, the term "spatial planning" does not appear throughout the text of chapter 3. Discussion on both issues appears weak in chapter 3. SPM statements need to be clearly justied by chapter text.	Paragraph reduced to one sentence. All efforts made to assure consistency with underlying text.
Juan Jose Sanchez (Ministry of the Environment, and Rural and Marine Affairs)	SPM	24	24	24	30	-	-	-	One key element for the large-scale deployment of direct solar energy could be harnessing the potential from deserts to supply large neighbour regions with less solar resources. In this regard, current lack of adequate infrastrutures is one of the main barriers.	Paragraph reduced to one sentence in rewrite for space considerations. No additional room to include further discussions.
Supachai Panitchpakdi (United Nations Conference on Trade and Development)	SPM	24	24	24	30	-	-	-	The argument is made that "regulatory and institutional barriers can also impede deployment, particularly for smaller, decentralized solar energy systems; to widely implement decentralized solar electricity, a different paradigm for electric system infrastructure may be needed". First, this correctly flagged paradigm shift for electric system infrastructure also concerns wind, and to some extent bioenergy. Second, current concentrated market structures may favour larger projects over more decentralized solutions.	text on decentralized systems deleted - replaced with more generalized text.
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	SPM	24	27	-	-	-	-	-	Delete the sentence below; "Regulatory and institutional barriers can also impede deployment, particularly for smaller, decentralized solar energy systems; to widely implement decentralised solar electricity, a different paradigm for electric system infrastructure may be needed." <reason> It is not unclear the meaning of ¿Regulatory and institutional barriers¿. There is no description in the body.	Full discussion on different types of barriers appears in Chapter 1.
United Kingdom (Department of Energy and Climate Change)	SPM	24	28	35	29	-	-	-	Discussing a different paradigm for electric system infrastructure without mentioning the differences uses words without assisting the reader to understand; suggest that this element is cut.	Accepted.
Taishi Sugiyama (Central Research Institute of Electric Power Industry (CRIEPI))	SPM	24	35	24	35	-	-	-	Spell out EGS - it is unfamilier to many readers.	Acronym spelled out in text. Full definition can be found in Ch 4.
Atle Harby (SINTEF Energy Research)	SPM	24	40	24	46	-	-	-	I suggest to include "multi-purpose reservoirs including hydropower production" as a solution to meet some of the barrieres related to environmental and social concerns, i.e. combined benefits from creating a reservoir. Markets for peak load and balancing services may be increased and opening up more potential for hydro.	No, it's a possibility among others, and cannot be highlighted as THE solution (or all other improvements / possibilities as described in ch 5 should also be listed here)

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
¿vind Christophersen (Climate and Pollution Agency)	SPM	24	40	24	41	-	-	-	Include information about how lagre part of the total energy production this will imply. Rationale: to make the text cocistent with the wind energy text at page 25.	indicate that the potential is 3 to 5 times the existing generation. Make sure it is consistent with ch 5 and 10. Provide a range of percentage of the total in 2050 (based for instance on IEA estmates of the total)
Gerrit Hansen (TSU)	SPM	24	40	-	46	-	-	-	statement does not conincide with the overall figures from chapter 5.9. Scenarios consistently report lower figures, though the technical potential is higher. the "realistic sustainable potential" portrayed in Fig. 5.30 and seems to be cited here is not justified by proper analysis within the chapter.	More work is needed in order to ensure consistency of the various figures put forward regarding potentials (also re to comment 387/360)
Richard Taylor (International Hydropower Association)	SPM	24	41	24	41	5	-	-	Add ""to 3000 GW"" after ""supply""	this suggestion will be dealt with (in TWh not GW) in consistency with dealing with comment 387/360
¿vind Christophersen (Climate and Pollution Agency)	SPM	24	42	24	45	-	-	-	Change text to: "Since some new hydropower projects may be controversial and environmental and social concerns may limit growth; benefits therefore exist in further developing sustainability assessment tools for hydropower.¿ Rationale: Consistency with the text for other energy sources (which also can be controversial) where the text is more related to how the limitations can be handled. Rationale: Consitency with the text for other energy sources (which also can be controversial) where the text is more reated to how the limitetions can be handled.	"Since some new hydropower projects may be controversial and environmental and social concerns may limit growth, benefits exist in further developing sustainability assessment tools for hydropower"
United States (U.S. Department of State)	SPM	24	43	-	-	-	-	-	insert after "limited growth": ", at least for some types of large, single-purpose projects."	concerns are not necessarly linked to the size or purpose (single or multiple) of the project
United States (U.S. Department of State)	SPM	24	45	-	-	-	-	-	insert after "projects": "and in demonstration of the more advanced, environmentally compatible technologies to gain understanding and acceptance for them."	does not add sufficient information to justify increasing length of the sentence
Kristie Ebi (Department of Global Ecology)	SPM	24	-	-	-	3	-	3	Odd that odor is highlighted as a possible health risks of hydropower. Dams are well known to increase rates of vectorborne and infectious diseases.	the comment doess not call for any change
Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	SPM	24	-	-	-	-	-	-	There could be a mention here that the market is in general not a fair playing field, as the externalities of fossil fuel used are not correctly translated to the market (e.g. there is no consensual value for GHG emission impacts). So - at least transitorily - this bias must be overcome with taxes and subsidies. Although such issues are addressed in p.28, they are in a different context; I believe some short mention at this point would still be worthwhile.	Accepted. Mentioned in Section SPM 7.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
United Kingdom (Department of Energy and Climate Change)	SPM	25	5	-	8	-	-	-	Does the 20% mentioned here take into account that transportation, residences, etc. will most likely be electrified by 2050,significantly increasing elecrticity demand?	This figure derives, ultimately, from the review of the scenarios literature provided in chapter 10, so chapter 10 is in the best position to address this specific issue; it is also a level of detail too far for this portion of the SPM. However, we should add text indicating that the 20% does loosely come from the scenarios literature, so that this is clear to the reader.
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	SPM	25	6	25	7	-	-	-	As global wind capacity doubles all three years 20% of total electricity supply will be reached before 2030. Denmark needed only 25 years to boost wind energy from 0% to about 20% of national electricity demand.	While we agree with elements of this comment, the 20% figure is not a cap: we mention "reach or exceed". The 20% figure comes from our review of the GHG mitigation literature, which accounts for other mitigation technologies, feedbacks, and other complexities. We do not believe that literature support a more aggressive statement here in terms of global deployment possibilities.
¿vind Christophersen (Climate and Pollution Agency)	SPM	25	6	25	6	-	-	-	Include the word potentially " could potentially reach"	Accepted.
¿vind Christophersen (Climate and Pollution Agency)	SPM	25	8	25	12	-	-	-	Change text to: " Achieving this level of wind energy supply would likely require not only economic support policies of adequate size and predictability, regional expansion, increased reliance on off-shore wind energy in some regions, technical and institutional solutions to transmission constraints and combination with other energy sources to compensate the wind variability, and proactive efforts to manage the social and environmental concerns associated with wind energy deployment. Since some new wind power projects especially onshore and near coast offshore may be controversial and concerns may limit growth; benefits therefore exist in further developing sustainability assessment tools for location of wind power projects. ¿ Rationale: The variability in wind energy production should be mentioned explicitly, and the text made consistent with the text for hydro energy sources and some of the words could be deleted in the existing sentence.	The current text focuses on the range of challenges that would face wind deployment at 20%. Siting / land use is only one of those concerns, and wind has other concerns that differ and are more severe than for hydropower. As such, we do not wish to overemphasize one concern (siting/land use/environmental) over other important challenges. We prefer to keep the listing as it stands, as that approach places all of the concerns on equal footing. Additionally, an earlier section addressed environmental and social concerns of wind more specifically.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
¿vind Christophersen (Climate and Pollution Agency)	SPM	25	8	25	12	-	-	-	This sentence is too long, try to shorten or split it.	Accepted.
China (China Meteorological Administration)	SPM	25	14	25	17	6	-	-	The first sentence should be changed into "In order to stabilize the concentration of GHGs in the atmosphere" which is consistent with AR4. There is no reference to a single stabilization level in AR4.	Agree
Taishi Sugiyama (Central Research Institute of Electric Power Industry (CRIEPI))	SPM	25	14	25	17	-	-	-	Delete this paragraph - it is untrue. You can develop nuclear and CCS instead of RE.	Accepted. Reworded to include a portfolio of low carbon technologies.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	25	14	25	16	-	-	-	In this sentence the verb "displace" is a bit strange. Why not stick to the usual "substitute".	Standard terminology
Japan (the Japanese Ministry of Foreign Affairs)	SPM	25	14	25	17	-	-	-	It is misleading to only refer to the 450ppm scenario. The deployment rate may differ according to the different stabilization scenario, so this part should refer to these differences. Also, there should be more discriptoin of whether these scenarios are economically feasible. The reference to the cost in the SPM is too simple.	Will try to amend the diagram to include other scenarios. 450 ppm was the accepted target at Copenhagen so is Ok to use here as is also in the IEA referenced scenario. Costs are included in Chapter 10.
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	SPM	25	14	-	26	-	-	-	This sentence in not at all related to Figure SPM 8. SPM 8 is a nice figure but it is not on integration of RE into the grid. Moreover it would be better to show the development of the electricity sector (and not the primary energy), as here the grid question emerges.	Not only electricity - is all renewable energy
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	SPM	25	16	-	17	6	-	-	This sentence is strange: It needs a doubling of the annual deployment rate of all RE in order to integrate RE into the grid? Do you mean deployment of grids?	Amended
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	SPM	25	28	25	32	-	-	-	Delete "as well as competition from other low-carbon technologies (including nuclear and carbon dioxide capture and storage) ", and amend the sentence as follows; "Increased RE penetration through integration into existing energy systems is technically feasible in most regions, but reaching much higher levels than today could be constrained by cost, lack of infrastructure investment, societal acceptance, appropriate policy framing and lack of trained personnel." <reason> It does not make sense to take up other technology as obstructive factor of introducing RE..	Has to be oput in context. Changed to "low C technologies"

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Brazil (Ministry of Science and Technology)	SPM	25	28	25	30	-	-	-	Facilitation of international trade is important for fostering the deployment of bionenergy, as recognised in SPM pg. 24, line 20. Therefore, the sentence starting in line 28 of page 25 should read as follows: ""Increased RE penetration through integration into existing energy systems is technically feasible in most regions, but reaching much higher levels than today could be constrained by cost, trade barriers¿""	Text amended
Arthur Lee (Chevron Corporation)	SPM	25	28	-	32	-	-	-	Increased RE penetration through integration into existing energy systems is technically feasible in most regions, but reaching much higher levels than today could be constrained by cost, lack of infrastructure investment, societal acceptance, appropriate policy framing and lack of trained personnel as well as competition from other low-carbon technologies (including nuclear and carbon dioxide capture and storage)."" This statement sets up renewable energy as competing with CCS and nuclear energy in a tone that appears to be unhelpful. It is important to note that a portfolio of energy technologies are projected to be needed. Further, CCS and nuclear also have to have lower costs, need infrastructure, and need trained personnel to design, implement, and construct them. I suggest a different tone like the following. ""Increased RE penetration through integration into existing energy systems is technically feasible in most regions, but reaching much higher levels than today could be constrained by cost, lack of infrastructure investment, societal acceptance, appropriate policy framing and lack of trained personnel. Other low carbon technologies (including nuclear and carbon dioxide capture and storage) have also been projected to be part of future energy portfolios at different proportions, though they also face similar constraints of cost, lack of infrastructure investment, societal acceptance, and appropriate policy framing and lack of trained personnel.¿	Agree. Text amended
United Kingdom (Department of Energy and Climate Change)	SPM	25	28	25	32	-	-	-	Need to be careful about using the word competition here. There are many commentators who see a low carbon energy system as having a balanced mix of renewable, nuclear and fossil with CCS plant. Such hybrid systems are argued to give high resilience etc. (i.e. they are complementary technologies just as much as competing ones)	Phrasing has been removed from text.
Keigo Akimoto (Research Institute of Innovative Technology for the Earth (RITE))	SPM	25	28	25	32	-	-	-	The described barriers of increase in RE penetration may be correct. However, some of them will not only for RE, but also for many of the new technologies. Deeper insights will be needed instead of such a general description.	Not useful for SPM
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	25	28	25	32	-	-	-	There is a small typo here as the reference "[8.1]" is before the stop, while everywhere else in the SPM references are after the stop.	Accepted.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Taishi Sugiyama (Central Research Institute of Electric Power Industry (CRIEPI))	SPM	25	28	25	32	-	-	-	You must address costs, intermittency, and stability of supply in the first place. These three are the key barries of RE.	Agree
Gunnar Luderer (Potsdam Institute for Climate Impact Research)	SPM	25	-	27	-	6.	-	-	This section on integration is a very important one. It could, however, present the issue in a much more clear and structured way by systematically exploring (a) technology pathways for producing the various kinds of secondary energy carriers from RE, and (b) ways of using RE-rich SE in end-use sectors. From this paragraph a clear perspective should emerge about how RE can contribute to the decarbonization ot the buildings, transport, and industy end use sectors.	Included in chapter text and partly covered in spm
Australia (0)	SPM	25	-	27	-	-	-	-	Electric vehicles should be mentioned as a potential key enabler for integration of renewable energy due to their potential for storage	Covered in 8.3.1
Finland (Finniah Meteorological Institute)	SPM	25	-	-	-	-	SPM 8	-	Please increase the size of the legends of renewable and non-renewable (the box in the upper right corner)	To be redrawn by graphic designer
United Kingdom (Department of Energy and Climate Change)	SPM	25	-	-	-	-	SPM 8.	-	This graph doesn't do a very good job of showing the progress that is needed to meet targets. The values for renewables seem much too low.	Taken from reference. Comment made on post 2030
Antoine BONDUELLE (E&E Consultant)	SPM	25	-	-	-	-	SPM 8	-	As suggested by authors, figure SPM8 could include a broder range of studies to avoid using WEO data only. Maybe bars (with absolute values) would be preferrable to these ""cakes"" that can be misleading.	Trying to amend to cover range of scenarios if possible
Canada (Environment Canada)	SPM	25	-	-	-	-	SPM 8	-	Suggest that notes of explanation for this diagram be included or summarized here, in particular to explain the relatively small increase in global energy consumption from 2007 to 2030 and the method for calculating RE shares for 2030.	These details contained in reference
¿vind Christophersen (Climate and Pollution Agency)	SPM	26	4	26	8	6	-	-	The meaning of this paragraph seems not clear; it seem to state that the competition between the different RE systems will hemper the deployment of the different technologies. Unclears is wether this will hemper the total deployment of RE. Could this be clearified?	Relevant text deleted in rewrite.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Arthur Lee (Chevron Corporation)	SPM	26	4	-	8	-	-	-	However, competition between RE systems to meet local and regional energy demands could reduce the future deployment potential for any single technology (for example, transport powered by either liquid biofuels, biomethane, hydrogen or electricity [8.3.1], or heating/cooling demands being met by bioenergy, solar thermal or ground source heat pumps installed in buildings competing with district heating schemes or electricity. [8.2.2]"" This statement in the SPM at first impression appears innocuous, but on deeper analysis and reviewing chapter 8, section 8.3.1 and 8.2.2, the statement is fraught with problems. While at first it seems to make sense that RE system could compete with each other, what are the criteria for assessing that the potential of one RE system would be reduced by the deployment of another RE system? I do not find any criteria or see any references in 8.3.1 that discuss that. This statement is also value-laden and sets a tone where one RE technology would compete with another, not necessarily for growth, but for some existing market (""cannibalizing"" share of some market). Projections by the IEA and IPCC all show the need for greater capacities for different RE systems as energy demand increases. There is simply insufficient data and criteria (or, in fact, none) in 8.3.1 and 8.2.2 to justify this statement.	Relevant text deleted in rewrite.
United Kingdom (Department of Energy and Climate Change)	SPM	26	4	-	8	-	-	-	Might be worth mentioning here that with bioenergy there may also be competition between different demand sectors for use of the same resource e.g. for heat and electricity and possibly in future for transport fuel.	Noted.
United Kingdom (Department of Energy and Climate Change)	SPM	26	4	26	11	-	-	-	Wrapped up in these two paragraphs appear to be assumptions regarding the relative roles of centralised and decentralised energy systems. The danger is that if you assume a centralised system (which this text seems to) you miss out on the fact that when you have scattered or low demand (e.g. due to local population density) then this assumption may push you away from arriving at the least carbon or cost solution	Relevant text deleted in rewrite.
¿vind Christophersen (Climate and Pollution Agency)	SPM	26	5	26	8	-	-	-	Suggest to end the sentence after "any single technology", and remove the parenthesis around the last sentence.	Relevant text deleted in rewrite.
¿vind Christophersen (Climate and Pollution Agency)	SPM	26	5	-	8	-	-	-	Suggest to replace the bracket with full stop and make a full sentence out of the next passage.	Relevant text deleted in rewrite.
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	SPM	26	11	26	11	8.3	-	-	This is applicable only to very limited area (e.g., remote communities and islands).	Relevant text deleted in rewrite.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
United Kingdom (Department of Energy and Climate Change)	SPM	26	12	37	13	-	-	-	This statement about buildings integrated RE technologies needs to be qualified; the author should explain the circumstances where RE energy density is so much higher than energy use that it is economic to build a distribution system to capture energy from buildings and export it for industrial use.	Reworded
¿vind Christophersen (Climate and Pollution Agency)	SPM	26	14	26	18	-	-	-	Too long parenthesis make this sentence a bit complicated. Try to split up, remove parenthesis, and state clearly the reference to the figure.	Reworded
Jänicke Martin (Environmental Policy Research Centre)	SPM	26	24	-	28	-	-	-	This is very difficult to read!	Rewritten
United Kingdom (Department of Energy and Climate Change)	SPM	26	29	37	35	-	-	-	CSP is only dispatchable from the molten salt store; any energy supply is dispatchable if there is a store; this is a misleading statement. This whole paragraph touches on an important subject that deserves a better explanation of the issues. As it stands this paragraph does not discuss the issues while implying that they can be easily managed.	Revised to clearly present RE electricity integration issues and challenges.
Emmanuel Branche (Electricité de France)	SPM	26	29	26	29	-	-	-	Proposition to harmonise the term controllable/dispatchable for non variable RE technologies	Noted.
Antoine BONDUELLE (E&E Consultant)	SPM	26	29	26	35	-	-	-	This segment is much more pessimistic that the content of the relevant chapter.	Text on electricity integration completely revised. Consistency with underlying text assured.
Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	SPM	26	29	27	6	-	-	-	To have very high penetration rates, in addition to the factors explained in the first paragraph, there is also a need for (large) energy storage, such as reverse pumping to dams, or other new techs. This seems to be addressed in the following paragraph but anyway not having storage capacity may lead to having to discard RE energy even in large grids.	Text on electricity integration completely revised. Storage presented in a portfolio of possible solutions.
Juan Jose Sanchez (Ministry of the Environment, and Rural and Marine Affairs)	SPM	26	29	-	-	-	-	-	variable sources should incluide other such as run-off river hydro and solar thermal electric without storage	More comprehensive details on variability profiles of technologies now provided in Box SPM1. Several technology examples are provided in relevant revised text in this section..
Steve Sawyer (Global Wind Energy Council)	SPM	26	30	26	30	6	-	-	should read, "¿hydro, bioenergy, CSP with storage, and geothermal)	More comprehensive details on variability profiles of technologies now provided in Box SPM1. Several technology examples are provided in relevant revised text in this section..

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	SPM	26	30	26	33	-	-	-	Displace "that integrating large shares (>20%) of variable sources" for "that integrating variable sources." <reason> Original sentence seems to imply misleadingly that no specific effort is required to integrate less than 20% shares of wind. Countermeasures to integrate variable sources can be diverse in terms of types and amount, and then universal facts can not be confirmed through experiences of limited countries or areas.	Relevant text deleted in rewrite.
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	SPM	26	30	26	33	-	-	-	Proposed altered text: "Experience from managing wind penetration in some countries confirms that integrating large shares (>20%) of variable sources in existing power supply systems requires designing a more flexible and intelligent mix of generation, storage and demand response technologies and corresponding dispatch methods (aided by short-term forecasts and real-time grid management)." Comment: "Grids"(cables, transformers, etc.) cannot be "flexible" or "intelligent". Alternatively, one could speak about flexible and intelligent operation of grids - in technical terms this means real-time management (dynamic rating of lines, dynamic voltage/VAr-regulation, etc.).	Relevant text deleted in rewrite.
Juan Jose Sanchez (Ministry of the Environment, and Rural and Marine Affairs)	SPM	26	31	26	33	-	-	-	This sentence establishes that a large share of variable renewable electricity is >20%, and then says that to achieve larger shares, a more flexible and intelligent grid is required. However, I think that the term ""large share"" here, is relative, and would depend on the size of the relevant market. If a market is poorly interconnected, even with much lower shares of variable renewable electricity than 20%, the system should be much more flexible and intelligent than conventional systems. Spain, for example, achieved in 2009 a share of wind penetration of around 12%. For achieving such a level, Spain has made great efforts in re-designing its system to enhance its flexibility and intelligence, including first-of-its-kind solutions like the CECRE (Control Centre for Renewable Energy) and others, which are considered a best practice world wide.	Relevant text deleted in rewrite.
Richard Taylor (International Hydropower Association)	SPM	26	33	26	33	6	-	-	Add ""and storage"" after ""generation"" and before ""technologies""	Relevant text deleted in rewrite.
¿vind Christophersen (Climate and Pollution Agency)	SPM	26	34	26	35	6	-	-	the meaning of the sentence-part "therefor avoiding possible increased system operating costs" in the context of the whole sentence seems unclear. Maybe the sentence is not necesssary?	Relevant text deleted in rewrite.
¿vind Christophersen (Climate and Pollution Agency)	SPM	26	-	-	-	-	SPM 9	-	Please highlight in the text the need/benefit of this figure. Also th arrow to the far right should probably not be an error but an end product.	Revised

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
United Kingdom (Department of Energy and Climate Change)	SPM	26	-	-	-	-	SPM 9.	-	This figure's meaning is hard to interpret. The preceding text is much more clear.	Revised
Supachai Panitchpakdi (United Nations Conference on Trade and Development)	SPM	27	1	27	6	-	-	-	Beyond increasing grid infrastructure in a given country, the forging of regional grid / electricity planning may allow for greater usage of RE potential in a particular country (especially developing countries).	A more comprehensive portfolio of solutions presented in revised text, though considering tight text constraints..
Juan Jose Sanchez (Ministry of the Environment, and Rural and Marine Affairs)	SPM	27	1	27	4	-	-	-	I would include too other solutions like: real-time monitoring mechanisms or grid codes (i.e. system ancilliary services by wind installations)	A more comprehensive portfolio of solutions presented in revised text, though considering tight text constraints..
United Kingdom (Department of Energy and Climate Change)	SPM	27	1	27	6	-	-	-	Might be worth making some sort of comment (or inserting a break out box?) around how the emergence of 'smart grids' could help the integration challenges at all levels on the system - from microgeneration to connection of intermittents to the transmission network	Too detailed for SPM. Text presented on electricity demand that can respond in relation to supply availability.
United Kingdom (Department of Energy and Climate Change)	SPM	27	1	38	18	-	-	-	The final paragraph implies that the authors have no hard analysis. It would be better to discuss the fact that the cost of integrating RE are almost entirely contextual and describe them, while accepting that they are hard to quantify, although often significant. The concepts of capacity credit, discretionary and non-discretionary use, low cost back-up and storage etc might be discussed. Some solid examples could be used for example to show that PV has a very low capacity credit except where air conditioning is the cause of peak load etc.	Full discussion on capacity credits of different technologies too detailed for the SPM. Covered in underlying chapter. Note included on the challenges of providing general quantification for integration costs.
Richard Taylor (International Hydropower Association)	SPM	27	4	27	5	6	-	-	Delete ""Energy storage is more important to balance autonomous systems and isolated grids than it is for inter-connected grids"". Comment: Energy storage is equally important, albeit in different ways, for integrated grids	Accepted.
United States (U.S. Department of State)	SPM	27	4	-	-	-	-	-	Replace "provide a smoothing effect and" with "better anticipate output fluctuations"	Relevant text deleted in rewrite.
Australia (0)	SPM	27	5	27	5	-	-	-	There is some debate about whether energy storage is more important to balance autonomous systems ... than for interconnected grids. Compared with page 78, lines 5-11 where a customised approach is advocated. Page 27 line 5-6 needs to be qualified with a "may be more important"	Relevant text deleted in rewrite.
Several experts 0 (Ministry of the Indutry, Tourism and Trade)	SPM	27	7	27	10	-	-	-	What is meant by "low grade RE inputs"?	Amended
Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	SPM	27	11	-	-	-	-	-	Mentioning hydrogen injection in gas grids at SPM level may lead the reader to the impression that H2 can indeed be directly injected in existing infrastructures.	Wrote hydrogen blend

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
China (China Meteorological Administration)	SPM	27	14	27	18	6	-	-	More information and key message should be added in this section for integration of RE in current energy system, especially the cost for energy storage which may be an important barrier for high RE penetration.	Included in electricty
Frank Mastiaux (EON Climate & Renewables)	SPM	27	17	27	18	-	-	-	Should it be attributed to a specific RE-technology? This is an externality over the whole grid.	Not just power grids
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	27	19	31	4	7	-	-	There is no mentioning of the effect of policies to promote production or use of fossil fuels, such as subsidies of coal production. I think this issue would merit a statement in section 7 of the SPM.	Noted.
Taishi Sugiyama (Central Research Institute of Electric Power Industry (CRIEPI))	SPM	27	19	27	19	-	-	-	Expanding RE itself should NOT be the policy goal. The goal should be cost-effective CC mitigation. Strong policy of RE without serious cost effecitvenessconsieration is called "governmental failure by pick and choose of technology", not a success story. You must discuss how the government can avoid such failure. Review, for example, Anthoff, David and Robert Harn, Government failure and market failure: on the inefficiency of envrionmental and energy policy, Oxford Review of Economic Policy, Volume 26, Number 2, 2010, pp. 197-224, doi: 10.1093/oxrep/grq004	Accepted.
Taishi Sugiyama (Central Research Institute of Electric Power Industry (CRIEPI))	SPM	27	19	27	19	-	-	-	You must address costs, intermittency, and stability of supply in the first place. These three are the key barries of RE.	Costs are covered in a comparison in Section SPM 3, variability of resources an dpossible solutions are covered in Section SPM 4
Canada (Environment Canada)	SPM	27	20	30	39	7	-	-	The report does not address the socially driven "Not-in-My-Back-Yard" sentiment that is a barrier to deployment of renewable energy. Greater discussion of this barrier could be considered.	discussed in underlying text. Too detailed for inclusion in SPM.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	27	20	27	23	-	-	-	add: unpriced externalities of traditional, fossil-based energy supply	Accepted.
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	SPM	27	20	27	23	-	-	-	Delete the sentense below; "the existence of monopoly powers in actual markets, limiting competition among suppliers or demanders, free entry and exit" <reason> -Some "monopoly power" make for rational and well cordinated power systems. They are not always bad for RE development.	Relevant text deleted in rewrite.
massimo tavoni (FEEM and CMCC)	SPM	27	20	-	-	-	-	-	Essentially all these market failures apply to most energy and non-energy technologies, not exclusively to RE.	Accepted.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Finland (Finniah Meteorological Institute)	SPM	27	20	-	-	-	-	-	General comment to the first section; lines 20-35: The title ¿Policies advancing RE deployment¿ calls for a logical start for the section. Now the section starts with policy failures etc. A suggestion: Please start the section with some general considerations on the role and possibilities of policies in this context; a link to the drivers (section 2, pages 4-5) may be needed. With such a start, the text in lines 20-35 lies in an appropriate context.	Accepted.
Juan Jose Sanchez (Ministry of the Environment, and Rural and Marine Affairs)	SPM	27	20	27	23	-	-	-	I would also include as a market failure here: subsidies for conventional fuels (this not only has to do with un-priced environmental impacts)	Noted.
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	SPM	27	20	27	21	-	-	-	Market failure is in this broad context not the right wording. It is better to speak of barriers. Because a lot of measures to deploy RE are not in line with market mechanisms. This is counterproductive.	Accepted.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	27	20	27	20	-	-	-	There is a small typo here in the reference "[1.5; 11.4]" where a semicolon is used, while everywhere else the paragraphs are separated by comma.	Relevant text deleted in rewrite.
France (MEEDDM (Ministry of Ecology, Energy, Sustainable Development and the Sea))	SPM	27	22	-	-	-	-	-	Is underinvestment a market failure ?	reworded for clarity
Antoine BONDUELLE (E&E Consultant)	SPM	27	22	-	-	-	-	-	The term ""monopoly powers"" is not enough. The word ""incumbents"" is key.	Relevant text deleted in rewrite.
Emmanuel Branche (Electricité de France)	SPM	27	22	27	22	-	-	-	To advance the argument on "monopoly powers" must be handled with care according to me. In a first analysis, the presence of a monopoly (or more realistically an oligopoly) should promote RE since prices should be higher, and therefore make RE more competitive. The argument that the monopoly could limit or block the entry of RE competitors is also quite difficult to mobilize: In non regulated market, RE prices do not mean have to force the oligopoly have to adopt predatory pricing. In the case of a non-liberalized market, it is reduced to the question of public policy.	Relevant text deleted in rewrite.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Italy (Institute for Environmental Protection and Research (ISPRA))	SPM	27	24	27	25	7	-	-	The current text fails to provide an assessment of the imbalance between public support to conventional fuels and public support to renewables. Replace the current sentence "When directed to boost non-RE systems and technologies, existing policies and regulations can act as barriers to RE deployment" with ""Existing policies and regulations aiming at boosting non RE-systems and tecnologies can act as barriers to RE deployment. An assessment for 2009 estimated the total expenditure of world governments for renewables and biofuels at 43-46 billion dollars (Bloomberg New Energy Finance), divided into tax credits, green certificates and other direct subsidy, whereas the expenditure for coal, oil and other fossil fuels was 557 billion dollars, as estimated by the International Energy Agency. "	Relevant text deleted in rewrite.
United Kingdom (Department of Energy and Climate Change)	SPM	27	24	-	27	-	-	-	When policy is formulated to boost non-RE systems, does it always turn out to be detrimental to the deployment of RE technologies? If so, is there a simple way that such policy can be adjusted in order to ensure RE advancement isn't obstructed? This is the kind of policy question a policy maker is likely to ask at this point in the document.	Relevant text deleted in rewrite.
Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	SPM	27	26	27	27	-	-	-	It could be added ""unsupported by quality schemes"" or another expression that points to the need of State backed frameworks such as certification schemes of equipments and personnel, and supply chains, to ensure the performance of the RE systems deployed.	Relevant text deleted in rewrite.
Garcia Javier (Garcia Monge Consultant)	SPM	27	28	27	33	7.	-	-	May I suggest to add the following barrier: ""lack of information publicly available about natural resources for RE.""	Incorporated under 'information and awareness barriers' in rewrite.
United Kingdom (Department of Energy and Climate Change)	SPM	27	28	-	32	-	-	-	Are these anthropogenic barriers easy or hard to solve? This isn't explained in the document, nor does the body of the report contain any information to support an answer. What kind of investment must be made to remove these barriers?	Noted.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	27	28	27	29	-	-	-	This definition of "barriers" here is not specific "to RE deployment". Therefore I suggest to delete this specification.	Accepted.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	27	29	-	-	-	-	-	Also "market failures" should be mentioned as barriers (they are mentioned in chapters)	Accepted.
United States (U.S. Department of State)	SPM	27	31	-	-	-	-	-	Prefer more direct language such as "siting, public acceptance and land-use barriers" rather than the more cryptic "socio-cultural barriers".	Noted.
Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	SPM	27	33	27	35	-	-	-	Mentioning technical obstacles such as ""dark hours for solar energy"" under a ""policies"" discussion is not coherent and most of all, distracts the reader from the main points under discussion.	Relevant text deleted in rewrite.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	27	33	27	34	-	-	-	The definition of "issues" here is very limited compared to the wide range of meanings it has in day-to-day conversation. Perhaps it would be better to use "anthropogenic barries" in line 28 and "natural barriers" in line 33.	Relevant text deleted in rewrite.
Modesto Fernandez Diaz-Silveira (Ministry of Science, Technology and Environment)	SPM	27	33	-	-	-	-	-	TO include text: "Human livelihood barriers (to call them in an innovative way) like risks to food security and difficulties to access food competing with biofuels, could be a serious barrier to be solved. Increased water consumption by crops used for biofuel production could be a growing barrier limiting in the future this production."	Concerns related to competition and land-use with bioenergy use now covered in a specific box in SPM FD.
United States (U.S. Department of State)	SPM	27	34	-	-	-	-	-	Delete the example of flat land impeding hydropower. That might be true for high-head, reservoir-based project designs, but there are other types of hydro that still can be developed in large rivers with high flow but low head.	Relevant text deleted in rewrite.
Emmanuel Branche (Electricité de France)	SPM	27	34	34	35	-	-	-	This is not true for hydropower. It should be removed as hydropower significant size of low head schemes can be developed in relatively flat areas (Rhine, Mississippi, ¿), e.g. on the lower reaches of large rivers which usually flow in flat areas	Relevant text deleted in rewrite.
United Kingdom (Department of Energy and Climate Change)	SPM	27	35	-	-	Policies for adv RE deployment	-	-	This section could also make reference to the influence of lobbying efforts for fossil fuels on renewable energy policy,	Noted.
¿vind Christophersen (Climate and Pollution Agency)	SPM	27	36	27	38	-	-	-	Avoid academic language like ¿externalities¿. We suggest this change: ¿ Comprehensive supporting policies for RE address specific barriers that hinder RE deployment by economic incentives and legislation; stimulate RE innovations; and enhance international cooperation.¿	Text revised to clarify use of 'externality'. Authors consider it to be an important term.
Australia (0)	SPM	27	36	27	38	-	-	-	Replace with "Comprehensive RE policy to correct market failures by pricing environmental impacts, establishing competitive energy markets and supporting R&D; dismantling existing regulatory and other policy barriers to RE; and encouraging the spread of information and knowledge about all RE innovation, including by international cooperation."	Text revised and shortened.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	27	36	27	38	-	-	-	There is a small issue of style consistency here. Uncharacteristically the elements of the listing are separated here by semicolons, where everywhere else elements in listings are separated by commas.	Accepted. Consistency in punctuation assured in FGD.
Supachai Panitchpakdi (United Nations Conference on Trade and Development)	SPM	27	39	27	43	-	-	-	In the context of developing countries, many times RE projects are carried out by foreign investors who have the capital and know-how to complete such a project. This requires policymakers in developing countries, but in developed countries as well, to consider issues related to investment promotion and creating an enabling environment for technology dissemination in order to ramp up deployment of RE within their respective countries.	Noted. will consider when revising underlying chapter text.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
United Kingdom (Department of Energy and Climate Change)	SPM	27	39	-	43	-	-	-	It is difficult to understand the point of this paragraph. It seems to be talking about how a positive feedback mechanism will be the solution to future deployment needs, but only just mentions the means to this end (targeted RE policies). A policy maker is going to find it quite difficult to "unpack" the message here - which doesn't mean the message is incorrect, only that it needs greater clarity.	Accepted. Reworded.
¿vind Christophersen (Climate and Pollution Agency)	SPM	27	39	-	-	-	-	-	R&D	Accepted.
¿vind Christophersen (Climate and Pollution Agency)	SPM	27	39	27	39	-	-	-	The bold text here is an important sentence. In our view it should be said that future policies is expected to be a most important factor regarding the rate of introduction e.g.: "Targeted RE policies accelerate RE development and deployment and future policies is expected to be a more important factor for the rate of introduction than short term cost competitiveness.¿	no literature on this; talks of future, and we don't know what will occur.
United Kingdom (Department of Energy and Climate Change)	SPM	27	39	38	43	-	-	-	These statements require solid research references showing that they can be substantiated, otherwise their use will tend to discredit the report as a whole.	Accepted.
Emmanuel Branche (Electricité de France)	SPM	27	39	34	43	-	-	-	This paragraph suggests that there is a mechanical relentless cost reduction through massive deployment policies and "objectified" by the learning curves. This mechanism is obviously quite relative. All the innovations do not prove successful. A timer, all successes are not the result of a raid linear learning curve, but rather the result of one or more technological breakthroughs (e.g. solar). Moreover, uncertainties on the learning curve remain. Resulted in additional costs, these uncertainties may cause very significant variations in additional costs. Even more significant than the technology is still far from maturity. In reality, at public policy level, mechanisms/tools must take into account the various technical and economic maturity of technologies	Accepted.
France (MEEDDM (Ministry of Ecology, Energy, Sustainable Development and the Sea))	SPM	27	39	-	-	-	-	-	To be consistent with lines 25 to 27 (same page), add ""can"" between ""poilcies "" and "" accelerate""	Relevant text deleted in rewrite.
Jänicke Martin (Environmental Policy Research Centre)	SPM	27	43	-	-	-	-	-	Add after "¿market deployment". "Targets should be both ambitious and realistic (in terms of existing capabilities)".	Relevant text deleted in rewrite.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	27	44	27	44	-	-	-	I would prefer to replace "policymaker" by "policy".	Relevant text deleted in rewrite.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
France (MEEDDM (Ministry of Ecology, Energy, Sustainable Development and the Sea))	SPM	27	45	28	1	-	-	-	The information content of those two lines is quite low.	Relevant text deleted in rewrite.
Gunnar Luderer (Potsdam Institute for Climate Impact Research)	SPM	27	-	-	-	7.	-	-	At the beginning of this section, the authors should make clear in a few sentences why RE deployment should be fostered. It should be made clear that RE use is not an objective by itself, but rather a means to achieve policy objectives such as climate change mitigation, reduction of air pollution, innovation, energy security, ...	Accepted.
Chile (CONAMA)	SPM	27	-	-	-	7	-	-	In chapter 7, ¿Policies for advancing RE deployment¿, I Suggest incorporate a paragraph about the positive relationship between renewable energies and job creation. (Comment made by Alwine Woischnik)	Employment benefits associated with RE covered in SPM 5
Gunnar Luderer (Potsdam Institute for Climate Impact Research)	SPM	27	-	-	-	7.	-	-	In this section, I miss a discussion of feed-in tariff systems vs. quotas vs tax incentives as policy instruments for RE market pull.	True. Space constraints restrict ability of authors to discuss these instruments in more detail in SPM.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	27	-	-	-	7	-	-	swap second and third paragraph - the third paragraph introduces man-made barriers, of which inadequate RE policy is only one manifestation	2nd paragraph deleted in rewrite.
Gunnar Luderer (Potsdam Institute for Climate Impact Research)	SPM	27	-	-	-	7.	-	-	The fluctuation of power production from some RE, notably wind and pv, introduce new externalities. This section (and Chapter 11) should address the question if new policies are needed to incentivize the ¿integratability¿ of RE, e.g. grid enhancements, demand side management, management of curtailment in periods of oversupply, etc.	Accepted.
Frank Mastiaux (EON Climate & Renewables)	SPM	28	10	28	22	7	-	-	A more thorough description of the regional characteristics, economic circumstances and policies would be useful	Noted. Due to space constraints, ability to incorporate e.g. discussion on regional charachteristics is limited.
Frank Mastiaux (EON Climate & Renewables)	SPM	28	23	28	38	7	-	-	In general for this section. A description regarding the mix of policy instruments is missing. It is explained that an enabling environment is required (very important). However also the interaction between policy instruments is crucial to describe. Currently many policies overlap and are sometimes counterproductive or make it impossible to meaure the effect of one single policy. On the other hand, some policies are watered down and incapable to work to their potential because of interactions.	Accepted.
Juan Jose Sanchez (Ministry of the Environment, and Rural and Marine Affairs)	SPM	28	2	-	-	-	-	-	I would include, apart from diversification of energy sources, reduction of dependency of energy imports	Accepted.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Supachai Panitchpakdi (United Nations Conference on Trade and Development)	SPM	28	3	28	4	-	-	-	In development discussions there are only developed and developing countries. The term "underdeveloped countries" that is used here is deemed inappropriate. In case reference is supposed to be made to countries with a particularly low level of development, one might refer to least developed countries (LDCs) or low-income countries or simply particularly poor countries.	Accepted.
Emmanuel Branche (Electricité de France)	SPM	28	5	28	9	-	-	-	Check sentence as Vietnam appears 2 times in the sentence ¿ it is in contradiction with the ideas. Furhermore what are the RE industries developed by Vietnam and South Africa ?	Accepted.
Supachai Panitchpakdi (United Nations Conference on Trade and Development)	SPM	28	10	28	22	-	-	-	Another important measure in this regard in the reduction or elimination of subsidies for carbon-intensive fuels (for example, gasoline and coal subsidies) that undermine moves towards RE. Publications on this issue are, for instance, available at the IISD website: www.iisd.org.	Accepted.
Ladislaus Rybach (Geowatt AG Zurich (company))	SPM	28	10	-	13	-	-	-	It should be mentioned here that feed-in tariffs have not yet been introduced in many countries.	not relevant here.
¿vind Christophersen (Climate and Pollution Agency)	SPM	28	10	28	10	-	-	-	This is a very important message and in our view it should include that the rate of deployment will remain low without a supporting policy:¿Though links exist between climate and RE policy, supporting policies for RE are still necessary and without such policies the RE deployment will may remain low¿	Accepted.
massimo tavoni (FEEM and CMCC)	SPM	28	10	-	22	-	-	-	This paragraphs is very contestious. The arguments in favour of multiple policies are weak and are true for most energy technologies, not only RE. Although potentially important, overlapping policies have been shown to increase the policy costs. Thus a trade off between the two is evident and shold at least be emphasized.	Accepted.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	28	11	28	12	-	-	-	CC is not a market failure, it is the result or consequence of market failures. Rephrase to: "¿address the major market failures that led to climate change¿"	Accepted.
Switzerland (Swiss Federal Office for the Environment)	SPM	28	13	-	-	-	-	-	Add a sentence that in the framework of project-based carbon offset mechanisms, especially the Clean Development Mechanism, numerous renewable energy projects have been initiated in the last years.	Relevant text deleted in rewrite. CDM discussion too detailed for SPM
Axel Michaelowa (University of Zurich)	SPM	28	13	28	13	-	-	-	Add after "¿ technology": "Project-based carbon offset mechanisms, especially the Clean Development Mechanism, have mobilized hundreds of renewable energy projects in the last five years".	Relevant text deleted in rewrite. CDM discussion too detailed for SPM

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Juan Jose Sanchez (Ministry of the Environment, and Rural and Marine Affairs)	SPM	28	13	-	-	-	-	-	I would include: enhancing public awareness and support for capacity building	Noted.
Frank Mastiaux (EON Climate & Renewables)	SPM	28	14	28	22	-	-	-	Here is a clear hierarchy missing, stating that a market oriented carbon pricing system is superior to any other system an RED funding have to be transform in market mechanism.	this is prescriptive.
Juan Jose Sanchez (Ministry of the Environment, and Rural and Marine Affairs)	SPM	28	14	28	22	-	-	-	In the second reason, it says that even if governments were to implement ""ideal"" carbon pricing, there are a range of other relevant market failures such as imperfect competition. This is inconsistent as if there is imperfect competition there cannot be ""ideal"" pricing. I would include maybe other type of failures like transaction costs of lack of consumer information	Relevant text deleted in rewrite.
United Kingdom (Department of Energy and Climate Change)	SPM	28	14	-	15	-	-	-	Where in the body of the report is the evidence supporting the statement that carbon pricing is not a sufficient tool for a low cost transition to a low carbon economy?	Relevant text deleted in rewrite.
United States (U.S. Department of State)	SPM	28	16	28	17	-	-	-	It is inappropriate to speak to "ideal" carbon pricing or technology support for a variety of reasons. Please see comment addressing p. 99 of Chapter 11. A more appropriate approach would be to speak to the fact that carbon pricing and innovation policy are both needed to fully address climate change. A carbon price addresses the climate change externality but does not address other market failures, nor does it include other, non-climate externalities such as air quality.	Relevant text deleted in rewrite.
United Kingdom (Department of Energy and Climate Change)	SPM	28	16	-	22	-	-	-	There are a lot of ideas mentioned in this section of the report that speak against the importance of carbon pricing, again without support. The economics literature does not support this claim (which doesn't mean the economics literature is correct, only that it seems an important body of literature to consider). The section as written runs the risk of persuading the reader that carbon pricing, how the price should be set, etc is either not an issue or has been resolved.	Relevant text deleted in rewrite.
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	SPM	28	18	28	19	-	-	-	Market failure is in this broad context not the right wording. It is better to speak of barriers. Because a lot of measures to deploy RE are not in line with market mechanisms. This is counterproductive.	Market failures removed from this context and allocated separate paragraph in SPM FD.
Sweden (Swedish Environmental Protection Agency)	SPM	28	20	-	22	-	-	-	It is stated here that the presence of different types of ancillary benefits (e.g., reduced local air pollutants) does in itself motivate explicit support for RE source. I do not see this, such effects motivate policies that explicitly address these effects (e.g., emission taxes) but not RE sources per se. However, the presence of ancillary benefits does lower the cost of RE policies (at least in those case where the net effect of these side effects are welfare improving).	Accepted.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Taishi Sugiyama (Central Research Institute of Electric Power Industry (CRIEPI))	SPM	28	21	28	22	-	-	-	While many kind of benefits of RE are qualitatively discussed, you must mention that there is no reliable estimates of benefits of RE to the extent that strong policy interventions are justified. There is a big knowledge gap here and you have to address it.	Noted.
Modesto Fernandez Diaz-Silveira (Ministry of Science, Technology and Environment)	SPM	28	22	-	-	-	-	-	To include text, at the end of the line: "At the same time, to be able to support some RE systems, mainly bioenergy production with biofuels, public policies must take into account the challenges posed by some RE systems, like biofuels, in order to ensure compatibility of this production with food security strategies for their own populations."	Accepted.
United States (U.S. Department of State)	SPM	28	23	-	-	-	-	-	Suggest deleting first sentence, since it is not clear what a "well-designed and -implemented policy" is. Make the second sentence the bold line in the paragraph and insert ", and convey clear and consistent signals to investors in RE technologies" after "availability".	Accepted. Bold statement reworded to focus on policy elements and their effectiveness and efficiency.
Supachai Panitchpakdi (United Nations Conference on Trade and Development)	SPM	28	23	28	38	-	-	-	These policies must also take into account the possibility that the private investors being targeted are foreign investors, meaning that RE policies must include provisions for investment promotion and the creation of linkages between foreign investors and domestic enterprises. For this aspect, see: UNCTAD (2010). World Investment Report 2010: Investing in a Low-Carbon Economy. United Nations: Geneva and New York.	Accepted.
¿vind Christophersen (Climate and Pollution Agency)	SPM	28	23	28	23	-	-	-	This important message should in our view be more active: "To be successful policies need to be well-designed and ¿ implemented, conveying clear and consistent signals"	Accepted.
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	SPM	28	27	28	38	-	-	-	Add the item below; "adequate target-settings while taking into account availability of RE resources, and economic, social, cultural, and ecological conditions as well."	Accepted.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	28	27	-	-	-	-	-	Bad sentence structure makes it unclear; is it meant that these policies must install the required conditions or are they in addition to the policy measures?	Accepted.
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	SPM	28	27	28	38	-	-	-	In this overview the integration of RE into the energysystem is missing.	Accepted.
¿vind Christophersen (Climate and Pollution Agency)	SPM	28	27	28	38	-	-	-	We think that at least three points are missing in the list. 1.The need to combine some RE with other energy sources to compensate the variabliliy in som sources such as wind energy, solar energy etc specially if RE will represent a large portion of the energy supply. 2. The need to adress the wole chain in the energy system; production, transmission and end use. 3. The need for international cooperation on an international framework and between countries which are part of the same energy marrket.	will address issue of integrating RE into existing systems and need for international framework/cooperation.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Garcia Javier (Garcia Monge Consultant)	SPM	28	28	28	38	7.	-	-	May I suggest to add the following bullet: ""Capacity building mainly in developing countries for new RE promotors and developers.""	Bullet list deleted. Revisions focus strictly on policy elements that have been successful.
Karsten Neuhoff (German Institute for Economic Research (DIW Berlin))	SPM	28	28	28	28	-	-	-	chapter 11 was extensively discussing the role of risk - in constraining access to finance and increasing financing costs.Perhaps risk could be added as a bullet point along the lines of ""design choices that limit exposure of investors to risks and uncertainties of future policy changes""	Accepted.
Juan Jose Sanchez (Ministry of the Environment, and Rural and Marine Affairs)	SPM	28	28	28	32	-	-	-	The 2nd bullet point covers the rest so I will quit it or make it more explicit. The same happens with the 5th bullet. The 4th and 1st bullet points should be combined into one single bullet point. I would add ""improved planning and reduced administrative burdens"" as one bullet point. I would also ""availability of qualified personnel""	Bullet list deleted. Revisions in paragraph form consider these sentiments.
Seth Dunn (GE)	SPM	28	28	28	38	-	-	-	This is a good synopsis of the attributes of an effective RE policy. However, I do not see this replicated in either the TS or Chapter 11.	Accepted.
¿vind Christophersen (Climate and Pollution Agency)	SPM	28	28	28	29	-	-	-	This sentence seems to be less logic; does it mean that a fair rate of return will attract investment which will create strong industries and drive down costs. If it is meant costs in the future this should be made clear.	Accepted.
France (MEEDDM (Ministry of Ecology, Energy, Sustainable Development and the Sea))	SPM	28	29	-	-	-	-	-	Add a bullet such as "" Measures preventing public financial support to induce an artificially high price of the supported RE "", to be consistent with the statement page 27, lines 25 to 27.	Bullet list deleted. Revisions in paragraph form consider these sentiments.
United States (U.S. Department of State)	SPM	28	32	28	33	-	-	-	Suggest replacing "guarantee a specific level of" with "provide". Guaranteeing a specific level of support is not necessary for policies to be successful and may be far from socially optimal. Leaving it to policymakers to set the level of support rather than the market can result in under- or over-payment for the desired services. Recent discussions in California regarding a reverse-auction feed-in tariff mechanism may provide a guaranteed level of support based on what project developers are willing to bid. This approach is more likely to set appropriate levels of support and avoid free-riders.	Bullet list deleted. Revisions in paragraph form consider these sentiments.
Australia (0)	SPM	28	34	28	35	-	-	-	Replace with " a combination of different types of policy instuments (market, regulatory, fiscal etc) to address the range of market failures;"	Bullet list deleted. Revisions in paragraph form consider these sentiments.
Frank Mastiaux (EON Climate & Renewables)	SPM	28	38	-	-	-	-	-	Consistent policy of nature protection and RE deployment (in some countries, nature protection laws inadequately hamper deployment of RE)	will be address in ch. 11.6.
United States (U.S. Department of State)	SPM	28	38	-	-	-	-	-	Insert "public" before "acceptance".	Accepted.
United Kingdom (Department of Energy and Climate Change)	SPM	28	38	-	-	-	-	-	It is not clear to me what this bullet point means.	Accepted.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
¿vind Christophersen (Climate and Pollution Agency)	SPM	28	38	28	38	-	-	-	This bullet should be reformulated. Acceptance will depend on the way RE is developt	Accepted.
Modesto Fernandez Diaz-Silveira (Ministry of Science, Technology and Environment)	SPM	28	38	-	-	-	-	-	To add a new bullet: "ethical balance ensuring non-conflict of RE with sensitive population needs like food accessibility and food security strategies, mainly for poor people in developing countries." NOTE: THIS COULD BE INSERTED ALSO IN FIGURE SPM 10 (NEXT PAGE).	Accepted.
Frank Mastiaux (EON Climate & Renewables)	SPM	28	38	-	-	-	-	-	To add: provision of adequate infrastrucutre 8e.g. ports for offshore construction) and grid infrastructure 8e.g. by adequate regulation for grid to be extended with growing share of reneables)	Accepted.
China (China Meteorological Administration)	SPM	29	17	29	17	7	-	-	It is suggested to add: ¿The developed countries (OECD countries) are obliged to support the developing countries in their endeavors to reshape energy infrastructure and increasing RE consumption not only as pay-off for the developed countries carbon debts since the industrial revolution also serve as catalysts to accelerate the RE transformations in the developing countries.¿	Too prescriptive but a good point. Refers to UNFCCC framework so a bit specific to be appropriate here.
Roberto Acosta Moreno (CITMA)	SPM	29	18	-	-	-	-	-	I suggest to delete ""new"". Comments: there are already in place some collaborative arrangments.	Accepted.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	29	19	30	2	-	-	-	I would like to restrict the use of "adaptation" to adaptation to climate change, and suggest to reformulate the sentence after de comma to read: "¿, and to tailor policies to fit to the specific local needs and conditions.".	Accepted.
United States (U.S. Department of State)	SPM	29	13	29	13	-	-	-	Insert the following at the end of the paragraph: "RE policies should be implemented both vertically -- at all levels of government, and horizontally -- by elements that are responsible for a wide range of services."	Will reword proposed statement to be non-prescriptive.
United Kingdom (Department of Energy and Climate Change)	SPM	29	19	30	2	-	-	-	Is this sentence a bit developed country centric? the partnerships stakeholder roles etc. will look very different in a rural community in a developing country.	Accepted.
Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	SPM	29	18	30	7	-	-	-	The argument is correct but biased to Governments, while local (e.g. municipality) level governance can play an important role, indeed in many cases more relevant that the one played by the central Government.	Accepted.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Canada (Environment Canada)	SPM	29	18	30	7	-	-	-	The section and underlying chapter (11) have not sufficiently discussed the role of international public-private partnerships. Institutional learning is emphasized as the primary role of these partnerships, but partnerships facilitate much broader work on accelerating development and deployment of clean energy technologies, increasing investment in R&D, fostering market mechanisms, etc. The work of specific partnerships could be discussed in greater detail in underlying chapter (more detailed examples of partnerships provided in comments under chapter 11). This section also refers several times to "new" partnerships - it is unclear what is encompassed in "new" and what would be considered "existing".	Accepted.
United Kingdom (Department of Energy and Climate Change)	SPM	29	3	-	7	-	-	-	This section should provide some mention of institutional capacity and organisation in relation to how R&D needs to adjust in the future to meet targets. Particularly lacking here, and indeed throughout the report, is an assessment of the institutional structures and capacities of developing nations, and their ability to deliver on technologies (RE or otherwise).	Accepted.
United Kingdom (Department of Energy and Climate Change)	SPM	29	3	29	7	-	-	-	Whilst we have the accrued experience we should not forget that the social, political and market contexts have all moved on, hence there remains scope to extract further learnings from what we thought/did 30 years ago	Accepted.
Garcia Javier (Garcia Monge Consultant)	SPM	29	-	-	-	-	SPM 10	-	May I suggest to add in the circle related to "Mix of Policy Instruments" : pre-investment subsidies for studies; information about natural resources."	will address in chapter text, but can't include in figure for lack of space.
Emmanuel Branche (Electricité de France)	SPM	29	-	29	-	-	SPM 10	-	This figure is very interesting. It could be important to describe in more details the "Finance Community" in brackets (insurer, equity/debt ratio, investor public/private, etc.). Make sure not to forget any stakeholders. Where is "regulation" taken into account ? what about E&S impacts ?	Accepted.
John Twidell (AMSET Centre)	SPM	29	-	-	-	-	SPM 4	-	Add to caption. Note 8 'Solar heat studies frequently neglect benefits of passive solar architecture'.	Noted.
United States (U.S. Department of State)	SPM	30	2	-	-	-	-	-	Unsure of the meaning of "reflexive" in this context. Perhaps use "flexible"?	Accepted.
Roberto Acosta Moreno (CITMA)	SPM	30	3	-	-	-	-	-	I suggest to add after the word cooperation: "" among countries,"" Comment: cooperation among countries is also key to estimulate technology transfer and worldwide RE.	Accepted.
Roberto Acosta Moreno (CITMA)	SPM	30	3	-	-	-	-	-	I suggest to delete ""new"" . Comments: the same reason than above.	Accepted.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Supachai Panitchpakdi (United Nations Conference on Trade and Development)	SPM	30	4	-	-	-	-	-	Comment to footnote 12: This definition seems outdated in terms of the ¿actors¿ involved. Technology is usually transferred among a wider range of actors including firms, research centres, academia or individuals. Even today some experts consider the weight of knowledge on individuals is becoming higher (Barton 2007). Even if we understand the term ¿within¿ as all encompassing, it sounds odd. The definition might be too linked to classic technology transfer clauses in international treaties. See extract from Barton's work on new trends in transfer of technology: Whether from basic research to applied technology or from one firm to another, the transfer of technology is fundamentally a matter of the flow of human knowledge from one human being to another. This can be through education, the scientific literature, or direct human contact. At the legal level, one thinks about licenses dealing with legal rights to use the particular technologies in the particular context ¿ but it is the human level that dominates the managerial and economic reality. And the classic view of a flow from basic to applied technology is a great oversimplification ¿ sometimes, for example, problems or insights arising at the production level give rise to new ideas that contribute to fundamental basic advance. At least in some sectors, close links between the basic researchers and the manufacturing experts, and even marketing personnel contribute to competitiveness and advancement.¿ See Barton 2007 at: http://www.iprsonline.org/resources/docs/Barton%20-%20New%20Trends %20Technology%20Transfer%200207.pdf.	Relevant text deleted in rewrite.
Roberto Acosta Moreno (CITMA)	SPM	30	4	-	-	Footnote 12	-	-	I suggest to modify the footnote as follows: " In the context of this report the term technology transfer is understood as the flow¿¿¿¿¿¿¿¿..and then continue as it stands until trade¿¿to include also ", international arrangements," ¿¿¿¿¿¿¿¿and then continue as it stands. Comment: It may be difficult to accept a unique definition of technology transfer, moreover when may exist many of them. The objective of the first addition is to limit the definition to this paper only and, therefore, facilitates its acceptance. The objective of the second addition is to reflect the importance of international arrangements to facilitate technology transfer (eg. UNFCCC, OMPI, etc.)	Relevant text deleted in rewrite.
¿vind Christophersen (Climate and Pollution Agency)	SPM	30	5	30	7	7	-	-	The sentence is so important, not at least for the Policy Makers that it should be considdered to be put in Italics	Relevant text deleted in rewrite.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Supachai Panitchpakdi (United Nations Conference on Trade and Development)	SPM	30	8	30	17	-	-	-	This passage on political support and regulatory commitment is dealing with governments setting the right framework for RE deployment. Particularly for developing countries RE deployment will require the participation of transnational corporations (TNCs) in one way or another. As for the relevant passages in chapter 11, due account needs to be taken of the special needs of foreign investors and the relevant measures governments can take. On this aspect see also the comments on relevant parts of chapter 11. In this summary, the following two passages might also take note of the importance of TNCs: p.32, line 8 and p.32, lines15-16. For this aspect, see: UNCTAD (2010). World Investment Report 2010: Investing in a Low-Carbon Economy. United Nations: Geneva and New York.	Accepted.
Sung-Hee Shim (Korea Energy Economics Institute)	SPM	30	10	30	12	-	-	-	Policies recommended here are more oriented towards deployment and investment incentives with less emphasis on encouraging demand for Res. Incentives for demand such as green pricing, net metering need to be explored, starting with relevant case studies if necessary.	Accepted.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	30	13	30	15	-	-	-	I would prefer to avoid using the word 'mitigate' in an other meaning than 'mitigate the anthropogenic causes of climate change', and therefore suggest to replace "mitigate" by "reduce" or "lessen".	Accepted.
Sung-Hee Shim (Korea Energy Economics Institute)	SPM	30	13	30	17	-	-	-	Specific examples might be desirable to exemplify the non-commercial risks. In addition to this, it might be useful that a couple of policy tools be made available to mitigate these risks	Accepted.
France (MEEDDM (Ministry of Ecology, Energy, Sustainable Development and the Sea))	SPM	30	14	-	-	-	-	-	IIIIlustrate what is meant by ""non-commercial risks"" by an example	Accepted.
Karsten Neuhoff (German Institute for Economic Research (DIW Berlin))	SPM	30	15	30	17	-	-	-	given the budget constraints also among developed countries, it might well be that the provision of risk guarantees could turn out to be the prefereed mechanism that to provide grant equivalent value towards incremental costs. This has the additional advantage that it facilitates private sector financing and thus increases likelihood of long-term self-sustaining business models.	Accepted.
Sweden (Swedish Environmental Protection Agency)	SPM	30	18	-	30	-	-	-	It needs to be stressed here that clearly a lot of the permitting and planning procedures could be made more efficient but this does not mean that RE sources should be prioritized within the realms of the planning system since this could create perverse incentives (e.g., investments at sensitive locations or locations with high competition for land use).	Relevant text deleted in rewrite.
United Kingdom (Department of Energy and Climate Change)	SPM	30	24	30	30	-	-	-	Is it more accurate to talk about levels of society? Otherwise might run the risk of overlooking the importance of how decision making etc. looks different outside a liberal western democratic system (e.g. in developing countries what are the need to engage with factors such as elders, tribal loyalties etc. in order to gain authority to operate?).	Relevant text deleted in rewrite. However, sentiment will be addressed in 11.6.5 (planning and permitting)

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
United Kingdom (Department of Energy and Climate Change)	SPM	30	24	30	30	-	-	-	Needs to take into account the diversity of societal groups which are consulted for planning purposes	Relevant text deleted in rewrite.
United Kingdom (Department of Energy and Climate Change)	SPM	30	24	-	30	-	-	-	One common problem with planning systems is that they focus on local context and impact; whereas the drivers and benefits derived from the RE systems are,in fact, global. It is difficult to evaluate trade-offs at different scales like this in a single framework. The UK's move towards the infrastructure planning commisison may assist with this, though not yet proven.	Relevant text deleted in rewrite. However, sentiment will be addressed in 11.6.5 (planning and permitting)
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	SPM	30	27	30	30	-	-	-	Add the words as follows; In order to support the deployment of RE, they should account for timely local participation, collaborative networking, co-construction of plans and should identify multiple benefits and benefit-sharing mechanisms in relation, and burden-sharing mechanisms as well, to local needs, concerns and expectations [11.6.5.4].	Relevant text deleted in rewrite.
Sung-Hee Shim (Korea Energy Economics Institute)	SPM	30	31	30	39	-	-	-	Social innovation, if supported by necessary policy tools, measures as well as scientific basis, best practices to be bench-marked, would provide a powerful approach in transforming energy and carbon intensive society to a more sustainable one.	Noted.
United States (U.S. Department of State)	SPM	30	31	30	39	-	-	-	This paragraph is not specific to RE and might reasonably be brought forward to the end of Section 2 (in the proposed Section 2.3 "General Solutions") for better context.	Relevant text deleted in rewrite.
Australia (0)	SPM	30	32	-	-	-	-	-	Suggest "Technical and regulatory options alone¿."	Relevant text deleted in rewrite.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	30	35	30	36	-	-	-	I would like to restrict the use of "adaptation" to adaptation to climate change, and suggest to replace "paired with adapting activities" by "and the change that it involves".	Relevant text deleted in rewrite.
Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	SPM	30	35	31	4	-	-	-	The burdens of responsibility and action are posed here only on ""citizens"". But firms have at least as much responsibility - and often more capacity to act.	Relevant text deleted in rewrite.
Garcia Javier (Garcia Monge Consultant)	SPM	30	39	30	39	7.	-	-	May I suggest to add, at the end of the paragraph: ""(¿) and institutions with public policies driving the transformations, including public awareness about the benefits of RE.""	Relevant text deleted in rewrite.
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	SPM	31	40	-	-	8	-	-	Again: what kind of data sets would be needed? It would be very important to know so that these data could become available for the AR5.	Section has been rewritten and substially shortened. In this process bullet in question was removed. In underlying text, more specifics on useful data were provided.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	SPM	31	19	-	-	8	-	-	For the future assessment it would be very important to know which kind of data is needed and how the data set could / should look like. Giving only this statement, nobody knows how to improve the reporting.	Section has been rewritten and substially shortened. In this process bullet in question was removed. In underlying text, more specifics on useful data were provided.
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	SPM	31	-	32	-	8	-	-	General comment: these gaps are very arbitrary and often too short to be meaningful. Sometimes it is not clear, if the statement addresses modelling issues, or real world data, or data collecting methods. Perhaps it could be structured according to knowledge gaps concerning 1) specific technologies 2) data availability 3) real world issues (e.g. integration), 4) modeling issues 5) data collecting methods.	Rewritten for SPM FD with a clear focus on categorization.
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	SPM	31	14	-	16	8	-	-	It should be also mentioned that the modeling results for the regional assessment is not sufficient so far (see 10.3.)	no space for this in SPM
Japan (the Japanese Ministry of Foreign Affairs)	SPM	31	-	-	-	8	-	-	The section should also discuss intellectual propery and technology transfer issues.	Section has been rewritten and substantially shortened. This comment is now encompassed under a more general bullet on 'policy, institutional and financial mechanisms'. Topics are discussed in depth in Ch 11.
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	SPM	31	36	-	-	8	-	-	This is a strange point. What is the "real" mitigation potential? How to measure? It will always be up to modeling results, insofar it will never be "real".	Section has been rewritten and substially shortened. In this process bullet in question was removed.
Canada (Environment Canada)	SPM	31	5	32	21	-	-	-	An extensive list of specific knowledge gaps is not relevant for the SPM and is better left in the TS and Chapters. Suggest condensing this section to cover main areas or themes of knowledge gaps or removing section entirely.	Section has been rewritten and substantially shortened accordingly.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	31	1	31	4	-	-	-	I miss a statement on technical measures that physically stimulate or force less energy demanding behaviour such as stop-and-go, speed and accelleration limiters.	Section has been rewritten and substantially shortened. This comment is now encompassed under a more general bullet on 'policy, institutional and financial mechanisms'. Detailed discussions on changing behavior are found in Ch 11.
Frank Mastiaux (EON Climate & Renewables)	SPM	31	5	-	-	-	-	-	In the knowledge gaps information on the coexistence of RES promoting systems like feed-in tariffs and cap and trade in respect of the CO2 mitigation effect of RES system is missing.	Section has been rewritten and substantially shortened. This comment is now encompassed under a more general bullet on 'policy, institutional and financial mechanisms'.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Switzerland (Swiss Federal Office for the Environment)	SPM	31	13	32	21	-	-	-	In the list, scientific and/or technological gaps are not mentionned, although earlier in the SPM (page 3) the need for research efforts and development of RE technologies is highlighted. This list might imply that the main existing gaps concern assessments, political, or economical, or regulatory problems, and that science and technology development needs are minor. This is contradictory to the contents of the whole report.	Section has been rewritten and substantially shortened. Rewrite has assured consistency with the report and categorized knowledge gaps.
Finland (Finniah Meteorological Institute)	SPM	31	5	32	-	-	-	-	One of the major knowledge gaps is certainly large uncertainties related to bioenergy potentials, land resource availability, and to GHG performance of various bioenergy options. This should be emphasised more than is done in the current version.	Section has been rewritten and substantially shortened. This comment is now encompassed under several more general bullets. Detailed discussion on bioenergy potentials can be found in Ch 2.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	31	14	32	21	-	-	-	Small typos: bullets 1, 3, 4, 14, 15, 16, 17, 18, 19, 20 do not end with a stop, while all others do. Also the location of the reference is not consistent.	Rewritten for SPM FD and consistency in such points was considered.
Gunnar Luderer (Potsdam Institute for Climate Impact Research)	SPM	31	14	-	16	-	-	-	The SPM should explicitly mention the lack of comprehensive data sets on renewable energy technical potential as a function of either quality (e.g. load factor) or price. Such information is of key importance for integrate assessment modeling	Section has been rewritten and substantially shortened. This comment is now encompassed under a more general bullet on 'realizable technical potential' and the specific point included in table in underlying text.
Nico Bauer (Potsdam Institute for Climate Impact Research)	SPM	31	13	32	21	-	-	-	This list must be condensed. Too much items seem of minor importance.	Section has been rewritten and substantially shortened accordingly.
Modesto Fernandez Diaz-Silveira (Ministry of Science, Technology and Environment)	SPM	31	17	-	-	-	-	-	TO include text, after ¿RE resources: "with special emphasis on agriculture changes because of climate change (shift in climate patterns) and adaptation needs and options."	Section has been rewritten and substially shortened. In this process bullet in question was removed.
Frank Mastiaux (EON Climate & Renewables)	SPM	31	31	31	37	-	-	-	What is the added value of the second bullet point. This seems included in the first	bullet will be deleted
United Kingdom (Department of Energy and Climate Change)	SPM	31	28	-	-	Knowledge gaps	-	-	Insert a bullet that says: "Assessment of resource limits, in particular, lithium and the rare earth elements"	Section has been rewritten and substantially shortened. This comment is now encompassed under a more general bullet on 'realizable technical potential'.
Richard Taylor (International Hydropower Association)	SPM	32	5	32	5	8	-	-	Delete ""large"". Delete ""dams in the tropics"" and replace with"" reservoirs (although expected to be low). Comment: Reservoir hydropower projects range in scale and net GHG emissions of reservoirs is not a problem solely confined to tropical areas	Section has been rewritten and substially shortened. In this process bullet in question was removed.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	SPM	32	8	-	-	8	-	-	what does this mean?	Section has been rewritten and substially shortened. In this process bullet in question was removed.
Frank Mastiaux (EON Climate & Renewables)	SPM	32	21	-	-	-	-	-	Extra bulletpoint suggestion: Better understanding of portfolios of policies and where they can create synergies would be helpful. Case study material (e.g. Europe or China CDM versus FIT) are becoming more abundant	Section has been rewritten and substantially shortened. This comment is now encompassed under a more general bullet on 'policy, institutional and financial mechanisms'.
Juan Jose Sanchez (Ministry of the Environment, and Rural and Marine Affairs)	SPM	32	15	32	16	-	-	-	I do not think this is a knowledge gap but a posible success factor.	Section has been rewritten and substially shortened. In this process bullet in question was removed.
Nico Bauer (Potsdam Institute for Climate Impact Research)	SPM	32	8	-	-	-	-	-	I do not understand the purpose and the effect of this point.	Section has been rewritten and substially shortened. In this process bullet in question was removed.
Helmut Haberl (Institute of Social Ecology, Vienna)	SPM	32	-	-	-	-	-	-	I think that the question how to best integrate food and bioenergy production is of eminent importance, as the difficulties in quantifying the bioenergy potential amply demonstrate. They therefore deserve to enter the list, in my view.	Section has been rewritten and substially shortened. This specific topic was therefore out of scope for the SPM, but has been discussed in Ch. 2 of the main report.
¿vind Christophersen (Climate and Pollution Agency)	SPM	32	6	32	9	-	-	-	If the section about gaps in knowledge gaps is kept avoid difficult language like ¿taxonomy¿.	Section has been rewritten and substially shortened. In this process bullet in question was removed.
United States (U.S. Department of State)	SPM	32	15	32	16	-	-	-	In keeping with the role of IPCC as being policy relevant but not policy prescriptive, it is not appropriate to recommend a body to be assigned to RE tech transfer, except in the context of providing a range of potential options. Note that the recently established IRENA is already providing RE options and technical knowledge to developing countries.	Section has been rewritten and substially shortened. In this process bullet in question was removed.
United States (U.S. Department of State)	SPM	32	8	32	10	-	-	-	Please clarify the meaning of these two points. Perhaps the first point is referring to an "inventory" of technologies that make use of particular RE sources? Then the second point is seeking a rating of each technology on the basis of sustainability indicators?	Section has been rewritten and substially shortened. In this process bullets in question were removed.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Canada (Environment Canada)	SPM	32	15	32	16	-	-	-	This sentence is not elaborated in the underlying chapter (9). As such, it is unclear why there ought to be an assignment of responsibilities for renewable energy technology transfer and development under the UNFCCC. Article 4.3 of the Convention states that developed country Parties "shall also provide such financial resources, including for the transfer of technology, needed by the developing country Parties to meet the agreed full incremental costs of implementing measures that are covered by paragraph 1 of this Article and that are agreed between a developing country Party and the international entity or entities referred to in Article 11, in accordance with that Article." Article 4.8 further states that "In the implementation of the commitments in this Article, the Parties shall give full consideration to what actions are necessary under the Convention, including actions related to funding, insurance and the transfer of technology, to meet the specific needs and concerns of developing country Parties arising from the adverse effects of climate change and/or the impact of the implementation of response measures". As there is no explicit reference to "assignment of responsibilities" in terms of technology transfer, further clarification on the intent of this sentence is needed.	Section has been rewritten and substially shortened. In this process bullet in question was removed.
Frank Mastiaux (EON Climate & Renewables)	SPM	32	8	-	-	-	-	-	Unclear what is intended	Section has been rewritten and substially shortened. In this process bullet in question was removed.
¿vind Christophersen (Climate and Pollution Agency)	SPM	32	16	-	-	-	-	-	We do not think that such assignments necessarily need to be under the UNFCCC and suggest to remove the bracket. Furtermore we are not convinced that this is a knowledge gap.	Section has been rewritten and substially shortened. In this process bullet in question was removed.
France (MEEDDM (Ministry of Ecology, Energy, Sustainable Development and the Sea))	SPM	32	-	33	-	SPM 8	-	-	Absent of the list are gaps in scientific and technical knowledge required to develop efficient and inexpensive tools, e.g. to use solar energy to produce electricity or large energy storage capacities to cope with intermittent REs.	Though section was substantially shortened, this was included under a bullet 'rechnical and institutional challenges and costs of integrating divers RE technologies into energy markets.'
Australia (0)	SPM	-	-	-	-	1	-	-	The report, and consequently the SPM, focusses mainly on renewables for electricity generation. There is very little in comparison on renewabels for transport or for other energy services. An explanatory sentence on scope could usefully be added to the Introduction, perhaps at line 10.	Effort made to include additional focus on H/C and Transport
Japan (the Japanese Ministry of Foreign Affairs)	SPM	-	-	-	-	2.1	-	-	It is not appropriate to use "AR4 concluded" but should use "AR4 indicated", as AR4 is in nature a synthesis of the various scientific views and does not provide ultimate conclusions or proposals.	Noted.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Haroon Kheshgi (ExxonMobil Research and Engineering Company)	SPM	-	-	-	-	2.1	-	-	This section alters and blurs some of the conclusions of the AR4-WG1 report and should be either changed to exactly reflect AR4-WG1, or be omitted. Suggest this be omitted in this report as it does not provide any new assessment of the scientific basis, and the report is already extremely long. For example, the section states that ¿there is a 90% likelihood that global warming is happening¿, however, the term ¿global warming¿ is only used sparingly in SPMs of the AR4 and, of course, the highlighted conclusion of the AR4 was that warming was unequivocal. Much greater care is needed if this report is to paraphrase the assessment of climate science in AR4.	Piece taken from the AR4 has been inserted into quotations to assure exact replication.
United Kingdom (Department of Energy and Climate Change)	SPM	-	-	-	-	2.2	-	-	This section should mention disruptive technologies, as this is what will in part drive uptake of the technologies.	Section removed from SPM in revised version.
Juan Jose Sanchez (Ministry of the Environment, and Rural and Marine Affairs)	SPM	-	-	-	-	4	-	-	As said in a previous general comment, a ""Gigatone narrative"" when talking about mitigation potentials could be helpful to better understand and assess the potential of RE with respect to the needs for the different stabilisation levels. In particular, it could be interesting to see how many Gt of the needed reductions could be obtained by RE in different models and scenarios, or equivalently, the share of the total reduction needed achieved throuh RE.	the mitigation potential of RE is strongly dependent on the whole system behaviour (determined by the substituted energy option and the corresponding CO2-emissions). Number can be given for a small number of scenarios (cf. figure 10.3.11) - a specific figure will be included if space limit allows, that means figure 10.3.11 or figure 10.2.2 which describes the interaction between CO2 emissions and RE contribution
Nico Bauer (Potsdam Institute for Climate Impact Research)	SPM	-	-	-	-	4	-	-	The section header is mitigation potential, which refers to the avoidance of carbon emissions measured in tons of carbon. However, the section only contains renewable energy supply measured in energy units. These are two very different entities. The reader is interested into the reduction of CO2 emissions due to the deployment of RE, not into the deployment of RE. The present structure mixes up means and ends.	see above
Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	SPM	-	-	-	-	5	-	-	The RE system statistical units vary with the technology, mixing J, W and Wth. Especially for electricity, it quotes power installed, instead of annual energy production; therefore the different technologies can not be compared on an equal basis. If not using SI unit J as done in Table 4, then at least some Watt-hour multiple could be used to give coherence to the numbers provided.	Text rewritten with an effort to assure consistency across units.
Haroon Kheshgi (ExxonMobil Research and Engineering Company)	SPM	-	-	-	-	5	-	-	This section relies on estimates of LCOE to compare different RE sources. While an important metric, the value of power delivered does depend on how it matches power demand. Suggest that this section also discuss and quantify the added/lost value of adjustable/variable sources of power in addition to the estimate of LCOE.	Noted. Variability discussed in Section 4 of FD, though quantification in comparison with LCOE is challenging and currently outside the scope of the underlying text.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Nico Bauer (Potsdam Institute for Climate Impact Research)	SPM	-	-	-	-	7	-	-	In this section I did not find the issue of limiting carbon emissions by either a cap-and-trade system or a carbon tax or any other policy instrument that addresses carbon emissions directly. This is a very important point.	Accepted.
Sweden (EON Climate & Renewables)	SPM	-	-	-	-	7	-	-	Somewhere in the SPM section 7 it should be noted that the (non-GHG) environmental impacts of RQE sources also differ substantially. This is addressed earlier in the SPM but in the policy section one gets the feeling that all renewable energy sources are equally benefical from this point of view (which hardly is the case).	Environmental impacts now discussed thoroughly in Section SPM 5. Space restrictions do not allow repetition of information in SPM 7.
Haroon Kheshgi (ExxonMobil Research and Engineering Company)	SPM	-	-	-	-	7	-	-	Suggest that this section be focused on the role of RE related to policies to mitigate climate change rather than policies to promote RE. I also suggest that this section summarize literature on the comparative cost efficiency of different policy tools in mitigating climate change as cost to society is an important metric.	Accepted.
United States (U.S. Department of State)	SPM	-	-	-	-	7	-	-	This is generally a good, balanced treatment of policies for RE deployment. However, there is an opportunity to provide policymakers with a perspective on socially optimal levels of RE deployment. The overall policy goal should be cost-effective reduction of GHG emissions in the provision of energy services, though this may include other considerations, such as sustainability and energy security. In creating policies in support of RE (or any low-carbon technology), one should distinguish between the support necessary to account for the climate change externality, that required to address other market failures, and that which is done simply to support a social goal of achieving more RE deployment. Too often reference is made to success stories that involve policy x leading to a particular level of deployment of technology y. But seldom is there discussion of whether that policy was a socially-optimal use of the incentives associated with the policy. Perhaps incentives for technology z would have been better, or a broad incentive for technologies similar to y and z. It would be helpful to add a paragraph to emphasize that some incentive policies are more cost-effective means of achieving the desired objective than others.	will address with more detailed focus on economic implications of policies, in chapter 11 and SPM, TS.
Haroon Kheshgi (ExxonMobil Research and Engineering Company)	SPM	-	-	-	-	8	-	-	A knowledge gap that should also be included is the one that is mentioned in SPM page 27 line 16 on the lack of knowledge about RE system costs.	Though section was substantially shortened, this was included under a bullet 'rechnical and institutional challenges and costs of integrating divers RE technologies into energy markets.'

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Sweden (Swedish Environmental Protection Agency)	SPM	-	-	-	-	8	-	-	In this section I think that one should note that most energy system models assume a cost effective penetration of RE sources at a global scale. However, in practice (and unlike CO2 emissions trading) countries often take a much more "nationalistic" approach to RE support (due to, for instance, industrial policy motives, employment, diversity of fuel supply arguments etc.). See, for instance, Soderholm, P. (2008). ¿The Political Economy of International Green Certificates Markets,¿ Energy Policy, Vol. 36, No. 6, pp. 2051-2062. This means that from a gloabl standpoint a more bottom-up approach to RE support can be envisaged and there is a need for research that addresses: (a) the trade-offs between a global cost effective policy and the one likely to materialize in practice; as well as (b) more detailed assessment and comparisons of the economic, political and institutional factors that promote and impede RE development in different countries.	Good comment. Section substantially shortened, but sentiment noted in revision of knowledge gap section in Chapter 1.
Gunnar Luderer (Potsdam Institute for Climate Impact Research)	SPM	-	-	-	-	8	-	-	In view of the large range of renewable deployment in IAMs [10.2] this section on knowledge gaps should explicitly mention the need to improve our understanding of the role of renewables in climate change mitigation and its driving forces.	Though this section was rewritten and substantially shortened, this has comment is encompassed under the bullet on 'future cost and timing of RE deployment for GHG mitigation'.
Nico Bauer (Potsdam Institute for Climate Impact Research)	SPM	-	-	-	-	8	-	-	It is important to know whether renewable support schemes like feed-in tariffs may achieve emission reductions. There might be rebound effects that lead to unlimited use of coal, though renewables are used at large scale.	Rebound effects have been incorporated into Section 7 on policies.
Nico Bauer (Potsdam Institute for Climate Impact Research)	SPM	-	-	-	-	8	-	-	It should be highlighted that we need to understand in how far short-term RE deployment is a substitute for a missing carbon price due to the lack of an international climate change mitigation agreement.	Section has been rewritten and substantially shortened. This comment is now encompassed under a more general bullet on 'policy, institutional and financial mechanisms'.
Gian-Kasper Plattner (IPCC WGI TSU, University of Bern)	SPM	-	-	-	-	8	-	-	Knowledge Gaps: many of the bullet point formulations seem not to be matching the title of the bullet list "Specific knowledge gaps identified by this report include". I don¿t think Assessments, Coherent sets, Improved Measurements, Better understanding can be called "knowledge gaps" -- rather those are ways to close these knowledge gaps...	Rewritten for SPM FD, and rephrased accordingly.
Nico Bauer (Potsdam Institute for Climate Impact Research)	SPM	-	-	-	-	8	-	-	The issue of carbon pricing must be addressed here and how it is related to other policy instruments like direct support for renewables.	Section has been rewritten and substantially shortened. This comment is now encompassed under a more general bullet on 'policy, institutional and financial mechanisms'.
¿vind Christophersen (Climate and Pollution Agency)	SPM	-	-	-	-	8	-	-	We suggest that you consider deeletion of the section about knowledge gaps since it is not the most policy relevant isssue and it may well end up with a long list which will be difficult to agree upon.	While the section was not deleted, it was substantially shortened, and the focus was put upon a concise, encompassing list of knowledge gaps.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Juan Jose Sanchez (Ministry of the Environment, and Rural and Marine Affairs)	SPM	-	-	-	-	-	-	-	A ""Gigatone narrative"" when talking about mitigation potentials could be helpful to better understand and assess the potential of RE with respect to the needs for the different stabilisation levels.	Noted.
Richard Taylor (International Hydropower Association)	SPM	-	-	-	-	-	-	-	Comment: build a comparative table for RES of the most important data/stats/information from the RES chapters (2-7) to climate change mitigation.	Figures were selected for use for their ability to more clearly present messages - figures on cost, potential and learning curves were included in revised version.
Richard Taylor (International Hydropower Association)	SPM	-	-	-	-	-	-	-	Comment: Summary tables and figures must harmonise with those in the RES chapters (2-7)	All attempts have been made to assure that the information presented in summary tables/figures reflects that that is in technology chapters.
Roberto Acosta Moreno (CITMA)	SPM	-	-	-	-	-	-	-	Comprehensive, focused and useful.	Thank you.
Taishi Sugiyama (Central Research Institute of Electric Power Industry (CRIEPI))	SPM	-	-	-	-	-	-	-	Cost and benefits of RE policy should be cafefully reviewed. There are many criticisms against the heavy governmental interventions lacking the cost-effectiveness.	Accepted.
Gian-Kasper Plattner (IPCC WGI TSU, University of Bern)	SPM	-	-	-	-	-	-	-	Editorial Comment: abbreviations need to be introduced and explained in the text (and perhaps repeated in Figure/Table captions?)	Acronym list for the SPM appears in Annex I
Taishi Sugiyama (Central Research Institute of Electric Power Industry (CRIEPI))	SPM	-	-	-	-	-	-	-	Expanding RE itself should NOT be the policy goal. The goal should be cost-effective CC mitigation. Strong policy of RE without serious cost effecitvenessconsieration is called "governmental failure by pick and choose of technology", not a success story. You must discuss how the government can avoid such failure. Review, for example, Anthoff, David and Robert Harn, Government failure and market failure: on the inefficiency of envrionmental and energy policy, Oxford Review of Economic Policy, Volume 26, Number 2, 2010, pp. 197-224, doi: 10.1093/oxrep/grq004	Accepted.
Dr. Md. Sirajul Islam (North South University)	SPM	-	-	-	-	-	-	-	fig spm 3¿nuclear energy can cause health hazard, if accident occurs/ Waste disposal is a problem and may cause health implication if leaked/ Workers are always under health risk	Figure removed from SPM FD
Dr. Md. Sirajul Islam (North South University)	SPM	-	-	-	-	-	-	-	Fig SPM10: Capacity building, research and innovation is missing¿aren't they important ?	Figure removed from SPM FD and underlying text
Supachai Panitchpakdi (United Nations Conference on Trade and Development)	SPM	-	-	-	-	-	-	-	For a summary for policy makers there is a lack of information on relevant policies in this summary. This seems telling about chapter 11, which is supposed to deal with the main policy questions.	Accepted. Rewritten with a focus to incorporate information on relevant policies.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Doug Arent (Joint Institute for Strategic Energy Analysis)	SPM	-	-	-	-	-	-	-	For the SPM, the bulk of this is very well written with clear msgs, however, the figures are complex (too complex for policy makers), and there is too much emphasis on the scenario modeling as ¿indicative¿ of mitigation potentials vs constrained by fundamental scientific information such as resource knowledge or representing a broad ranges of RETs. I would recommend you consider adding caveats up front in the SPM and in Chpt 10 on these points (they are currently buried about 50% into Chpt 10). Additionally, the SPM seems to not clearly state the ¿technical potential¿ for RETs and then articulate that the contribution of RETs to local to global energy is therefore not one of resource, but of ¿harnessing¿ and converting to align with today¿s evolving (and enormous) energy supply and use system. As such, the mitigation potential of RETs depends therefore on what individuals, corporations and governments choose to invest in, thru choices of R&D, programs, and policies. This msg is not clear enough.	Rewritten for SPM FD with an attempt to clarify these messages and simplify figures.
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	SPM	-	-	-	-	-	-	-	Genaral comment: the SPM needs more work as it does not answer the most important question: can RE do the job or not? This is the question a policy maker has in mind when reading the SPM but the answer is not given here. Often a "on the one hand... on the other hand..." is given, but no general statement answering this question. Even if it is not possible at all to answer this question, this should be mentioned, including the identification of major research gaps on the way to answer this question. I would like to find statements such as i) RE can / cannot take over ii) at high / low costs, iii) in 2030, in 2050, only in the long term, iv) at mostly positive / negative side-effects. Moreover, an integrating view is missing. In the individual chapters, the individual technologies are assessed in depth. The SPM should provide an integrated overview on these technologies to make them somehow comparable. This is done very well in Table SPM1 and Table SPM3. In contrast, it is hard to get an integrated view on the market development status from the lists on page 18-19. At least a paragraph summarising and comparing these technologies should be added. For structuring these overview Tables or lists, it could be helpful to consider the above mentioned questions i-iv) as guiding questions.	Rewritten for SPM FD with an effort to clearly provide answers to questions such as this one to the best ability while still following underlying text.
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	SPM	-	-	-	-	-	-	-	General comment: the links to the original Figures and Tables in the individual chapters are missing, e.g. for Figure SPM 4, 5, 6, or Table SPM1. Also the references in the text to the other chapters are sometimes very weak. If one wants further reading, it is not enough to give a link to chapter x.y., better provide the subsection x.y.z. This is also important to be assured against the review by IPCC critics who will evaluate if the SPM really gives a summary of the information given in the chapters or gives an additional view.	Rewritten for SPM FD with focus on correctin these points.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Elina Vapaavuori (Finnish Forest Research Institute)	SPM	-	-	-	-	-	-	-	General comment: This chapter should be improved for better readability. At the present state it is useless. Illustrations and tables should be clear and self-sustaining; a bad example is Table SPM 5. Who are the politicians capable of digesting this? In SPM you should use appreviations with care and if needed, then give a list of appreviations at the end to help the reader.	Rewritten for SPM FD with a focus on clarity. Confusing figures were eliminated. Abbreviations are all explained in Annex I.
Antoine BONDUELLE (E&E Consultant)	SPM	-	-	-	-	-	-	-	General remark on PV. No explicit mention is made of possible (probable?) break even of PV electric production with fossil resources in the next decade, 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 implication 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. Maybe this should appear in the text.	will be looked if it is possible to add it
Taishi Sugiyama (Central Research Institute of Electric Power Industry (CRIEPI))	SPM	-	-	-	-	-	-	-	Heat pumps, including geothermal hot water heat pumps, room air conditioners, hot water heat pumps of Japan know as 'Ecocutes", are renewable energy. Review the the current status, technology development and policies. Literature include, to name a few, SRREN_Draft2_Review_Sugiyama_Taishi_Material_1, SRREN_Draft2_Review_Sugiyama_Taishi_Material_2,SRREN_Draft2_Review_Sugiyama_Taishi_Material_3,SRREN_Draft2_Review_Sugiyama_Taishi_Material_4, SRREN_Draft2_Review_Sugiyama_Taishi_Material_5.	Heat pumps are mentioned under 'Geothermal energy' in Box SPM 1. A more thorough explanation of the technology appears in underlying chapter but is too detailed to include in SPM.
Osamu Kimura (Central Research Institute of Electric Power Industry)	SPM	-	-	-	-	-	-	-	Heatpumps are recoginzed as renewable energy these days. Technology and policy has to be reviewed by SRREN. To name a few, followings are the literature: i) EU Directive on the promotion of the use of energy from renewable sources http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2009:140:0016:01:EN:HTML ii) German Renewable heat Law http://www.bmu.de/files/pdfs/allgemein/application/pdf/ee_waermeg_en.pdf iii) UK's Renewalbe Heat Incentive http://www.rhincentive.co.uk/eligible/energies/ iv) UK's Renewable strategy http://filesdown.esecure.co.uk/Gartree/TheUKRenewableEnergyStrategy2009_1_.pdf_17072009-1624-43.pdf	Heat pumps are mentioned under 'Geothermal energy' in Box SPM 1. A more thorough explanation of the technology appears in underlying chapter but is too detailed to include in SPM.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Taishi Sugiyama (Central Research Institute of Electric Power Industry (CRIEPI))	SPM	-	-	-	-	-	-	-	History tells that hydro, in particular large ones, and fossil fuels have been the key driver of WEHAB in modern society in UK, US, Japan and everywhere. The same goes to many developing countries. The draft neglects this reality . It is very biased.	All efforts are made to assure the text is balanced in its presentation. Impacts of individual technologies are addressed briefly in Section 3, and hydropower projects are noted to possibly require impreoved sustainability assessment tools. More detailed discussions are found in the underlying text, for which there is not room in the SPM.
Seth Dunn (GE)	SPM	-	-	-	-	-	-	-	I have read the SPM and cannot find any estimate of the emissions reduction potential of renewable energy, i.e. the estimated range of emissions avoided by 2050-2100. Isn't that a key deliverable of the report? Similarly, how much RE deployment would be needed to achieve 450 ppmv? I imagine policymakers would expect this report to help them understand the relative potential contribution of RE to achieving broad climate stabilization objectives.	Rewritten for SPM FD with more focus on scenarios and RE's contribution to emissions reduction; See section 6
Juan Jose Sanchez (Ministry of the Environment, and Rural and Marine Affairs)	SPM	-	-	-	-	-	-	-	I would suggest to include an specific section on barriers, before section 7 on policies. Current section 7 comments on barriers too, but given the importance of such an issue, it should be considered a section itself	An attempt was made to allocate barriers to a specific section, but because of substnatial overlap with Section 7 was again incorporated into that section.
Frank Mastiaux (EON Climate & Renewables)	SPM	-	-	-	-	-	-	-	In general a description of policies is missing. The SPM is highly technical, describing a lot of RE technologies, potential and deployment. The integrative chapters that are a large proportion of the main report are underrepresented here.	An effort was made to expand the discussion on policies.
Supachai Panitchpakdi (United Nations Conference on Trade and Development)	SPM	-	-	-	-	-	-	-	In the summary, market failures are mentioned many times, without specifying which ones. As many arguments for government action are based on the assertion that there are market failures, even in the summary, there should be an explanation of their nature.	Rewritten for SPM FD clarifying the discussion on market failures; See section 7
Chile (CONAMA)	SPM	-	-	-	-	-	-	-	In the text it is mentioned that the RE systems and energy efficiency can be powerful tools to expand the access to energy in a cost-effective way, improving the quality of life of the poor people. However, since currently the " low-carbon" systems can be very expensive, depending upon the availability of cheaper alternatives or renewable resources. Currently the ER can help to the access of the poor people to the electricity in more remote zones, where it is more expensive to get a connection, but not necessarily in case of the cities, where it is cheaper to be connected. Currently forcing to generate with a high percentage of ERNC, can strongly harm poorest, since this increases the price of the electricity (Comment made by Alexander Galetovic)	Access to energy particularly in the case of developing countries is discussed in Section 5, where it is clearly pointed out that access to RE is more competitive in rural areas with significant distances to the national grid.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Taishi Sugiyama (Central Research Institute of Electric Power Industry (CRIEPI))	SPM	-	-	-	-	-	-	-	Integration of PV with power grid should be addressed more - there is hot debate in Japan. I find many literature with regard to wind power in wind chapter and the intergration chapter, but almost none in solar and integration chapter with regards to solar.	Agree it should be in 8.2.1 and a comment in SPM if room
Nico Bauer (Potsdam Institute for Climate Impact Research)	SPM	-	-	-	-	-	-	-	It is not clear who the intended audiance is. I always understood IPCC as a scientific body that provides knowledge to policy makers at the international level that is agreed on before negotiations start. The reports and especially the SPM provide a certain common ground about the scientifc fundaments. Most of the issues tackled in the present SPM are more on the national level like the support of renewables or regulations of energy markets. Why is all that important and notable for the IPCC? The SPM should be clearer on the interesting points for international policy makers. However, it should not miss the importance for the nnational policy makers, because technology development has a lot to do with coordination of domestic policies under national souveraeignity. International technology transfer is another issue that is important for the international policy makers. It would also be important to explore the institutional umbrella under which such negotiations could take place; e.g. is the UNFCCC essential or are also bilateral agreement important. Moreover, what is the role of international institutions like IMF, Worldbank, UNIDO, UNEP, etc. And what could be the role of national institutions working on the international level like the German Kreditanstalt fuer Wiederaufbau (KfW) etc.	Accepted. Effort made to assure relevance for international as well as national policy-makers.
Richard Mueller (Climate Monitoring Satellite Application Facility, DWD)	SPM	-	-	-	-	-	-	-	It might be good to mention somewhere that solar irradiance assessment is no barrier for the use of solare energy as there exist several reliable sources on information.	will be added to underlying chapter. May be too detailed for SPM.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Hartmut Grassl (Max Planck Institute for Meteorology)	SPM	-	-	-	-	-	-	-	My comment only refers to the Summary for Policy Makers: Overall the text is a plea for a much higher share of renewable energies, which is nowadays kind of a motherhood statement but is still necessary for some regions of the world and some sectors of society. The following weaknesses in the SOD come to my mind: 1) Lack of a table with physical energy flux densities. Examples for global averages are: Solar Irradiance at the surface (161 Wm-2), wind energy flux density (3 Wm-2), geothermal heat flux (0.1 Wm-2), bioenergy flux density (0.1 Wm-2). Such a table should make clear that in the long run (beyond 2050) only solar energy and wind can supply the energy needed for mankind without major impacts on the environment. Another regional example may underline this statement: Germany has an energy flux density of its energy supply system of about 1.5 Wm-2. A well fertilized maize field delivers 0.3 Wm-2. If up to 20% of Germany's area would be given to bioenergy only up to 4% of our energy demand could be satisfied. These constraints for densely populated and highly developed areas become not clear in the present text. 2) All Tables follow the alphabetical order of renewable energy types but this is not told. Please indicate. 3) A major lack of the summary is the low key debate concerning externalities. Although subsidies for fossil energies are abundant in most countries and internalisation of externalities would boost renewable energies this does not become clear in the text. Again an example from Germany: The Environmental Protection Agency of Germany has published in 2007 a report indicating that feed-in tariffs for wind energy would be already lower than prices for electricity from coal-fired power plants were the externalities internalized. Present utilities companies always were fighting against internalisation. Please be more courageous in this regard.	Though physical energy flux densities are not compared across technologies, a figure on technical potential was introduced to address a similar message. A consideration of externalities is addressed alongside the revised discussion of LCOEs.
Gian-Kasper Plattner (IPCC WGI TSU, University of Bern)	SPM	-	-	-	-	-	-	-	several times in the SPM, the expression "the poor" is used. But how is a group like "the poor" defined? Who are "the poor". I suggest to avoid such generalization unless specific explanations are given.	Rewritten for SPM FD; 'The poor' has been removed
Gian-Kasper Plattner (IPCC WGI TSU, University of Bern)	SPM	-	-	-	-	-	-	-	Some of the bolded statements don't have a reference to the underlying text in the SRREN given. This needs to be added.	Text references were added consistently to the closing of the paragraph in which the bolded statement appears, or to individual sentences where relevant..
Antoine BONDUELLE (E&E Consultant)	SPM	-	-	-	-	-	-	-	SPM is well built and relevant to the chapters, but it includes several graphs that are too complex that could be simplified or removed for a better reading.	An effort was made to simplify or remove graphics that prove complicated or unuseful.
Dr. Md. Sirajul Islam (North South University)	SPM	-	-	-	-	-	-	-	Table SPM5 : Why Bioenergy is missing ?	Table removed from SPM FD. Comment no longer relevant.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Chile (CONAMA)	SPM	-	-	-	-	-	-	-	The different types of bioenergy have very different implications regarding their contributions to mitigating climate change. By generalizing the analysis in the Summary for Policy Makers and Technical Summary, much information about technologies, environmental impacts and other aspects that make more complex the analysis, is lost and not properly oriented to policy makers. This is particulary important for those located in poorer countries where biomass use is massive and brings significant air pollution problems. It is recommended to divide the analysis, so as to facilitate the understanding and assessment of the challenges of development (for example, it could be presented separately traditional and modern use of Bionergy, or depending on the risk of negative impacts associated with a poor planning of the land use) (Comment by Maritza Jadrijevic)	Unfortunately space limitation doesn't allow a discussion covering developed and developing countries bioenergy uses.
Chile (CONAMA)	SPM	-	-	-	-	-	-	-	The figures of the summary policy maker report should be self-explanatory. For example, for Figure SPM5 indicating a number of scenarios should be explained each of them. (Comment by Maritza Jadrijevic)	figure title will be revised if not self-explanatory
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	-	-	-	-	-	-	-	The information is sometimes presented in a somewhat incoherent manner; it needs a thorough consistency check.	Rewritten for SPM FD
Finland (Finniah Meteorological Institute)	SPM	-	-	-	-	-	-	-	The potential of biogas as traffic fuel should be presented more clearly in the SPM. Natural gas is already largely used as traffic fuel in many countries. It has an existing delivery network, where biogas could be connected without building additional delivery network. Utilisation of waste and residue biomaterials (such as municipality waste and agricultural and food waste) as feedstock for biogas will not only reduce usage of fossil fuels, but, in addition, increase the captivation of methane and other greenhouse gas emissions occurring if these materials decompose unutilised in dumps. In the same time this technology allows recovery and reuse of the nutrients contained in municipality waste and the residues from food production processes.	Biogas is just one of the options. It is not yet used in traffic except in demonstration.
Haroon Kheshgi (ExxonMobil Research and Engineering Company)	SPM	-	-	-	-	-	-	-	The SPM is very long. Suggest that the SPM be cut in half in length, its clarity and balance improved, and information retained only if it has a firm basis in the underlying chapters. On balance, for example, traditional uses of biomass contribute over half of all renewable energy yet receive little attention in the SPM where it is vaguely referred to in, for example, figure SPM 2.	Rewritten for SPM FD with a focus of shortening the text and improving clarity.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Nico Bauer (Potsdam Institute for Climate Impact Research)	SPM	-	-	-	-	-	-	-	The SPM misses to confront the potentials of RE supply for supplying various energy carriers and expected demand in the future (say 2050). This is important to know and should be put into a graph. The issue of barriers and issues is then much better to understand and also why additional policies may be sensible to implement. The following material contains support for this argument. 1. SRREN_Draft2_REVIEW_Bauer_Nico_Material3.pdf on page 289 shows that renewable energy technologies oculd do large part of the emission mitigation alone with only small increase of mitigation costs. 2. SRREN_Draft2_REVIEW_Bauer_Nico_Material4.pdf on page 125 shows that mitigation costs increase significantly, if renewables were fixed to the baseline case. 3. SRREN_Draft2_REVIEW_Bauer_Nico_Material5.pdf shows the same argument for also for other models on page 37	Figure on Technical potentials introduced in revised version. Text introduced on justification for policies.
Nico Bauer (Potsdam Institute for Climate Impact Research)	SPM	-	-	-	-	-	-	-	The SPM should be very clear about the problem of fossil fuel reserves and resources, which potentially could supply future energy demand, but which would exceed atmospheric carbon concentration consistent with Art. 2 UNFCCC. From the climate change perspective this is the starting point for considering renewable energy sources. SPM 2.1 is too weak in this repsect because it does not refer to the problem of hege carbon supplies in the future. SRREN_Draft2_REVIEW_Bauer_Nico_Material2.pdf on page 111 and 113 provides an overview of numbers published in scientific literature (including former IPCC reports) on fossil fuel reserves in terms of energy content and carbon content. These numbers need to be confronted with the emission limits that are consistent with achieving more or less stringent climate protection targets.	Fossil fuel reserves and resources are covered to the extent possible in Ch 1. Specific discussions on fossil fuel reserves are outside the scope of the SPM, though will be considered to the extent possible in the scenarios discussions..
Supachai Panitchpakdi (United Nations Conference on Trade and Development)	SPM	-	-	-	-	-	-	-	The summary also does not depict a greater challenge ahead, as according to some global GHG emissions will have to be reduced by at least 50% until 2050, and in developed countries by 80% or more. In this scenario it is suggested that this can only be achieved by a combination of drastic improvements in energy and material efficiency, on the one hand, and landmark shifts in the energy-generation mix, on the other.	Rewritten for SPM FD. Section 6 addresses mitigation challenges in the long-term.
Ladislaus Rybach (Geowatt AG Zurich (company))	SPM	-	-	-	-	-	-	-	The Summary for Policymakers 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 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.	Section SPM 2 now includes wording on a shift from high GHG energy carriers to lower GHG energy carriers such as RE in an attempt to address this point and simultaneously balance concerns with space.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Chile (CONAMA)	SPM	-	-	-	-	-	-	-	The variability of the power output of the ERNC may increase operation costs of the electrical system, because a greater margin of reserve in the operation is required. In addition, with a strong penetration of these technologies it is necessary also to invest in reinforcing and modernizing and to invest in systems of prediction. This could be considered like a negative effect of intermittent ER power stations (eolic). Energy security energetics can be improved with renewable energies, but at higher prices.	Not SPM. Will include in Chile case study if that is incorporated into new 8.2.1.Comment addressed by the existing text and proposed changes. Primary energy security is addressed in sections 1 and 2.2 of SPM.
Taishi Sugiyama (Central Research Institute of Electric Power Industry (CRIEPI))	SPM	-	-	-	-	-	-	-	There are criticisms to the benefits estimate of RE, and they must be reviewed. For exapmle, Lesser, J.A. Renewable Energy and the Fallacy of 'Green Jobs', Electr, J. (2010), doi:10.1016/j.rej.2010.06.019.	Detailed literature review is done in the chapters. A literature review surrounding the benefits of RE is done in depth in chapters 1 and 9.
Taishi Sugiyama (Central Research Institute of Electric Power Industry (CRIEPI))	SPM	-	-	-	-	-	-	-	There are criticisms to the cost effectiveness of RE promotion policies, and they must be reviewed. For example, Frondel, Manuel et al., Economic Impacts from the promotion of renewable energy technologies: The German Experience, Energy Policy 38(2010) 4048-4056 doi:10.1016/j.enpol.2010.03.029. ; Aonther example is Simon Less, editor, "Greener, Cheaper", Policy Exchange, www.policyexchange.org.uk, ISBN 978-1-906097-82-0.	Accepted.
Chile (CONAMA)	SPM	-	-	-	-	-	-	-	There is an imbalance in the report towards the analysis of the issue of biofuels, and there is little relevance to the bioenergy from waste, and improved use of traditional biomass (Comment by Maritza Jadrijevic)	Due to space restrictions focus on bioenergy remains on modern bioenergy. Where possible bioenergy from waste considered in underlying text.
Juan Jose Sanchez (Ministry of the Environment, and Rural and Marine Affairs)	SPM	-	-	-	-	-	-	-	There is few said along the whole text on the issue of capacity building. Lack of adequate qualified personnel along the whole value chain of the renewable energy sector is one of the main barriers already, not only in developing countries. Much more insights should be provided in this text with regard to this barrier and how to address it.	Noted. Efforts will be made to expand this discussion in underlying text, though too detailed for SPM.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Chile (CONAMA)	SPM	-	-	-	-	-	-	-	This report raises that regulatory barriers discourage renewable power plants. At such, it Is questioned the convenience of establishing a special regulations to make competitive to renewable in terms of its costs and benefits. The Renewable Energy (RE) have a true potential of CO2 mitigation, if their costs are comparable to those of the conventional technologies, as it is, for example, the case of the hydroelectric power stations and some projects of biomass. In the case of Chile, due to the characteristics of the electrical market, the technologies that were mainly replaced by RE proyects were large hydroelectric plants accomplishing only small reductions of CO2 and local atmospheric pollution, since the technology replaced does not emit CO2. It can be more advisable to expand the capacity of generation with other technologies. (Comment made by Alexander Galetovic)	There is a clear difference between a regulatory barrier and a regulation established by policy makers in support of RE.
Taishi Sugiyama (Central Research Institute of Electric Power Industry (CRIEPI))	SPM	-	-	-	-	-	-	-	This draft says : RE is cheep, but policy is unfair, that is why RE is not developing fastly, and strong policy should be in place. But, in reallity, RE is costly in most occasion, and that is why RE is not developing fastly despite costly policy interventions.	Clear effort has been made to present costs of RE in a balanced way. See Section SPM 3 in FGD.
Supachai Panitchpakdi (United Nations Conference on Trade and Development)	SPM	-	-	-	-	-	-	-	This summary is largely a technology-focused analysis. This is surprising as the paper underlines that economic, political and cultural, and not technical constraints are the main challenge for the massive deployment of RE technologies. By the same token, although the summary points out that "the transition to low-carbon energy systems are systemic and evolutionary social processes ¿ that imply important changes in societal activities, practices, and institutions with public policies driving the transformations", exactly this very task is not achieved.	Rewritten for SPM FD, technology section shortened.
Taishi Sugiyama (Central Research Institute of Electric Power Industry (CRIEPI))	SPM	-	-	-	-	-	-	-	While many kind of benefits of RE are qualitatively discussed, you must mention that there is no reliable estimates of benefits of RE to the extent that strong policy interventions are justified. There is a big knowledge gap here and you have to address it.	RE in the context of SD is discussed in Section 5, which addresses both the positive and negative aspects of RE. A quantification of the positive aspects of RE is difficult, as is the quantification of negative externalities of conventional fuels. The SPM and SRREN presents the knowledge that is available and knowledge gaps are covered in Section 8.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Taishi Sugiyama (Central Research Institute of Electric Power Industry (CRIEPI))	SPM	-	-	-	-	-	-	-	While the draft include many valuable information, they are masked by cheep policy propaganda of renewable lovers, unfortunately. Remove all policy prescription, put more emphasis on technical information so that the readers benefit from data. The current draft is highly plicy prescriptive, biased in support of RE policy, often lacking scientific substanciation. Without major revision, I am afraid that the reputation of IPCC may be in danger.	Rewritten with an attempt to eliminate any advocacy language and to clearly present all related issues in a balanced way, clearly supported by data.
Taishi Sugiyama (Central Research Institute of Electric Power Industry (CRIEPI))	SPM	-	-	-	-	-	-	-	You must address costs, intermittency, and stability of supply in the first place. These three are the key barries of RE.	Rewritten for SPM FD
Taishi Sugiyama (Central Research Institute of Electric Power Industry (CRIEPI))	SPM	-	-	-	-	-	-	-	You must show the current status of RE supply at first, define RE (including distinction between large hydro and small hydro), and explain that majority of RE today is large hydro and conventional biomass, while modern bio/PV/wind share is very small compared to total energy supply of the globe.	Rewritten for SPM FD; See section 3
Ladislaus Rybach (Geowatt AG Zurich (company))	SPM	-	-	-	-	-	-	SPM 2	Are there no more recent data as from 2007?	NEW DATA FOR 2008 NOT YET AVAILABLE
United States (U.S. Department of State)	SPM	-	-	-	-	-	-	SPM 2	It is unhelpful to include traditional biomass in the totals for RE. Traditional biomass is largely unsustainably harvested, resulting in increased GHG emissions and its use is associated with adverse air quality and health impacts.	Traditional Biomass included in the underlying data from the IEA. Specifications made clarifying its percentage in new figure that replaces this table.
Nico Bauer (Potsdam Institute for Climate Impact Research)	SPM	-	-	-	-	-	-	SPM 2	refer to table 1.5; EJ numbers for "Renewables" and "total" differ from table 1.5., % for "renewables" as well, check; as in table 1.5 suggest to round to full numbers since assesments may not that precise in reality	Table replaced with more accurate/clear figure in SPM FD
United Kingdom (Department of Energy and Climate Change)	SPM	-	-	-	-	-	-	SPM 2	The data in this table aren't reflected in later chapters. What are the criteria to which the numbers published by the IEA have been applied? What report published by the IEA do the baseline numbers come from? Is it public domain? It is not possible for the policy maker to track from this table back to the supporting data. If these are judgments by the working group, that is fine and should just be stated. But as it stands, the reader expects to find supporting information back in the body of the document, and if it is indeed there, it was not evident during this review.	Table replaced with figure in SPM FD, and text introduced clarifying source of data.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	SPM	-	-	-	-	-	-	SPM 3	[Land Use and Population] <comment> From evaluating viewpoint of "comparison of generating efficiency per unit area for electric power facility", it is necessary to specify such advantage into the field of positive (plus) aspect of nuclear. <reason> Such evaluation criteria is very important for the area with limited land use. <reference> Agency for Natural Resources and Energy ; JPN http://www.meti.go.jp/committee/materials/downloadfiles/g60815a05j.pdf	Removed from SPM FD and underlying report

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Gilbert Eggermont ()	SPM	-	-	-	-	-	-	SPM 3	Air and Water: incorrect statement! There are multiple releases of radioactive and non radioactive products over the nuclear fuel cycle industry. The radon emanations in and around uranium mining activities and downstream fuel cycle activities (till enrichment) is considerable with lung cancer risk (with increased risk factors by WHO in 2009). Considerable quantities of noble gases (xenon and krypton isotopes) are released also during reactor operation and for Kr85 during reprocessing together with tritium; a large part can be mitigated by hold up for decay as applied in some NPP except during reactor start up, but this practice is not generalized;skin doses are considered marginal due to present model assumptions but uncertainty (precaution?) persists on solubility of noble gases in the human body; the leukemia clusters around nuclear power plants (German SSK Study,KiKK) could not be explained yet by the dose concept and are assessed by health council working groups in Belgium and the Netherlands. Finally during reprocessing a longer living Krypton-85 isotope is released in huge quantities with world wide measurable dispersion. (Ref Kr-85 proc of a workshop, Brussels 1998, (with int review) publishes as SCK-BLG-835, Mol, 1999). Again in dose this is not so important but the krypton background average in the atmosphere has increased orders of magnitude since 1945. Ref.: Most complete overview of releases to land air and land dumps of the whole nuclear fuel cycle per GWe produced are given in Pigford T.H.., Environmental Aspects of nuclear energy production, Annual Review of nuclear Science 24, 1974; Periodic reassessments are presented by UNSCEAR and reassessed from 16 tot 20/8/2010 in Vienna (57° session UN Sc Com Effects Ion. Rad.). They list the collective doses from the nuclear fuel cycle which are most important even dominant in the mining of uranium due to radon gas emission (source term Ra 226 half life 1600 y) from tailing piles and residuals; considerable progress occurred last decennium but the remediation actions of former mines are not yet considered sustainable and consist of ground coverage which is not effective over long periods. A broader debate on the life-cycle analysis of uranium mining and nuclear power is proposed as necessary to UNSCEAR Vienna ongoing discussions 57° session (ref Methodology for estimating exposures due to discharges A/AC.82/R.677.which illustrates the evidence of multiple releases (see also the DIRATA data base of IAEA). They are considered to have limited health significance at present due to the controversial dose abstract concept indicator. In the fuel cycle industries (fuel fabrication) pollution of classicreleases such as fluorine needs attention and mitigation (enrichment by diffusion is done with gaseous uranium fluoride) Finally, tritium, with low radio-toxicity is released in NPP and reprocessing industries in air and water. But in future developments considerable quantities of tritium will be released by fusion development projects . TheEC fusion direction is already proposing to make the drinking water directive less stringent (factor 100) in future for not constraining fusion development. Recommendation Belgian Health Council in 2007 (nr 8274) to clarify risks from tritium and to control better tritium releases and to improve environmental follow up of tritium in future	Removed from SPM FD and underlying report

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Gilbert Eggermont ()	SPM	-	-	-	-	-	-	SPM 3	Built Environment: nothing is said on thermal pollution which is a considerable scale effect of large nuclear sites requiring huge cooling towers but also without cooling towers at locations near the sea side (temperature increase (ex Gravelines site 6GWe)	Removed from SPM FD and underlying report
Sampo Soimakallio VTT Technical Research Centre of Finland)	SPM	-	-	-	-	-	-	SPM 3	Column 1, row 2: Add after ""threats to small landowners"" or replace it with ""potential disruption of local production systems and concentration of land and other social impacts"". Cf. Chapter 2, section 2.5.5, p. 73, lines 31-35.	Removed from SPM FD and underlying report
Gilbert Eggermont ()	SPM	-	-	-	-	-	-	SPM 3	Ecosystem: Remark that the nuclear sector has not yet developed anecosystem approach in its regulation; it remains anthropocentric with non-successful attempts to enlarge the risk assessment system to other species of fauna and flora (ICRP, EC)	Removed from SPM FD and underlying report
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	-	-	-	-	-	-	SPM 3	First row under ocean energy, suggest change "decentralised" to "offshore". There is not much reason to think that ocean energy will be decentralised, it will likely be in utility scale installations like wind parks.	Removed from SPM FD and underlying report
Steffen Schlömer (TSU)	SPM	-	-	-	-	-	-	SPM 3	Geothermal: no direct atmospheric emissions (with the exception of geothermal heat pumps)	Removed from SPM FD and underlying report
Gilbert Eggermont ()	SPM	-	-	-	-	-	-	SPM 3	Human health: Virtually no pollution is incorrect considering the mining activities and legacies in numerous developing countries (tailing piles similar to coal terrils)	Removed from SPM FD and underlying report
Chile (CONAMA)	SPM	-	-	-	-	-	-	SPM 3	In Table SPM 3 (Social and Environmental Benefits and Concerns Associated with Conventional and Renewable Energy Sources), we recommend in the column labeled ¿bioenergy¿ and the raw labeled ¿ human health¿ add at the end of the sentence ¿lower and less toxic air pollutant emissions improving human health¿ the sentence: subjet to appropriate conditions for biomass combustion. (Comment by Maritza Jadrijevic)	Removed from SPM FD and underlying report
Chile (CONAMA)	SPM	-	-	-	-	-	-	SPM 3	In Table SPM 3 (Social and Environmental Benefits and Concerns Associated with Conventional and Renewable Energy Sources), we recommend adding in the column labeled ¿bioenergy¿ and in the row labelled ¿air and water¿, a mention to air pollution problems such fine particulate matter (PM2.5), and volatile organic compounds (VOC) (Comment by Maritza Jadrijevic)	Removed from SPM FD and underlying report
Chile (CONAMA)	SPM	-	-	-	-	-	-	SPM 3	In table SPM3 there are no probabilities of ocurrence to the events, so nuclear and hidropower technologies, and biomass may be unfairly considered. In the case of Chile, cost presented are no representative enougth. (Comment made by Alexander Galetovic)	Removed from SPM FD and underlying report
Gilbert Eggermont (0)	SPM	-	-	-	-	-	-	SPM 3	Land use: low land use from nuclear power plants but considerable land use from fuel cycle industries in particular from U mining waste	Removed from SPM FD and underlying report

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
United Kingdom (Department of Energy and Climate Change)	SPM	-	-	-	-	-	-	SPM 3	Negative impacts of bioenergy should include pollutants impacting on local air quality. Many of the other items of concern are much lower for bioenergy than for common agricultural use e.g. fertilizers, nitrate pollution, agrochemicals, risk of fires (often reduced when bioenergy implemented for woodlands).	Removed from SPM FD and underlying report
Gerrit Hansen (TSU)	SPM	-	-	-	-	-	-	SPM 3	Nuclear power risks seem to be limited to case of accidents, but BAU (radioactive) hazards due to Uranium mining, and health risks to workers might be included fo nuclear power.	Removed from SPM FD and underlying report
United States (U.S. Department of State)	SPM	-	-	-	-	-	-	SPM 3	Recommend deleting table. Much too detailed for SPM and inconsistent treatment of impacts across technologies.	Removed from SPM FD and underlying report
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	-	-	-	-	-	-	SPM 3	row 4 under ocean energy: not sure what the effects on pollution are from wave and tidal power? Please clarify. Also suggest that you do not distinguish between swell and wave, just call it wave	Removed from SPM FD and underlying report
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	-	-	-	-	-	-	SPM 3	row 6 under ocean energy: it is not only barrages that could have a negative environmental impact, i think the other ocean technologies could be mentioned briefly.	Removed from SPM FD and underlying report
Netherlands (KNMI (Royal Dutch Meteorological Institute))	SPM	-	-	-	-	-	-	SPM 3	row five under ocean energy: this increase in biodiversity is not supported/referenced very well in chapter 6, i think this needs checking/clarifying	Removed from SPM FD and underlying report
United States (U.S. Department of State)	SPM	-	-	-	-	-	-	SPM 3	The adverse impacts for hydropower listed here are mostly from large, poorly designed projects and are not necessarily applicable for all types of hydropower. See for example the IEA Hydropower Annex's report on Good Practices.	Removed from SPM FD and underlying report
United Kingdom (Department of Energy and Climate Change)	SPM	-	-	-	-	-	-	SPM 3	There is no real sense of the relative weight or inter-dependency between the benefits and concerns given in the table which makes it potentially a bit misleading. e.g. 'positively intensified land uses' is given as a point in favour of bioenergy, but this is situation-specific and depends on other considerations like the availability of a sustainable water supply for irrigation. The risk of deforestation or other land use change in favour of bioenergy is probably a wider issue. Similarly, a concern associated with nuclear power is the impact of an accident - potentially very serious but the risk is actually relatively low in the right safety/regulatory conditions.	Removed from SPM FD and underlying report
Haroon Kheshgi (ExxonMobil Research and Engineering Company)	SPM	-	-	-	-	-	-	SPM 3	This table is unusual for an SPM in that it provides literature references as opposed to sections of the report that came to the table¿s conclusion, and that the SPM does not list the references at the end of the SPM. Furthermore, the reference from Krewitt appears to be relied on heavily as a source of technical potential. Suggest that inconsistency of referencing be fixed, the reasons behind (and definition of) the wide range of technical potential be given, and a broad range of literature be relied on.	Removed from SPM FD and underlying report

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Haroon Kheshgi (ExxonMobil Research and Engineering Company)	SPM	-	-	-	-	-	-	SPM 3	This table loses relation to the relative magnitude of the potential effects of the different sources of energy. For example, on land use bioenergy is clearly the most land intensive yet it appears on par with other energy sources. On air it is not clear why air emissions of biomass combustion are not mentioned or the effects of atmospheric circulation of wind energy. On built environment it is not clear if new additional infrastructure (and additional cost) is actually a positive or negative. Suggest that this table be reconsidered and give weighting of statements consistent with the magnitude of effects.	Removed from SPM FD and underlying report
Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	SPM	-	-	-	-	-	-	SPM 3	Under ""air & water"" and ""bioenergy"", there are co-benefits of reducing the amount of complex organic compounds released to the water and soils by digestion for biogas production. Under ""geothermal"", it is not strictly correct that there are no emissions: for vulcanic sources it is probable the release of CO2 and sometimes H2S, SO2 from using deep water in contact with hot rocks.	Removed from SPM FD and underlying report
Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	SPM	-	-	-	-	-	-	SPM 3	Under ""built environment"" and ""hydropower"", flood control from dams should be mentioned as beneficial.	Removed from SPM FD and underlying report
Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	SPM	-	-	-	-	-	-	SPM 3	Under ""land use & population"" and ""direct solar"" it seems odd mentioning negative impacts from use of land for power plants in urban areas. This should be too rare to be mentioned as significant, as the high land price and physical conditions (shadows, aerosols, etc.) do not advise to place large power plants into dense urban areas. Micro- or mini-systems can be placed on roofs or walls and that is on the contrary a a benefit in terms of land use. Under ""hydropower"", it strikes me that the two most important uses in my country - crop irrigation and municipality uses - are not mentioned (and again in ""air & water"").	Removed from SPM FD and underlying report

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	SPM	-	-	-	-	-	-	SPM 3	Under "ecosystems & biodiversity" and "bioenergy", it seems odd to state just negative impacts on biodiversity and invasive species; on the contrary, correctly performed forest clearing for retrieving wastes for burning should allow improved biodiversity (increasing areas with access to the sun at any point of the canopy allow growing of species of the beginning of the ecological succession adapted for a certain site) and target primarily invasive species, protecting endemic species. Note: it seems that nearly all the comments in the Table for "bioenergy" only have in mind the case of monoculture "energy crops"... Under "hydropower", there are also benefits for biodiversity from water dams, not just threaths - e.g. 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. Under "nuclear" and "fossil fuels", there should be a mention to the ecological impact of warming river or sea waters as a result of cooling needs of the power plants. This impact can be large for instance during summer in mediterranean type climates with highly variable seasonal river regimes and is prone to worsen with, precisely, climate change.	Removed from SPM FD and underlying report
Nico Bauer (KNMI (Royal Dutch Meteorological Institute))	SPM	-	-	-	-	-	-	SPM 3	What's the message? Pls refer to critique on Figure 1.5	Removed from SPM FD and underlying report
Steve Sawyer (Global Wind Energy Council)	SPM	-	-	-	-	-	-	SPM 3	When comparing the different generation technologies, we suggest to also compare water consumption, to highlight the fact that a number of RE technologies, wind and solar in particular (excluding CSP) consume no water when producing electricity. This could be added into the comments under 'air and water' for each technology	Removed from SPM FD and underlying report
Brazil (Ministry of Science and Technology)	SPM	-	-	-	-	-	-	SPM 4	Bioenergy has a significant potential for electric power and heat generation. Therefore, its technical potential should be listed in these two sections of table SPM.4.	Biomass was included under 'primary energy' in the figure that replaced this table.
Japan (the Japanese Ministry of Foreign Affairs)	SPM	-	-	-	-	-	-	SPM 4	It should be clarified whether technical potential includes only new installations or also existing installations, with consideration for quality deterioration, such as that for PV cells, which have been recently reported.	Table replaced with Figure in SPM FD. Additional notes on data included in figure are found in Chapter 1.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
United States (U.S. Department of State)	SPM	-	-	-	-	-	-	SPM 4	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	Though table replaced with figure that does not differentiate on and off-shore wind for brevity purposes, data in underlying chapter is differentiated.
Gerrit Hansen (TSU)	SPM	-	-	-	-	-	-	SPM 4	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 readibiliy as TS and chapter 1 text refers to total technical potentials.	Table replaced with figure in SPM FD. In revision, consistency with data in tech chapters assured.
Kaija Hakala (MTT Agrifood Research)	SPM	-	-	-	-	-	-	SPM 4	Range of estimates of biomass energy crops and biomass residues are not addressed to either?	Biomass was included under 'primary energy' in the figure that replaced this table.
Japan (the Japanese Ministry of Foreign Affairs)	SPM	-	-	-	-	-	-	SPM 4	Table should include current figures for comparison.	Current demand figures for electricity, heat and primary energy were included in Figure SPM.5, which replaced Table SPM.4 of the SOD.
United States (U.S. Department of State)	SPM	-	-	-	-	-	-	SPM 4	Table SPM 4, Table TS 1.1, and Table 1.3 are all identical. These three tables include multiple footnotes that undermine the validity of the figures and are not related to the values from the technology chapters. These footnotes mean that the table tends to negate the work in the technology chapters. If a technical potential summary table is to be included in these summary chapters it should summarize the content of the technology chapters. Technical potential varies significantly by technology and by region, therefore a summary table should reflect both of these variations.	Table replaced with figure in SPM FD. In revision, consistency with data in tech chapters assured.
Sampo Soimakallio (VTT Technical Research Centre of Finland)	SPM	-	-	-	-	-	-	SPM 4	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.	biomass figures were included in the figure that replaced this table, and are consistent with the content of Chapter 2.
Brazil (Ministry of Science and Technology)	SPM	-	-	-	-	-	-	SPM 5	Bioenergy costs should be included in table SPM.5.	Bioenergy costs have been included in the LCOE cost comparison, which appears as a figure in the FGD SPM.
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	SPM	-	-	-	-	-	-	SPM 5	Offshore wind cost appear to be to low, cost for North Sea projects are about 18 ¿ct/kWh (2010).	Table removed from SPM FD

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Nico Bauer (Potsdam Institute for Climate Impact Research)	SPM	-	-	-	-	-	-	SPM 5	Please make clear that the percentage number is the interest rate. I did not find in the figure caption.	Table removed from SPM FD
Keigo Akimoto (Research Institute of Innovative Technology for the Earth (RITE))	SPM	-	-	-	-	-	-	SPM 5	The definition of ""Learning Rate"" is needed for many readers.	Table removed from SPM FD
Switzerland (IPCC WGIII)	SPM	-	-	-	-	-	-	SPM 5	There is no reference, and it was not possible to find any reference for the learning rate for hydropower given for various RE sources.	Table removed from SPM FD
Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	SPM	-	-	-	-	-	Box 1	-	In ""Bioenergy"", waste waters could be specifically mentioned at the same level of municipal solid wastes, as ""other organic waste streams"" does not seem clear for non-expert readers. (note: the acronym MSW is not used is the rest of the SPM, could be removed).	We will use the term organic waste stream in the SPM
Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	SPM	-	-	-	-	-	Box 1	-	In ""Direct solar energy"", an expert can appreciate the careful use of the expression instead of just ""solar energy"", but for a policymaker this may be confused with ""direct solar radiation"", that he/she may be hearing in the context of concentrated solar power plants that are currently receiving so much attention. I believe ""solar energy"" is sufficiently clear and no rigour is lost as the meaning is anyway defined in the Box. The TS uses just ""solar energy"" and is intended for a more technical audience than the SPM...	The terminology 'direct solar energy' was a mandate from the IPCC plenary.
Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	SPM	-	-	-	-	-	Box 1	-	In "Geothermal", the term "capacity factor" is certainly not clear for many policymakers, would need prior definition; this, and the quotation of specific numerical data, seems uncoherent with the way the other RE items are treated.	Capacity factor text removed from SPM, though covered more extensively in underlying text of Chapter 8.
Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	SPM	-	-	-	-	-	Box 1	-	In "Ocean energy" no technologies for "biomass energy" from seawater are mentioned; indeed one is referred in Table 1, at R&D stage only, but then not in the "energy paths" of Figure 1 some pages ahead. Anyway it is confusing and seems to me that it would be better ranked under "Bioenergy", as for the partially related case of algae. And note that it is not consistent with the TS, that does not include biomass as "ocean energy".	Aquatic biomass is now discussed under bioenergy - it does not appear in the ocean energy section.
Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	SPM	-	-	-	-	-	Box 1	SPM 1	CPV is certainly used for "decentralized" application, not just for "centralized" power plants. Single trackers are being sold and used for mini-generation systems at least in Spain and Portugal. Also, it strikes me as somewaht odd that the maturity of "Concentrating PV" is set at just "Demo and Pilot"; at least in Spain there are what I would consider early stage commercial power plants... although the frontier between pilot and early commercial is nowadays a bit vague.	Table removed from SPM FD

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Nico Bauer (Potsdam Institute for Climate Impact Research)	SPM	-	-	-	-	-	SPM 1	-	A number of issues with that, refer to critique on Figure 1.6	Figure substantially revised. Comments from underlying text also considered.
Australia (0)	SPM	-	-	-	-	-	SPM 1	-	A number of the diagrams contained in the section are overly complicated and perhaps belong in the Technical Summary rather than the Summary for Policymakers.	Accepted. Figures 2 and 3 removed from SPM.
Richard Mueller (Climate Monitoring Satellite Application Facility, DWD)	SPM	-	-	-	-	-	SPM 1	-	Arrow from solar energy to electricity is missing (PV systems)	Added in revised figure.
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	SPM	-	-	-	-	-	SPM 1	-	Figure is not well explained, the arrows in both directions are not explained, disarranged.	Figure substantially revised for clarity
Nico Bauer (Potsdam Institute for Climate Impact Research)	SPM	-	-	-	-	-	SPM 1	-	It is not clear how this graph is related to the problem of fossil energy carriers and the limited absorptive capacity of the earth system if the carbon is released to the atmosphere. It only gives a scetch of energy conversion path ways. There is no indication of the severity of the climate problem arising from fossil fuels and to what extent renewables may possibly contribute to the solution of this problem. Also the corresponding text on page 9 is not directing the reader into that direction because it mainly speaks about the problem of ""thermal losses to which combustible fuels are subject"". However, the problem of climate change is due to uncontrolled CO2 emissions and not due to thermal losses.	The point of this figure is to present a schematic image of the paths from energy sources to services, and not to explain the relationship between renewables and climate change.
United States (U.S. Department of State)	SPM	-	-	-	-	-	SPM 1	-	Recommend deleting figure. Does not add value in SPM.	Noted.
¿vind Christophersen (Climate and Pollution Agency)	SPM	-	-	-	-	-	SPM 1	-	The figure is a bit theoretical and seems to miss some important elements. Fuels can be used to produce electricity without going through heat e.g. in gas turbines. We think the dimensions related to transmission of energy carriers are missing. Electricity is also a carrier of all the way from production to end use. Liquid fuel can be used directly for transport services i etc.	Figure substantially revised, considering sentiments of comment.
Nico Bauer (Potsdam Institute for Climate Impact Research)	SPM	-	-	-	-	-	SPM 1	-	The top-layer (original source of energy) is not adding knowledge that is important for policy makers. Please skip it from the graph.	Accepted.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Haroon Kheshgi (ExxonMobil Research and Engineering Company)	SPM	-	-	-	-	-	SPM 1	-	This figure is repeated in the technical summary and in chapter 1 however the source of information in the figure is not given and I worry about its accuracy. For example, for lignocellulose ethanol the Ch 2 executive summary states that it would require R&D advances and market support before potentially becoming commercial in 2020, however, the table says it is in the early commercial stage. Currently the largest lignocellulose ethanol plant produces ethanol at a rate of approximately 1% of a typical new conventional ethanol plant; to me this does not appear to be at the early commercial stage. Suggest that this table be based on assessed literature in the supporting chapters and not simply put forth without a clear and strong basis.	Figure is original. Assuming that the rest of the comment refers to Table SPM, revisions will be made to assure consistency with underlying text.
Gunnar Luderer (Potsdam Institute for Climate Impact Research)	SPM	-	-	-	-	-	SPM 1, SPM 2, SPM 8	-	These figures contain a lot of redundant information, but also different information. They should be harmonized and streamlined in order to avoid confusion.	Accepted. Effort made to condense and streamline information presented in SPM figures.
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	SPM	-	-	-	-	-	SPM 10	-	In one of the bubbles a "mix of policy instruments is mentioned". This is misleading because it is very rare that there is a mix of instruments in one country. It should only be stated that a policy intrument is needed. So delete "Mix of".	Figure removed from SPM text.
Brazil (Ministry of Science and Technology)	SPM	-	-	-	-	-	SPM 10	-	Mandates stipulating a share of renewable sources in the energy mix are one of the most important policy instruments to foster renewable energies. Therefore, the illustrative list of policy instruments in figure SPM 10 should read as follows: ""Mandates, FIT, quotas, tax incentives¿"".	Figure removed from SPM text.
Nico Bauer (Potsdam Institute for Climate Impact Research)	SPM	-	-	-	-	-	SPM 10	-	This graph is the simplest of the whole SPM and it is at the very end. Why? It would be more conenient for the readr to start with an overview that is simple and general and than go into the details of e.g. energy system like it is depicted in Figure 1.	This graph has been removed from the SPM. Nonetheless, an attempt was made to simplify the figures for clarity and understanding.
United States (U.S. Department of State)	SPM	-	-	-	-	-	SPM 10	-	Though this figure makes some important points, it should be modified for consistency. For example, the headings should describe either members of the group or activities of the group. Also, replace "Institutions" with "Government" and include local, regional and national elements to emphasize the importance of governance at all levels in creating an enabling environment.	Figure removed from SPM text.
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	SPM	-	-	-	-	-	SPM 2	-	Figure is disarranged.	Figure deleted from SPM FGD.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Ladislaus Rybach (Geowatt AG Zurich (company))	SPM	-	-	-	-	-	SPM 2	-	The EJ number for Geothermal in Primary Energy Supply (second from bottom) should be 0.4 (see Table SMP 2) instead of 2.1.	Appears to have been done in the Table SPM2 but not Figure SPM2. The EJ number for Geothermal in Primary Energy Supply (second from bottom) is 0.39 (rounds to 0.40) in table SPM2 as pasted in to right (here). Figure SPM2 needs be edited as shown at right with call-out box
¿vind Christophersen (Climate and Pollution Agency)	SPM	-	-	-	-	-	SPM 2	-	The figure is difficult to understand.	Figure deleted from SPM FGD.
Nico Bauer (Potsdam Institute for Climate Impact Research)	SPM	-	-	-	-	-	SPM 2	-	The figure provides a snapshot of the situation in 2007, however, the main issue should be in how far RES can replace fossil fueld energy to supply the growing demand	Figure deleted from SPM FGD.
Nico Bauer (Potsdam Institute for Climate Impact Research)	SPM	-	-	-	-	-	SPM 2	-	This figure contains an implicit assumption that is hard to justify. The allocation of RE secondary energy (electricity and heat) to the end-use sectors can not be done in the way it is presented here without an additional assumption. Statistics of IEA do not reveal how much RE electricity is used in the industry or transport sector. The IEA statistics provide information of how much electricity is used in the end-use sector, but it is not clear how much of that comes from which energy carrier. E.g. households and industry have very different patterns of temporal demand. As industry is more related to a flat load-duration curve households have disnct peaks in the morning and the late afternoon. If a country is mainly flat hydro would surely supply more to industry, but is the country is characterized more with mountains hydro would certainly use hydro more to balance load variations. Hence the same hydro production could supply industry and/or households with more or less electricity. Hence, an additional assumption is required to fix the supplies. This assumption is clearly stated here and there is no peer-reviewed reference to the validity of the method.	Figure deleted from SPM FGD.
Haroon Kheshgi (ExxonMobil Research and Engineering Company)	SPM	-	-	-	-	-	SPM 2	-	This figure is confusing, and the focus on thermal losses as opposed to overall efficiency is potentially misleading. It is not clear why electricity is included as an energy carrier, but biofuels are not. And it is not clear why efficiency is not depicted: for solar power where only a small fraction of sunlight is used, and for traditional uses of biomass where much of the heat of combustion does not provide the cooking or heating service desired.	Figure deleted from SPM FGD.
United Kingdom (Department of Energy and Climate Change)	SPM	-	-	-	-	-	SPM 3	-	Box with words "biofuel crop cultivation" is misleading as biofuels are normally understood as liquid transport fuels. Cultivation is also misleading, as we don't think of forests as bieng cultivated. Something like "biomass production" would be better.	Figure deleted from SPM FGD.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Antoine BONDUELLE (E&E Consultant)	SPM	-	-	-	-	-	SPM 3	-	Figure SPM3 is rather too complicated for the benefits it brings to the text. Maybe simplify?	Figure deleted from SPM FGD.
Ricardo Aguiar (LNEG - National Laboratory for Energy and Geology, P.I.)	SPM	-	-	-	-	-	SPM 3	-	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 from SPM FGD.
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	SPM	-	-	-	-	-	SPM 3	-	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 from SPM FGD.
United States (U.S. Department of State)	SPM	-	-	-	-	-	SPM 3	-	Recommend deletion. Figure doesn't convey any helpful information. Is there a point that might be better explained through the use of a table?	Figure deleted from SPM FGD.
Ladislaus Rybach (Geowatt AG Zurich (company))	SPM	-	-	-	-	-	SPM 3	-	Row ¿Air and Water¿ + / column ¿Geothermal¿: ¿No atmospheric emissions¿ is not strictly true: geothermal power generation is accompanied by CO2 emission, with about 100 gCO2/kWhe [4.5.1]. The text should read ¿only limited atmospheric emissions¿.	Figure deleted from SPM FGD.
¿vind Christophersen (Climate and Pollution Agency)	SPM	-	-	-	-	-	SPM 3	-	The figure is difficult to understand.	Figure deleted from SPM FGD.
Brazil (Ministry of Science and Technology)	SPM	-	-	-	-	-	SPM 3	-	The following impacts associated with wind power should be included: ""bird and bat fatalities, habitat and ecosystem modifications, landscape alterations"". Source: Table SPM.3	Figure deleted from SPM FGD.
Ladislaus Rybach (Geowatt AG Zurich (company))	SPM	-	-	-	-	-	SPM 3	-	This figure is too busy and more confusing than helpful. In addition: the figure caption clearly admits that the figure is incomplete.	Figure deleted from SPM FGD.
Gunnar Luderer (Potsdam Institute for Climate Impact Research)	SPM	-	-	-	-	-	SPM 3	-	This figure is very confusing. It seems absolutely inaccessible for the target audience: Policymakers. It needs to be simplified to convey a clear message or removed.	Figure deleted from SPM FGD.
Switzerland (Potsdam Institute for Climate Impact Research)	SPM	-	-	-	-	-	SPM 3	-	Too sophisticated for the readership of an SPM. Needs too much time to understand what the figure wants to show. Probably a table similiar to Table SPM-3 would be more appropriate.	Figure deleted from SPM FGD.
Luiz A. Horta Nogueira (RWE Innogy GmbH)	SPM	-	-	-	-	-	SPM 4	-	The horizontal axis categories should be explained	will be done in the figure caption
Haroon Kheshgi (ExxonMobil Research and Engineering Company)	SPM	-	-	-	-	-	SPM 4	-	This figure mentions scenarios assessed, and the paragraph that precedes the figure discusses the effects of ghg reduction objectives on future emissions. It is unclear in this figure what is the criteria for selection of scenarios that are summarized in this figure: e.g. are these reference scenarios or mitigation scenarios? Do they include energy outlooks? It may also be useful to include a panel on actual 2010 RE sources as well as a bar for non-RE sources perhaps on a different scale.	background of scenario survey (selection and survey of 165 scenarios should be mentioned, current status of RE use will be outlined in the figure caption

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
United States (U.S. Department of State)	SPM	-	-	-	-	-	SPM 4	-	This is another place in which the inclusion of traditional biomass is not helpful for understanding the evolution of the energy system toward providing sustainable modern energy services. Is the rise in biomass simply due to population increase and associated traditional biomass usage, or is there an increase in the use of biomass to provide sustainable energy services? One can't tell from the figure.	role of tradionell biomass should be pointed out, caveat will be included
Fritz Vahrenholt (Prof. Dr.) (U.S. Department of State)	SPM	-	-	-	-	-	SPM 5	-	It appears as if the bars are missing for "no ccs and no nuclear" in most scenarios in the chart: Possible? In case of a mistake also check Figure 10.2.6 accordingly.	some of the scenarios do not deal with no CCS or No nuclear case studies, howver the SPM 5 will be skipped
massimo tavoni (FEEM and CMCC)	SPM	-	-	-	-	-	SPM 5	-	Results from the RECIPE model intercomparison exercise are shown for both RE-MIND and IMACLIM-R, but not for WITCH, which also participated in the same analysis.	space lmitation does not make the desription of every scenario possible, however SPM 5 will be skipped
Haroon Kheshgi (ExxonMobil Research and Engineering Company)	SPM	-	-	-	-	-	SPM 5	-	The scenarios include a set of conditions that are summarized by the terms first and second best, however, these terms are not sufficient to describe the conditions. Suggest that the conditions and assumptions of the scenarios be summarized (e.g. a global price on carbon). First and second best are economics jargon; suggest that the terms not be used in an SPM without definition.	1st- and 2nd best as term will be avoided
United States (U.S. Department of State)	SPM	-	-	-	-	-	SPM 6	-	Insufficient detail is provided regarding the scenario inputs in either the figure caption or the associated text. It would also be helpful if ranges from a variety of different models could be included rather than one from a single model.	there are only a limited number of scenarios available providing the necessary breakdown, ER and IEA reference describe the range of scenario paths, however more sceanrios will be included
Keigo Akimoto (Research Institute of Innovative Technology for the Earth (RITE))	SPM	-	-	-	-	-	SPM 6	-	The additional explanations for ""Energy Revolution"" are needed.	SPM 6 will be revised, Energy Revolution will be explained and more sceanrios will be included
Haroon Kheshgi (ExxonMobil Research and Engineering Company)	SPM	-	-	-	-	-	SPM 6	-	This figure is not transparent about what is the energy revolution scenario considered. Suggest that the figure in the underlying chapter be referenced and that that scenario be discussed in that chapter in detail. In addition it is not clear if this figure includes non-market RE sources since it is described as market potential; suggest that this be made clear.	Figure replaced with one presenting the four illustrative scenarios in 10.3. Where ER scenario is presented in underlying chapter, brief explanation will be included.
Kaija Hakala (MTT Agrifood Research)	SPM	-	-	-	-	-	SPM 6	-	Use EJ instead of PJ	Accepted.

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
Gunnar Luderer (Potsdam Institute for Climate Impact Research)	SPM	-	-	-	-	-	SPM 6	-	Why are only the "IEA reference" and the Greenpeace ER results shown? If I understand correctly, the "IEA reference" is not provided directly by IEA, but rather an extrapolation of IEA WEO beyond 2030. In view of the lack of sufficient scientific underpinning, the authors should reconsider showing this graph here.	Accepted. Graph replaced with one presenting the four scenarios illustrative scenarios examined in 10.3
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	SPM	-	-	-	-	-	SPM 7	-	Offshore wind cost appear to be to low, cost for North Sea projects are about 18 ¿ct/kWh (2010).	North Sea wind offshore cost are within the presented bar
United States (Potsdam Institute for Climate Impact Research)	SPM	-	-	-	-	-	SPM 7	-	SPM7 and Figure 10.5.1. It is misleading to present an LCOE graph with an assumed carbon price. What would be more helpful would be to show how the LCOE varies with carbon prices, either through multiple graphs or through ranges in a single graph.	conventional cost will be skipped from the figure and described in the text (including highlighting the uncertainty range)
Haroon Kheshgi (ExxonMobil Research and Engineering Company)	SPM	-	-	-	-	-	SPM 7	-	This figure does not indicate the year in which it is meant to be applied? The caption mentions a carbon price in 2020; is that the year that the figure applies? Suggest that the caption clearly define the figure.	will be added: current cost level
Nico Bauer (Potsdam Institute for Climate Impact Research)	SPM	-	-	-	-	-	SPM 7	-	This figure only refers to electricity and it only refers to the costs of electricity. There should also be a figure on other fuels like biofuels and gases, as well as RE hydrogen. Moreover, the figure does not show the different sensitivity of carbon prices on the production costs. It only assumes a single carbon price of 30$US per tCO2. However, the sensitivity is important here!	no sufficient set of data available for heat and transport, conventional cost will be skipped from the figure and described in the text (including highlighting the uncertainty range)
Gerrit Hansen (TSU)	SPM	-	-	-	-	-	SPM 8	-	Figure reported for PE do not correspond with figures in table SPM 2. please reconcile	Noted. Effort will be made to assure consistency across data.
United States (U.S. Department of State)	SPM	-	-	-	-	-	SPM 8	-	Suggest breaking out fossil energy, nuclear energy, and traditional biomass in the figures, since these are very different and important parts of the energy system. Also consider using bar charts instead of multiple pie graphs to improve clarity. As it stands, it looks like the sectoral charts are coming out of the renewable slice.	Too much detail.This info in Chapter 1
Gunnar Luderer (Potsdam Institute for Climate Impact Research)	SPM	-	-	-	-	-	SPM 8	-	This Figure lacks the level of secondary energy carriers, which is of crucial importance for the integration of RE. It should therefore be revised.	Too detailed for this figure which does not cover energy carriers
massimo tavoni (FEEM and CMCC)	SPM	-	-	-	-	-	SPM 8	-	What is the source of this figure ? As previoulsy mentioned, there is wide disagreement across models on the level of deployment of renewables. Providing a single estimate is thus unwarranted.	Own fig. To be updated to include other scenarios if possible
Haroon Kheshgi (ExxonMobil Research and Engineering Company)	SPM	-	-	-	-	-	SPM 9	-	I do not understand the meaning of this figure or the paragraph that comes before it (what is indirect Vs direct?). Suggest that this either be deleted or explained more clearly.	To be redrawn

Name (Institute)	Chapter	From page	From line	To page	Toline	Section	Figure	Table Info	Comments	Consideration by the writing team
China (China Meteorological Administration)	SPM	-	-	-	-	all	-	-	Adaptation is an important part for assessing sustainable development of renewable energy. This is particularly the case for the developing countries with multiple goals, not only mitigation but also adaptation.	While authors agree with the usefulness of the suggestion, due to space restrictions in the SPM, it is not possible to incorporate a discussion of adaptation.
China (China Meteorological Administration)	SPM	-	-	-	-	all	-	-	Apart from policy tools, most of the discussions on RE in the context of sustainable development focus on the developing country cases. Successful stories and lessons from the developed world can be highly relevant to sustainable development of renewable energies in the poor countries. It is suggested to look more cases in the developed countries.	Rewrite has attempted to give SD discussion a balance between developing and developed countries.
China (China Meteorological Administration)	SPM	-	-	-	-	all	-	-	Comparative assessments should be made with regard to different renewable energy resources using economic, environmental and social sustainability requirements. For instance, solar PV may not be economicaly viable in poor areas as it is too expensive.	Additional comparative assessments included in FD.
China (China Meteorological Administration)	SPM	-	-	-	-	all	-	-	Non-commercial use of renewables should also be given more attention. In fact, for the poor in the developing world, non-commercial use of renewable energy such as biodigesters and solar water heating devices are of great importance for rural energy supply.	More discussion on use of RE in rural areas has been included with rewrite in Section 5.
China (China Meteorological Administration)	SPM	-	-	-	-	all	-	-	The whole structure of SPM is unbalanced. Section 3 as a technical section is much longer than other sections and some important section like section 4, 6 and 7 is too short. It is suggested that take additional key messages in relevant chapters to section 4, 6 and 7, but shorten section 3 to balance the whole structure. The cost and financial aspect of RE should be further enhanced in SPM to give clear policy-relevant suggestion and messages to policy makers to indicate the global investment needs for RE investment and the financial barriers faced by developing countries.	Additional space has been allocated to sections 4, 6 and 7, and more detail allocated to the cost discussions.
Gunnar Luderer (Potsdam Institute for Climate Impact Research)	SPM	-	-	-	-	Box SPM.1	-	-	Bioenergy: The significance of bioenergy, particularly in the context of low stabilization scenarios, lies largely in the possible combination with CCS (BECS). This should be discussed more prominently (along with relevant caveats) here, and throughout the SPM.	Role of CCS in bioenergy GHG emission accounting now prominent in Section SPM 5.
Gian-Kasper Plattner (IPCC WGI TSU, University of Bern)	SPM	-	-	-	-	Box SPM.1	-	-	Editorial Comment: NOTE that the line numbering within the box is not correct¿not all lines get a number??? [might be true for all SRREN Chapters?]	Fixed in SPM FD