



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

All SRREN

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

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

Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table info	Comments	Consideration by writing team
Norway (Climate and Pollution Agency)	All SRREN	0	-	-	-	-	-	-	Generally speaking, this is an impressive survey of renewables, renewable technologies and their utilization practices and possibilities. However, the report should more implicit express the complexity and uncertainties of large scale use of renewable and the report seems to lack a thorough discussion of the external costs and benefits of renewables versus those of fossil fuels. Although briefly mentioned (e.g. chpt 11.3.5), the report seem to avoid the discussion between the downsides. Examples are that sometimes bio energy use poor combustion techniques compered to some fossil fuel systems and give related local emissions and human health issues. Land-use questions is discussed, and it is reassuring that the conclusion seem to be that all in- and outputs should be accounted for, but the actual conflict between food crop and fuel crop or monoculture and biodiversity is not dealt with in-depth.	More discussion included in Chapter 9. Bioenergy and fuel crop discussion included in Chapter 2 and 9 and also highlighted in SPM.
Norway (Climate and Pollution Agency)	All SRREN	0	-	-	-	-	-	-	I find some inconsistencies in what is stated of formulations and definitions especially in chapter SPM compared to chapter TS, 1 and 5. It seem that this chapter needs a general update to be in accordance with the other mentioned.	will be considered
Norway (Climate and Pollution Agency)	All SRREN	0	-	-	-	-	-	-	In Chapter 5, which discusses hydropower, it is mentioned that size is not an appropriate criteria to measure its sustainability, whereas in other chapters, especially chapter 9, this has been ignored. All chapters addressing hydropower issues should be reviewed to ensure that passages where there is still a distinction between small and large hydro, nuances should be made by replacing these terms with "smaller/larger or small-scale/large-scale projects", so that readers are not given the false impression that large hydro in general is less sustainable than small hydro.	Accepted. Authors will make an effort to assure consistent reference to hydro across the SRREN, avoiding small and large terminology as appropriate with Chapter 5.
Norway (Climate and Pollution Agency)	All SRREN	0	-	-	-	-	-	-	In order to be consistent, the tables presented in the summary chapters should be based on the information collected from the respective technical chapters	Accepted.
Australia (0)	All SRREN	0	-	-	-	-	-	-	Overall the SRREN text is very dense and there is a need for greater rigour in the use of terminology. For instance, terms such as 'financial', 'commercial' and 'economic' are used interchangeably when they mean different things in practice. In addition some scientific and technical terms used are not included in the glossary or explained in parentheses in the text. It is suggested that the glossary include and define key terms such as 'economically affordable', 'environmentally sustainable' and 'socially acceptable'. Once defined the terms must be used consistently throughout the text. Notably, the SRREN is very European and US-centric, offering limited guidance on how and in what circumstances technologies may be deployed in other countries. For example, the Australian grid is long and narrow, quite different from the USA/Europe model. The challenge of deploying RE on such grids is very different to the USA/Europe experience, as is the economic, financial and grid system consequences of RE in less developed economies. We suggest that each technology chapter has a clear, consistent and concise statement of comparative tech maturity.	Accepted. An effort will be made to assure all useful definitions are included in the glossary. In addition, variation across grid systems will be covered in 8.2.1.
Canada (Environment Canada)	All SRREN	0	-	-	-	-	-	-	The report presents valuable information for policy and decision makers and we look forward to the final product. In moving toward the final stage, the report will require thorough editing to reduce repetition between sections and chapters and to increase the overall quality of the writing. Note that tables and table captions are also often repeated word-for-word in the document.	Accepted. Report will undergo thorough editing.
Norway (Climate and Pollution Agency)	All SRREN	0	-	-	-	-	-	-	The report would benefit from a systematic review on how the attribute "sustainable" and "sustainability" are used throughout the whole document. (see more detailed comments under chapter 9) Since sustainability implies a balanced consideration of all three dimensions (environmental, social and economic) it is conceptually incorrect to use "environmentally sustainable"	Sustainable development defined in Glossary and effort made for consistent use across chapters.
Norway (Climate and Pollution Agency)	All SRREN	0	-	-	-	-	-	-	The tables which summarises up- and down-sides of renewables (especially in SPM, TS and ch 9) need to be completed for hydropower. Some important information is missing	Accepted
Norway (Climate and Pollution Agency)	All SRREN	0	-	-	-	-	-	-	To improve sustainable decision-making in the energy sector, the criteria of energy pay-back ratio should be included as a tool to support efforts in using natural resources in the most efficient way. Rationale: 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. We think one of IPCCs roles is do discuss the pros and cons related to these different tools and also use them consistently throughout the report to the extent possible.	Accepted. Energy pay-back ratio covered now in Section 9.3.4.
Gerrit Hansen (TSU)	All SRREN	0	-	-	-	-	-	-	when citing REN21 data for hydro, please note that REN21 (2010) has changed their definition/split of small and large hydro and now accounts installations <10 MW to small hydro, regardless of national definitions, where some countries have much higher limits - 25 MW in India, 30 MW in Brazil and the US, and up to 50 MW in China. This might cause a significant drop in numbers reported for small hydro compared to 2008, and should be kept in mind when national statistics are used.	hydro will not be defines according to installed capacity but small scal and large scal may be used
David Clubb (European Environment Agency)	All SRREN	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.	Relevant text deleted in rewrite.

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Zoltán Somogyi (Hungarian Forest Research Institute)	All SRREN	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 "Knowledge 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)	All SRREN	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.
Zoltán Somogyi (Hungarian Forest Research Institute)	All SRREN	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. To be considered in Chapter 9.
Zoltán Somogyi (Hungarian Forest Research Institute)	All SRREN	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)	All SRREN	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.
Zoltán Somogyi (Hungarian Forest Research Institute)	All SRREN	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 SPM 5 of revised draft.
Zoltán Somogyi (Hungarian Forest Research Institute)	All SRREN	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)	All SRREN	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 explicitly 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 explicitly be discussed and acknowledged somewhere in the document.	LCA analysis of GHG emissions included in Section SPM 5 of revised draft and in Chapter 9. Further information on areas where more data is needed are included in Setion SPM 8.
Zoltán Somogyi (Hungarian Forest Research Institute)	All SRREN	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 CO ₂ , and not in other units which may have nothing to do with mitigation), and practically one or two for biomass.	There is no Table TS 0.3. Please clarify comment.
Zoltán Somogyi (Hungarian Forest Research Institute)	All SRREN	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 SPM 5 of revised draft.

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Zoltán Somogyi (Hungarian Forest Research Institute)	All SRREN	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 SPM 5 of revised draft. The role of RE in different GHG mitigation scenarios is discussed in Section SPM 6.
Zoltán Somogyi (Hungarian Forest Research Institute)	All SRREN	9	-	-	-	-	-	SPM 2	When discussing and comparing the various options of various energy sources, such balances may not be, and most of the 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.
David Clubb (European Environment Agency)	All SRREN	14	41	14	41	-	-	-	Do not use the word 'disadvantage', but use 'characteristic' instead.	Relevant text deleted in rewrite.
Karsten Neuhoff (German Institute for Economic Research (DIW Berlin))	All SRREN	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""	Good comment, sentiment included in rewrite (bullet list removed).
Karsten Neuhoff (German Institute for Economic Research (DIW Berlin))	All SRREN	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 preferred 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.	Noted.
Edeltraud Guenther (TU Dresden, chair for environmental management and accounting)	All SRREN	-	-	-	-	-	-	-	1. An analysis of 104 empirical studies of innovation to change showed the following barriers, that could refine the discussion of barriers: Issues of resourcing (76%), for instance, ζ not enough resources ζ (Post and Altman 1994), ζ lack of adequate resources such as time and staff ζ (Adams and McNicholas 2007), limited or no budgeting (e.g. Harris 2000 and Anumba et al. 2006), access to capital and lack of time (Rohdin and Thollander 2006). Issues of capabilities (75%), for instance, ζ low technology literacy ζ (Stewart, Mohamed and Marosszeky 2004), ζ ill-equipped in terms of training and expertise ζ (Whitaker 1987), ζ employees are not trained ζ (Tamimi and Sebastianelli 1998), ζ lack of understanding ζ (Waldron 2005), ζ lack of technical skills ζ (Rohdin and Thollander 2006), ζ lack of skill, knowledge and expertise ζ (Kirkland and Thompson 1999), etc. Issues of communication (64%), for instance, ζ communication barriers ζ (Heide, Grønhaug and Johannessen 2002), ζ communication overload and distortion ζ (Allen 2002), ζ lack of communication within the team ζ (Attaran and Nguyen 1999), ζ lack of communication among those sharing responsibility for different aspects ζ (Kunda and Brooks 2000), ζ poor communication practices that damaged employee commitment to projects ζ (Jacobs et al. 2006), ζ tension among departments arising from the incompatibility of actual or desired responses ζ (Aggarwal 2003), etc. Issues of organizational structure (62%), for instance, bureaucracy (e.g. Molinsky 1999; Borins 2000; Abdul-Hadi, Al-Sudairi and Alqahtani 2005), ζ salary structure ζ (Al-Qirim 2007), ζ complexity, centralization, and formalization ζ (e.g. Allen 2002), ζ rigid organizational boundaries ζ (Butler 2006), ζ departmental fortresses ζ (Cicmil 1999), and organizational structure (e.g. Scarbrough and Lannon 1988; McGaughey and Snyder 1994; Yauch and Steudel 2002). Abdul-Hadi, N., Al-Sudairi, A. und Alqahtani, S. (2005): Prioritizing barriers to successful business process re-engineering (BPR) efforts in Saudi Arabian construction industry, In: Construction Management & Economics, Vol. 23, Nr. 3, S. 305-315. Adams, C.A. und McNicholas, P. (2007): Making a difference: Sustainability reporting, accountability and organisational change, In: Accounting, Auditing and Accountability Journal, Vol. 20, Nr. 3, S. 382-402. Aggarwal, N. (2003): Organizational Barriers to Market Orientation, In: Journal of Management Research, Vol. 3, Nr. 2, S. 87-97. Allen, R.Y.W. (2002): Assessing the impediments to organizational change: A view of community policing, In: Journal of Criminal Justice, Vol. 30, Nr. 6, S. 511-517. Al-Qirim, N. (2007): The adoption and diffusion of E-commerce in developing countries: The case of an NGO in Jordan, In: Information Technology for Development, Vol. 13, Nr. 2, S. 107-131. Anumba, C.E.H., et al. (2006): Understanding structural and cultural impediments to ICT system integration: A GIS-based case study, In: Engineering Construction & Architectural Management, Vol. 13, Nr. 6, S. 616-633. Attaran, M. und Nguyen, T.T. (1999): Design and implementation of self-directed process teams, In: Management Decision, Vol. 37, Nr. 7, S. 553-561.	Thank you for the references. They will be considered in rewrite of barriers discussions in Chapters 1 and 11.
John Twidell (AMSET Centre)	All SRREN	-	-	-	-	-	-	-	A NOMENCLATURE LIST is needed, either overall or for each chapter. For instance, in ch 2 and 11 I could not find out easily what 'LUC' and 'LUC' abbreviated. Different readers will be perturbed throughout the Report by not knowing the many abbreviations. This is an urgent task for a sub-editor.	A list of terms, acronyms and chemical symbols can be found in Annex I.

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Frank Krysiak (University of Basel)	All SRREN	-	-	-	-	-	-	-	A similar point: Whereas the report mentions market failures with regard to RE frequently, it does not acknowledge (with the exception of a small section in Ch. 11) that there is also a danger of policy failure (such as setting suboptimal subsidy levels or technology standards, or failing to adjust subsidies to changing costs). There are many examples of costly but unsuccessful governmental intervention in technology development. The report seems to be somewhat biased to an "interventionists" stance (I am not implying that intervention is unnecessary; but a review should consider both the advantages and (!) the disadvantages of intervention).	Team will discuss and address as part of broader effort to address economic implication of RE policies. This will be in 11.4 or 11.5.
Andries Kruger (South African Weather Service)	All SRREN	-	-	-	-	-	-	-	All critical comments of the first review have been addressed. No comments on the rewritten Chapter 9.	Thank you.
David Klein (PIK)	All SRREN	-	-	-	-	-	-	-	All heating values and conversion efficiencies should be labeled as referring to lower or higher heating value. This is especially important for chapter 2 (Bioenergy)	Not applicable to all chapters. Noted where appropriate.
Adriaan Perrels (Finnish Meteorological Institute (FMI) & Government Institute for Economic Research (VATT))	All SRREN	-	-	-	-	-	-	-	Also when one subscribes to the view that RE deployment efforts should be stepped up, one still faces the dilemma how to balance between the right pace of deployment and the right amount of caution to avoid adverse effects. That dilemma is acknowledged in the report, but the size of the report hampers adequate synthesis and reflection and thereby results in lack of depth regarding inclusion of complex induced effects, e.g. as is the case with land use and land markets.	Land use discussion given more attention in Chapters 2, 9, the TS and SPM. Efforts made to slim down entire report and pull out key messages.
Jorge Bonnet Fernández-Trujillo (Agencia Canaria de Desarrollo Sostenible y Cambio Climático)	All SRREN	-	-	-	-	-	-	-	Although errors in formatting, spelling, etc will be corrected in the publication it should be changed CO2 to CO ₂ with the "2" in subscript in both text and figures of the SRREN. The same with other chemical compounds like H ₂ O, CH ₄ , H ₂ , etc.	A copy-editor will process the entire SRREN, correcting subscripts in all chemical symbols.
Jorge Martínez Chamorro (Agencia Canaria de Desarrollo Sostenible y Cambio Climático)	All SRREN	-	-	-	-	-	-	-	Although errors in formatting, spelling, etc will be corrected in the publication it should be changed the way it is written the °C as it is done in the International System of Units (SI) of the Bureau International des Poids et Mesures. Example: t= 30.2 °C but not t=30.2°C nor t=30.2° C (page 133, chapter 5 "Writing unit symbols and names, and expressing the values of quantities"; http://www.bipm.org/utis/common/pdf/si_brochure_8.pdf)	Noted. Common system will be implemented by professional editor in later stages of the report.
Several experts 0 (Ministry of the Industry, Tourism and Trade)	All SRREN	-	-	-	-	-	-	-	Any reference to trade marks must be deleted from the report since it is a technical document and other systems as well as those mentioned may exist. When citing a site just mention the location but not the company or the supplier	Accepted. An effort will be made to remove trade marks across the SRREN.
United Kingdom (Department of Energy and Climate Change)	All SRREN	-	-	-	-	-	-	-	Be careful to avoid advocacy language, which we note is still present in the report, (such as SPM page 30 line 27 -29) and make it clear at the beginning of the report what the assumptions are, for example noting that there is now a strong drive to promote renewable energy.	Accepted.
Finland (Finnish Meteorological Institute)	All SRREN	-	-	-	-	-	-	-	Biomass as a resource of energy is different from the other renewables. Bioenergy itself causes a C flux into the atmosphere. Use of biomass has a direct impact on the C balance of the terrestrial ecosystems, which are a part of the global C cycle. Terrestrial ecosystems are a substantial C stock, of the order 2000 GtC. Deployment of bioenergy options may decrease the net emissions with respect to the fossil energy and terrestrial C stock baseline or it can even strongly increase the emissions. Thus the uncertainties in estimation of the mitigation potential of bioenergy are very high (impacts could be positive or negative) and they should be addressed in SPM, TS and individual chapters. Besides, important is also the dynamics of the terrestrial C stocks. Dependent on the timeframe of GHG mitigation, different bioenergy options could be favourable or unfavourable, based on their cumulative warming impact.	Considerations of bioenergy use impacts (both positive and negative) covered extensively in Chapters 2 and 9. Sentiments reflecting these fuller discussions will be pulled into the TS and SPM.

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Edeltraud Guenther (TU Dresden, chair for environmental management and accounting)	All SRREN	-	-	-	-	-	-	-	<p>Borins, S. (2000): What Border? Public Management Innovation in the United States and Canada, In: Journal of Policy Analysis and Management, Vol. 19, Nr. 1, S. 46-74.</p> <p>Butler, J.C. (2006): Ten Lessons Learned: Data Warehouse Development Project, California Department of Fish and Game, In: CrossTalk: The Journal of Defense Software Engineering, Vol. 19, Nr. 10, S. 16-20.</p> <p>Cicmil, S. (1999): Implementing organizational change projects: impediments and gaps, In: Strategic Change, Vol. 8, Nr. 2, S. 119-129.</p> <p>Harris, L.C. (2000b): The organizational barriers to developing market orientation, In: European Journal of Marketing, Vol. 34, Nr. 5, S. 598-624.</p> <p>Heide, M., Grønhaug, K. und Johannessen, S. (2002): Exploring barriers to the successful implementation of a formulated strategy, In: Scandinavian Journal of Management, Vol. 18, Nr. 2, S. 217-231.</p> <p>Jacobs, G., et al. (2006): The fatal smirk: Insider accounts of organizational change processes in a police organization, In: Journal of Organizational Change Management, Vol. 19, Nr. 2, S. 173-191.</p> <p>Kirkland, L.-. und Thompson, D. (1999): Challenges in designing, implementing and operating an environmental management system, In: Business Strategy and the Environment, Vol. 8, Nr. 2, S. 128-143.</p> <p>Kunda, D. und Brooks, L. (2000): Assessing organisational obstacles to component-based development: a case study approach, In: Information & Software Technology, Vol. 42, Nr. 10, S. 715-726.</p> <p>McGaughey, R.E. und Snyder, C.A. (1994): The obstacles to successful CIM, In: International Journal of Production Economics, Vol. 37, Nr. 2-3, S. 247-258.</p> <p>Molinsky, A.L. (1999): Sanding down the edges: Paradoxical impediments to organizational change, In: Journal of Applied Behavioral Science, Vol. 35, Nr. 1, S. 8-24.</p> <p>Opportunities, In: Journal of Organizational Change Management, Vol. 7, Nr. 4, S. 64-81.</p> <p>Rohdin, P. und Thollander, P. (2006): Barriers to and driving forces for energy efficiency in the non-energy intensive manufacturing industry in Sweden, In: Energy, Vol. 31, Nr. 12, S. 1836-1844.</p> <p>Scarborough, H. und Lannon, R. (1988): The successful exploitation of new technology in banking, In: Journal of General Management, Vol. 13, Nr. 3, S. 38-52.</p> <p>Stewart, R.A., Mohamed, S. und Marosszeky, M. (2004): An empirical investigation into the link between information technology implementation barriers and coping strategies in the Australian construction industry, In: Construction Innovation, Vol. 4, Nr. 3, S. 155-171.</p> <p>Tamimi, N. und Sebastianelli, R. (1998): The barriers to total quality management, In: Quality Progress, Vol. 31, Nr. 6, S. 57-60.</p> <p>Waldron, M. (2005): Overcoming Barriers to Change in Management Accounting Systems, In: Journal of American Academy of Business, Cambridge, Vol. 6, Nr. 2, S. 244-249.</p> <p>Whitaker, M. (1987): Overcoming the barriers to successful implementation of information technology in the U.K. hotel industry, In: International Journal of Hospitality Management, Vol. 6, Nr. 4, S. 229-235.</p>	Will review as we revise Sections 11.4 and others where these might be relevant.
Morgan Bazilian (UNIDO)	All SRREN	-	-	-	-	-	-	-	Both chapters need to be more well aligned with each other to avoid duplication and even being in disagreement with each other.	Accepted (Chapters 7 and 8)
Steffen Schläömer (IPCC WGIII)	All SRREN	-	-	-	-	-	-	-	choice of the discount rate needs to be discussed comprehensively, either in chapter 1 or 10, cross-references to the respective chapter should be included, wherever discount rates are discussed in the report. See chapter specific comments to chapter 1 and 10, but might need discussion in MGMT	impact of discount rate should be addressed in chapter 1, regarding cost curves there is an intensive discussion in chapter 10
Fernando Fariás (CONAMA)	All SRREN	-	-	-	-	-	-	-	Congratulations to the authors for this very complete and comprehensive report, it will be useful for Governments and policy makers (Comment by Maritza Jadrijevic)	Thank you.
Taishi Sugiyama (Central Research Institute of Electric Power Industry (CRIEPI))	All SRREN	-	-	-	-	-	-	-	Cost and benefits of RE policy should be carefully reviewed. There are many criticisms against the heavy governmental interventions lacking the cost-effectiveness.	Team will discuss and address as part of broader effort to address economic implication of RE policies.
Steffen Schläömer (IPCC WGIII)	All SRREN	-	-	-	-	-	-	-	Discuss chapter-specific glossary	Comment unclear.
Steffen Schläömer (IPCC WGIII)	All SRREN	-	-	-	-	-	-	-	Do the sections on resource potential provide an assessment of the availability and quality of information on the technical resource potential with a view to additional investments into resource exploration needed by private investors and project developers? How do both compare across RE resources? I think the information policy makers will want to get from this section are: Is the current and future technical potential large enough for a significant contribution from its exploitation to the mitigation of climate change - this information is largely provided. Secondly, they will probably want to know how large the technical potential is on a country level - this information seems to be rather scarce. The crucial question seems to be whether additional action is needed from governments to explore the available resource, and to which extent exploration can be expected from private investors. This question should be addressed collaboratively by technology chapters and the policy chapter.	These questions will be addressed in the different technology chapters at different levels of detail due to the varying degree of difficulty of an assessment of the different resources in question. Due to space limitations and limited knowledge provided in the (peer-reviewed) literature, the answers provided in the different chapters mostly concern global and regional resource availability rather than at a country level. Some technology chapters also address the question to what degree different stakeholders are and will be able to contribute to an improved knowledge of the resource availability, e.g. in Chapter 3 and Chapter 7.
Gunnar Luderer (Potsdam Institute for Climate Impact Research)	All SRREN	-	-	-	-	-	-	-	Due to the character of IPCC reports as review assessments the entire spectrum of scientific findings need to be represented. Unfortunately, for many research questions, numerical results vary widely, or findings are ambiguous altogether. In such cases, authors should carefully track down discrepancies to differences in assumptions or methodological approaches, rather than only giving ranges of results without any further explanation. If it is impossible to attribute differences to assumptions or methods, these discrepancies should be mentioned in the section on knowledge gaps.	Accepted. An effort will be made to clarify methodological differences where possible across the SRREN.

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Jorge Bonnet Fernández-Trujillo (Agencia Canaria de Desarrollo Sostenible y Cambio Climático)	All SRREN	-	-	-	-	-	-	-	Due to the large number of acronyms that are used in the SRREN it could be useful to include all of them in the Glossary annex or in another specific annex.	A list of terms, acronyms and chemical symbols can be found in Annex 1.
Gian-Kasper Plattner (IPCC WGI TSU, University of Bern)	All SRREN	-	-	-	-	-	-	-	Editorial Comment: remove double brackets for all references	SRREN will be processed by a professional copy-editor before the final draft is released. Editorial processing will be handled at that time.
Edeltraud Guenther (TU Dresden, chair for environmental management and accounting)	All SRREN	-	-	-	-	-	-	-	environmental performance resp. impact is addressed in all chapters, but in different ways: focusing on some aspects like GHG or very general. If the SRREN could provide a structure like for barriers and use that structure in all the chapters consistently, the environmental performance could be presented in a better way. My suggestion is to adopt the structure given in the ISO 14040 and 14044, that is broadly accepted in politics and business as well. The environmental impact of the different renewable energies could be presented as a vector of impact categories, that could be used for all the renewables addressed. Moreover the overall environmental performance could be summarized in the end in a matrix.	A coherent examination of environmental impacts will be added in Ch 9 during rewrite, with a consistent methodology pulled across technology chapters for e.g. GHG emission comparisons.
Taishi Sugiyama (Central Research Institute of Electric Power Industry (CRIEPI))	All SRREN	-	-	-	-	-	-	-	Expanding RE itself should NOT be the policy goal. The goal should be cost-effective CC mitigation. Strong policy of RE without serious cost effectiveness consideration 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 environmental and energy policy, Oxford Review of Economic Policy, Volume 26, Number 2, 2010, pp. 197-224, doi: 10.1093/oxrep/grq004	will address in 11.1 or 11.5
Gerrit Hansen (TSU)	All SRREN	-	-	-	-	-	-	-	figures should be consistently based on the latest available of report series, e.g. REN (2010), WEO 2010	Accepted. Every attempt will be made to assure that figures use the most up-to-date information.
Oluf Ulseth (Statkraft AS)	All SRREN	-	-	-	-	-	-	-	For the sake of consistency, tables presented in summary chapters should be based on information gathered in the respective technical chapters. In the case of hydropower the information provided about technical potential is seriously underestimated (SMP table 4 and TS 1.1); using the data provided by each technical chapter would avoid to have a long legend specifying how these Krewitt et al study actually does not really reflect the reality for each of the RE options, what affects from the onset the credibility of this table. If this should not be possible, then it is necessary to mention as it is done for PV and CSP in an additional footnote that these estimates from Krewitt et al. are significantly underestimating the technical potential for hydropower.	Accepted. In SPM, table was replaced with figure containing data from technology chapters, rather than referring to Krewitt.
Oluf Ulseth (Statkraft AS)	All SRREN	-	-	-	-	-	-	-	General comment relevant for SMP (3. solutions), TS (p-93-99) chapter 9 (as an additional energy indicator for sustainable development) and chapter 10 (Introduction and Executive Summary): as a guiding principle for decision-making the efficiency rate of the conversion from raw material into end-use energy expressed by terms like energy pay-back ratio (amount of energy required to produce electricity compared to the output = amount of electricity produced) is an emerging new paradigm in responsible resource management and should therefore be included into this most up-to-date reference document for RE - two relevant references are for further information herewith attached	Accepted. Energy pay-back ratio covered now in Section 9.3.4.
Japan (the Japanese Ministry of Foreign Affairs)	All SRREN	-	-	-	-	-	-	-	Given the diversity of national classifications of hydropower and biomass in the context of renewable energy, comparisons made among different energy types should clarify the definitions or at least note that the comparisons may not be accurate.	comment probably address crosscut chapters ? However the intent will be checked for hydro
Taishi Sugiyama (Central Research Institute of Electric Power Industry (CRIEPI))	All SRREN	-	-	-	-	-	-	-	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 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.	Partially accepted. It is implicit that GHPs are renewable given definition for all geothermal energy as renewable in lines 25-28 on page 3 and Lines 23-24 on page 5 state that "Geothermal Heat Pumps (GHP) are a subset of direct use. 'Ecocutes' is a very specific term used in Japan and can not be included in Chapter 4. Several bibliographic sources are included and then it is no necessary include more.
Osamu Kimura (Central Research Institute of Electric Power Industry)	All SRREN	-	-	-	-	-	-	-	Heatpumps are recognized 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 Renewable Heat Incentive http://www.rhincenative.co.uk/eligible/energies/ iv) UK's Renewable strategy http://filesdown.esecure.co.uk/Gartree/TheUKRenewableEnergyStrategy2009_1_.pdf_17072009-1624-43.pdf	GHP are discussed as RE in chapter 4 and several bibliographic sources are included.

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Dr. Md. Sirajul Islam (North South University)	All SRREN	-	-	-	-	-	-	-	Historically, human civilization was renewable, who mostly used those renewable energy sources like domestic animal to move, plough land, wind to sail, water wheel, sunlight to dry cloths/ use of day light, there should be at least one section dedicated to those indigenous energy sources. A large part of the world, still may not be accessible to those hi-tech renewable energy sources, but will continue to use those traditional renewable energy sources. Many of them are highly sustainable like if you use domestic bulls/cows to plough land...you save diesel, then the cow dung can be used in the land as manure...so no chemical fertilizer...saved energy again...less pollution...soil fertility intact. I request SRREN authors to add one chapter on the pro-poor options of renewable energy sources.	SRREN Chapters are specified by IPCC Plenary. Traditional biomass sources covered to a limited extent in Chapter 2 and mentioned where relevant in integrative chapters.
Taishi Sugiyama (Central Research Institute of Electric Power Industry (CRIEPI))	All SRREN	-	-	-	-	-	-	-	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.	Authors recognize this important point. These sources have supported development in the context of WEHAB. However with the focus on RE in the SRREN, the report has concentrated more on assessing the contributions of different RE technologies to (sustainable) development.
Christoph von Stechow (IPCC WGIII TSU)	All SRREN	-	-	-	-	-	-	-	How do those numbers compare: 2.4 billion people mentioned in chapter 2, page 7, line 9, or 2.5 billion people mentioned in chapter 2, page 48, line 12, that depend on biomass primary energy for cooking (IEA WEO 2009); 4 billion people mentioned in chapter 2, page 75, line 7 or 2.4 billion people mentioned in chapter 11, page 49, line 13 that suffer from indoor air pollution from biomass burning (Pimentel et al, 2001); 3 billion people mentioned in chapter 8, page 8, line 8 that use traditional solid biomass fuels used for cooking and heating as used, along with coal (UNDP 2009), 2 billion people mentioned in chapter 9, page 11, line 23 that rely on fuelwood and other primitive solid fuel; 2.6 billion people mentioned in chapter 8, page 94, line 29 or 2 billion people mentioned in chapter 3, page 60, line 41 that depend on traditional biomass? The same problem exists for numbers of people without energy access (between 1.4 and 2 billion).	will work for consistency to extent possible.
Gonzalo Piernavieja (Instituto Tecnológico de Canarias (ITC))	All SRREN	-	-	-	-	-	-	-	I generally suggest to shorten a) projections/future scenarios/forecast issues, b) resource potentials and similar data (this information is relevant when referred to specific areas or regions) and c) too technical descriptions of technologies. Arguments: these rather "obvious" or more or less well known aspects are, in my opinion, less critical than specific technological issues (their regional adaptation is particularly important) as well as cost/financing issues. The focus on developing countries (as well as on islands) is also of particular interest and should be emphasized. Another aspect that should be emphasized is energy storage (particularly in the Summary for Policymakers, in the Technical Summary, and in chapter 8). Micro- and mini-grids with high RES penetration (and storage), as well as different kinds of hybrid systems will play a key role in the massive deployment of RE technologies, particularly in islands and developing regions (maybe examples of some outstanding projects are missing). The cost of such solutions will be competitive in the very short-term. Finally, and as expressed in my previous review, I am still missing promising solutions that combine RES and water technologies, such as solar driven desalination or low energy water purification/treatment systems for remote areas or islands (off-grid applications). My institute is developing and transferring these technologies successfully to African countries.	Noted. Authors believe that the scenario aspect of the SRREN is of critical importance. Technical detail on technologies is provided for readers searching for such information. Authors agree that emphasis on developing countries could be further highlighted. Storage is included as one of a number of options to help balance electricity grids that use high penetrations of variable renewables.
Herbert Wade (none)	All SRREN	-	-	-	-	-	-	-	If this is intended for policy makers and other non technical persons, there seems to be too much theory and not enough in the way of implementation information. For example, talking about parabolic trough collectors is not enough when talking to policy makers and non technical persons. Drawings or photographs are needed. This whole document can only be properly understood by persons already familiar with the technologies listed, there are too few illustrations, photos and diagrams associated with the theoretical information of the text. I find the wind section much better in this regard. The solar section is not as useful to persons not knowledgeable with the technology already.	Noted. Will work to make technology chapters, particularly Ch 3 more accessible to all readers.
United States (U.S. Department of State)	All SRREN	-	-	-	-	-	-	-	In addition, the USG review team synthesized a number of general or overarching comments. While critical in nature, they should not detract from the USG's view of the importance of the Report. The general comments are communicated here to draw attention to common problems, strengthen and improve the balance, accuracy and utility of next draft, and advance the broad interests of all nations in maintaining, indeed, enhancing the authoritative reputation of the IPCC.	No action needed.
Adriaan Perrels (Finnish Meteorological Institute (FMI) & Government Institute for Economic Research (VATT))	All SRREN	-	-	-	-	-	-	-	In conjunction with the previous comment the report should be thoroughly screened on cross-cutting issues that are discussed in various chapters. This should lead to more cross-references, reduction or eviction or transfer of text patches and eventually to better attempts to synthesize at section, chapter and report level.	Accepted. The report will be processed thoroughly in the next round to assure consistency across cross-cutting issues and to assure accurate cross-referencing.
Frank Krysiak (University of Basel)	All SRREN	-	-	-	-	-	-	-	In most instances where policy is discussed, the report does not clearly distinguish between the global and a country's perspective. It might, for example, be beneficial to support R&D in RE from a global perspective, but for a country that cannot hope to become a market leader, it will usually be better to freeride on other countries' efforts. Similarly, countries with large fossil-fuel resources have different policy incentives than those with few such resources. Thus if a policy is beneficial from a global perspective, it is not necessarily beneficial for individual countries. Depending on who is addressed by the policy-relevant conclusions of the report, this distinction could be useful.	Accepted
Oluf Ulseth (Statkraft AS)	All SRREN	-	-	-	-	-	-	-	In the hydropower chapter it is mentioned that size is not an appropriate criteria to measure its sustainability, whereas in other chapters, especially chapter 9, this has been ignored. All chapters addressing hydropower issues should be reviewed to ensure that passages where there is still a distinction between small and large hydro, nuances are made by replacing these terms with "smaller/larger or small-scale/large-scale projects".	Accepted

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Netherlands (KNMI (Royal Dutch Meteorological Institute))	All SRREN	-	-	-	-	-	-	-	In this excell sheet the sorting option has been unabled. That is not very practical when combining and comparing comments for the Focal Points.	Unrelated to SRREN draft.
Taishi Sugiyama (Central Research Institute of Electric Power Industry (CRIEPI))	All SRREN	-	-	-	-	-	-	-	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.	References available to be provided
Jorge Martínez Chamorro (Agencia Canaria de Desarrollo Sostenible y Cambio Climático)	All SRREN	-	-	-	-	-	-	-	It is needed a clarification when the text talks about billion \$. Are we talking about 10^9 (1,000,000,000)\$ or 10^12 \$?. The same with billion people or other billions along the text. Avoiding the use of "billion" could be a solution for the misunderstandings. It is necessary to state the dimensionless quantity of all the data used in the SRREN in the annex to avoid any misunderstanding and checking all the figures of the text because of the different nationalities of the CLA, LA, CA and RE for each chapter).	Good observation. Authors will try to assure clarity in metrics and figures wherever possible.
Angel DE LA VEGA NAVARRO (UNAM - National Autonomous University of Mexico)	All SRREN	-	-	-	-	-	-	-	It is said that IPCC reports need to drive towards more economic emphasis. This is important not only because of present crisis but of specific issues related with CC: growth, employment, cost, risks, etc. But it is difficult to achieve a more economic emphasis proceeding by pieces: in some part neoclassical economics, in other places Keynesian or neo-institutional. Sometimes SRREN sounds heterodox, e.g in its criticism to growth and conventional development analysis, in others perfectly orthodox. I do not want to reproduce several paragraphs or to quote extensively. Just some of them in order to make some points: In the Summary for Policymakers (SPM), p.27, lines 19-23: ¿Various market failures, policy failures and barriers impede RE deployment [1.5; 11.4]. Market failures that impede RE deployment may include un-priced environmental impacts and risks, underinvestment in invention and innovation and the existence of monopoly powers in actual markets, limiting competition among suppliers or demanders, free entry and exit¿. ¿Monopoly powers in actual markets¿, in the energy sector, refer mainly to state or national enterprises, often in a monopoly situation, both in developed and developing countries. The issue of its role and actual working needs to be deepened. Even in Europe the reality is administered national markets dominated by big national enterprises (¿national champions¿) and governments often support them to confront competition and prevent entries from foreign actors. Orthodox economics see ¿competition among suppliers or demanders, free entry and exit¿ as a model for all societies. But there is important criticism to this model and a refusal of a mechanical vision of its implications for the energy sector, especially considering a total liberalization of the sector and the energy movements between countries. SRREN seems to open some ways, but it lacks of coherence across the whole report: Chapter 9: Renewable Energy in the Context of Sustainable Development Page 3: lines 22-24:¿Much of the discourses on SD have historically focused on economic and environmental dimensions of renewable energy technologies and their implementation. Social and institutional dimensions have not received the same degree of attention¿. In this direction, I suggest to deep some insights as the following: SRREN_Draft2_Ch09.doc Page 33, lines 1 to 3:energy system is a system consisting of (renewable energy) technologies, laws, institutions, education, industries and prices governing energy demand and supply for the sustainable development process (Diesendorf, 2007).	Noted.
Keigo Akimoto (Research Institute of Innovative Technology for the Earth (RITE))	All SRREN	-	-	-	-	-	-	-	It is significant to assess not only kWh-based costs but also kW-based costs for RE. The report mentions a lot of discussions of kWh-based costs but a few of those of kW-based costs. In other words, the kWh-based costs could increase under large installations of RE due to requirement of battery or backup power station. Such discussions are very poor in the draft of SRREN.	Rejected: All chapters discuss investment costs (in USD/kWh) and their underlying drivers for various technologies. A summary of the data is included in Annex III and will be expanded based on available data in the chapters. Whether or not the additional cost for storage options are included in the investment cost of particular technologies is highlighted in the text. For technologies that may be used in conjunction with on-site storage, such as thermal storage in the case of concentrating solar power plants, these options are discussed to the extend that data is available.
Babacar Sarr (ENERTEC-SARL)	All SRREN	-	-	-	-	-	-	-	It is worth mentioning that:" 2008 was the first year that new power investment in RE was greater than fossil fuel technologies" source: Global Trends in Sustainable Energy Investment 2009 / UNEP-SEFI.	Noted. May be included in Chapter 11 finance discussions.
Finland (Finniah Meteorological Institute)	All SRREN	-	-	-	-	-	-	-	Many chapters contain material that is not within their role but belongs elsewhere in the report or is completely outside of the proper coverage of the report. This leads to useless repetition and conflicting statements when specialists of one area want to make statements on issues outside their core competence. This problem can be corrected only by much better overall editing.	Accepted. Effort will be made to reduce repetition and thoroughly edit report to assure concentrated, competent discussions.

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David Clubb (European Environment Agency)	All SRREN	-	-	-	-	-	-	-	Many of the chapters are written in verbose and imprecise language which increases their length and decreases both the impact and the likelihood that it will be read. This is a really significant issue for me, and I would strongly urge strict editorial which can make the whole document much more incisive. There is also duplication between the chapters; I suspect that (understandably) this is because different writers have worked on different chapters. However, the duplication between chapters indicates that the editorial process is not sufficiently robust. Terminology and abbreviation varies across the whole document; this strays from being an editorial issue to a technical one and can be simply remedied with 'find and replace'	In terms of language, the complete SRREN will be edited by a professional editor. Also, effort will be made to assure a reduction in repetition and a streamlining of arguments.
Jorge Bonnet Fernández-Trujillo (Agencia Canaria de Desarrollo Sostenible y Cambio Climático)	All SRREN	-	-	-	-	-	-	-	Most of the cost figures have an indication that they have been obtained taking into account the value of the US \$ in 2005. Please, all the cost figures need to have a reference year to allow the comparison among them	Accepted. In the final SRREN, all cost figures should appear in 2005 US\$
Frank Krysiak (University of Basel)	All SRREN	-	-	-	-	-	-	-	Most of the policy discussion seems to be done under a ceteris paribus assumption, that is, increasing the market share of RE will not influence prices of carbon-based energy sources. This assumption might be reasonable for the small increases observed so far but seems to be implausible for the increases envisioned in the report. Thus the questions of carbon leakage and of the green paradox remain open. This is somewhat astonishing, in particular as much research has been conducted on these topics in the past 3 years.	Team will discuss and address as part of broader effort to address economic implication of RE policies.
Jean-Yves CANEILL (EDF SA)	All SRREN	-	-	-	-	-	-	-	My first overall remark is that the report has been strongly improved compared to the first order draft and that the different remarks and interactions have helped to frame a better articulated vision to put the renewables energy in perspective. I have concentrated my reading on the transversal chapters and I have one suggestion to make for including a reference in Chapter 9 which I make below (I made a similar suggestion in the FOD but at this time I had only the french report available).	Thank you.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	All SRREN	-	-	-	-	-	-	-	Needs a thorough consistency check.	Accepted.
David Clubb (European Environment Agency)	All SRREN	-	-	-	-	-	-	-	NOTE comments labeled 'ALL SRREN' from here on relate ONLY to the Chapter 'Summary for policy makers'	No action needed.
Herbert Wade (none)	All SRREN	-	-	-	-	-	-	-	NOTE that I did not review in detail sections outside my basic expertise which is developing country solar, wind, hydro and ocean energy	No action needed.
Pa Abdoulie Manneh (0)	All SRREN	-	-	-	-	-	-	-	On the whole, I would like to observe that given the state and rigorous theoretical and technical (Scientific, Technical, and Socio-economic) presentation in the reports, from Chapters 1 -11, I would like to note that these reports are relatively accurate, and complete with respect to the existing body of knowledge on Renewable Energy, Climate Change, and GHG emission reduction objectives. Fittingly, as stated in the reports work is on going in RE technologies that have not fully matured likewise in those that have, which calls for continuous improvements: in RE material science, tools, methodologies, as well as improvement in our understanding of the institutional and social processes with regards to RE technologies development and deployment, equally comparison of national and local experiences with various RE sources are crosscutting themes or co-issues in these subjects of discussion that made the reports content in my view fairly well balanced.	Thank you.
Matt Davison (University of Western Ontario)	All SRREN	-	-	-	-	-	-	-	Overall an excellent overview. I did feel that the work was a bit biased against market solutions. While I agree that markets are not a panacea, several market features can actually enable green technologies. For example, fluctuating power prices allow storage technologies to be profitable. Storage is made more necessary due to the inherent variability of many renewable power sources. Carbon markets allow at least some of the externalities of for instance coal and gas power generation to be quantified in an unambiguous manner, allowing green technology to have a better chance to compete.	Accepted
United States (U.S. Department of State)	All SRREN	-	-	-	-	-	-	-	Overarching Comments 1 of 9: The discussion of policies and measures is organized and comprehensive. Their effects in terms of advancing RE are reasonably clear. In contrast, the discussion of their costs, economy-wide impacts, and non-economic disadvantages, is incomplete and not systematic. Many of the most policy-relevant aspects of these policies are missing. The authors should strive to ensure that these are strengthened in the final report.	will add subsection on this
United States (U.S. Department of State)	All SRREN	-	-	-	-	-	-	-	Overarching Comments 2 of 9: The authors should carefully review the entire document to ensure that the tone is one of policy neutrality throughout the Report, in keeping with IPCC principles. The text contains a number of instances in which the language is more normative than objective, which diminishes the intended impact of the Report. In certain cases the tone is more appropriate for an advocacy piece, and is often attended by biases against non-RE options. Statements in a number of instances appear in the Report as assertions, rather than arising from fact-based analysis, substantiated by recent and peer-reviewed citations. It is refreshing, but rare, to encounter well written and even-handed treatments of the difficulties facing RE deployment. Without major revisions in this area, the current draft would present serious challenges to the objectivity and credibility of the IPCC.	Accepted. SRREN will be edited to remove advocacy language and assure neutrality and objectivity.

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Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table info	Comments	Consideration by writing team
United States (U.S. Department of State)	All SRREN	-	-	-	-	-	-	-	Overarching Comments 3 of 9: Side-by-side comparisons of RE technologies to non-RE technologies, such as those that appear in key tables in the SPM, TS, and elsewhere, along with similar comparisons in the text throughout the Report, are meant to present λ pros λ and λ cons λ of various energy options. However, reviews by experts of non-RE technologies find the narratives over-simplified, in error, or otherwise problematic. The assessment extends beyond RE technologies to include comparisons of non-RE technologies, but there is no authoritative assessment of such technologies. It is essential that these elements be robust and authoritative. Many of the detailed comparisons evidence selectivity to outdated technology, incomplete context, inattention to customary or known remedies to issues, missing discussion of broader or countervailing advantages, and lack of knowledge and expertise by authors. The USG review found that most comparisons could be reasonably contested and are not easily corrected by editing. The Report would be strengthened if it limited itself to tables of comparisons among RE technologies only -- the technical strengths of the Report.	Noted. Comments received from reviewers are contradictory on this point, some would like comparisons with fossil fuels, others not. Authors will try to limit comparisons in the SRREN text.
United States (U.S. Department of State)	All SRREN	-	-	-	-	-	-	-	Overarching Comments 4 of 9: The technology chapters typically start with discussions of resource potentials. However, terms such as λ theoretical λ , λ technical λ and λ market λ need to be defined. Ideally, estimates of λ technical λ and λ market λ potential would embrace a standardized set of assumptions and methodological approaches to ensure uniformity throughout the Report.	Accepted. Different definitions of potentials now defined in SRREN glossary.
United States (U.S. Department of State)	All SRREN	-	-	-	-	-	-	-	Overarching Comments 5 of 9: Regarding sustainable development, the Report adopts the Brundtland Report's definition. In many places throughout the Report, however, the text incorrectly interprets this definition to infer or conclude that only RE technologies can be λ sustainable λ , λ and conversely that all RE technologies are inevitably sustainable and devoid of environmental impacts. Such inferences need to be identified and deleted.	The re-write of Chapter 9 will aim to identify both the positive and negative effects of RE technologies and compare these (where possible and appropriate) to fossil fuels and nuclear. It is clear that all energy technologies will come with their own set of impacts and Chapter 9 will aim for a comprehensive assessment of these. In addition, an effort will be made to remove any inappropriate wording throughout the report as noted in the comment and link this to the findings in Chapter 9.
United States (U.S. Department of State)	All SRREN	-	-	-	-	-	-	-	Overarching Comments 6 of 9: The Report frequently appends λ energy efficiency λ to λ renewable energy λ , but ignores most similar synergies that are possible between RE technologies and non-RE technologies. The Report does not present authoritative work on energy efficiency, so it appears in the Report as an unsubstantiated addition. Either λ energy efficiency λ should be dropped from these conjoined phrases to avoid unexplained selectivity, or λ and other non-RE technologies λ should be added for balance and completeness. Along a similar vein, it is not clear that the title of the Report, which was originally limited to SRREN, but now appends λ and Climate Change Mitigation λ is appropriate. If λ mitigation λ is a main focus of the Report, the body needs to be expanded to include a plethora of mitigating non-RE technologies, policies and measures.	Energy efficiency discussions are to be limited to a few sections of the report where discussion of relationship can be explained more coherently. The title of the report refers to the role that RE plays in mitigating CC. All efforts were made to assure that RE was placed in context, referring to a portfolio of mitigation options where relevant.
United States (U.S. Department of State)	All SRREN	-	-	-	-	-	-	-	Overarching Comments 7 of 9: Renewable energy is often presented as a monolithic energy option, whereas each individual technology has a unique set of characteristics and of level of maturity. The distinctions are clear in the technology chapters, but are often lost in the summary and cross-cutting chapters.	The level of detail of different technology characteristics and maturity level is difficult to capture in summaries. Nonetheless, an effort will be made to better present the differences across technologies in the summaries as well as chapters.
United States (U.S. Department of State)	All SRREN	-	-	-	-	-	-	-	Overarching Comments 8 of 9: Economic discussions tend to focus on the cost of electricity from renewable energy sources. They do not take into account broader market considerations that impact prices, revenue, and internal rates of return.	Accepted: Discussions of technologies in the SRREN emphasize costs, where possible, as prices may include various kinds of mark-ups depending on market structure and policies. Costs per kWh are (or will be) discussed in relation with existing energy prices to provide a rough indication of how revenues from selling at these prices could compare to costs. Levelized costs of energy are presented for three different discount rates (3, 7, and 10%) highlighting the impact of different internal rates of return and associated risk premiums. A more thorough discussion of the appropriateness of particular discount rates or risk premiums under specific circumstances is beyond the scope of the report.
United States (U.S. Department of State)	All SRREN	-	-	-	-	-	-	-	Overarching Comments 9 of 9: A thorough cross-chapter edit is advised to ensure consistency of message and analytic complementarity. In many places the text is redundant and lacks coherency, integration and focus. There are many λ micro-level λ discussions of RE specifics, but few that address larger decision-making frameworks or strategic perspectives. Metrics lack commonality. In addition, organizational structure within each of the chapters is inconsistent with others. All chapters should, or should not, have overviews or executive summaries. Many chapters would benefit from cross-referencing to technical and policy descriptions in other chapters.	Accepted. A thorough cross-chapter edit will be undertaken, ensuring consistency across arguments and metrics.
Christoph von Stechow (IPCC WGIII TSU)	All SRREN	-	-	-	-	-	-	-	Please check for consistency among chapters when discussing barriers, thereby keeping in mind that the agreements that have been reached so far might be subject to changes due to expert comments to individual chapters.	Efforts will be made to assure consistency in categorization of barriers across the SRREN.

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Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table info	Comments	Consideration by writing team
Christoph von Stechow (IPCC WGIII TSU)	All SRREN	-	-	-	-	-	-	-	Please consider pointing to the complexity of economy-wide welfare effects (some of which may be captured by the Chapter 10 Scenarios) when discussing employment benefits of increasing renewable energy deployment (e.g. Ch. 10, page 76, lines 15-8).	Noted.
Christoph von Stechow (IPCC WGIII TSU)	All SRREN	-	-	-	-	-	-	-	Please make sure that the terms "learning", "learning/experience curve", "learning rate", "progress ration" "RDD&D", "demonstration", "(early) deployment", "commercialization", "competitiveness" etc. are consistently used and defined throughout the report.	Accepted.
China (China Meteorological Administration)	All SRREN	-	-	-	-	-	-	-	Please refer to the attached tables for specific comments and suggestions after reviews by the Chinese government and its experts on the SPM, Technical Summary and individual chapters of the report.	Noted.
Algeria (Institute)	All SRREN	-	-	-	-	-	-	-	Please see material named SRREN-Draft2-Review-ALGERIA.doc	Noted.
Gerrit Hansen (TSU)	All SRREN	-	-	-	-	-	-	-	references to "small" and "large" hydro should be consistent throughout the SRREN. The distinction is made in several chapters (e.g. TS, p. 10, 2-8; ch.9, ch.8) and a definition of the terms "large and small hydro" is given in the glossary, whereas chapter 5 does not provide a clear definition (but later uses the terms anyway). It is strongly suggested that chapter 5 should give a clear definition of small and large as used in the SRREN, discuss the underlying rationale and give examples for definitions that are different from the SRREN's. As REN21 numbers are frequently used, it might be helpful to consolidate the SRREN definition with that of REN21.	no consensus or physical/technical/environmental rationale for defining small and large - this will be explained in ch 5, ch 5 - consistency re this will be checked in ch 5 and in the SRREN
China (China Meteorological Administration)	All SRREN	-	-	-	-	-	-	-	So far as the contents of the Special Report is concerned, the Chinese government holds that the report has indeed given a systematic assessment on the role of renewable energies in mitigating climate change, and a comprehensive summary by combing the distribution, technological maturity, socio-economic and environmental impacts of the major renewable energy resources, among other issues. The information in the Special Report will provide all governments with useful references for developing and deploying the renewable energies and for formulating policies in response to climate change.	Thank you.
United States (U.S. Department of State)	All SRREN	-	-	-	-	-	-	-	Summary of U.S. Government Review of the IPCC's Special Report on Renewable Energy and Climate Change Mitigation (SRREN): The Special Report presents a wealth of context and supporting data on renewable energy (RE). The level and style of presentation, in large measure, was found to be appropriate for the intended audience. The Report assembles and organizes a comprehensive array of policy-relevant information across a diverse set of resources, technologies, natural circumstances, and associated policy approaches designed to further RE's contributions to U.S. and international goals for energy, environment and climate.	No action needed.
Gerrit Hansen (TSU)	All SRREN	-	-	-	-	-	-	-	Tables SPM4, TS1.1, 1.3 (identical) and 10.3.1 need reconciliation. Ranges of estimates and Sources for those ranges are different, as well as some design details and footnotes.	issue has been covered in a specific X-cut in Mexico (LA4). Ranges and sources made consistent in FD across chapters and summaries.
Supachai Panitchpakdi (United Nations Conference on Trade and Development)	All SRREN	-	-	-	-	-	-	-	The above comments are based on inputs received from the following UNCTAD staff members: Daniel De La Torre Ugarte, David Vivas Eugui, Dimo Calovski, Dong Wu, Lucas Assuncao Matthias Rau-Göhring, Michael Hanni, Milasoia Chereh-Robson, Mineko Mohri, Ralf Krüger, Ulrich Hoffmann, Yin Yan	Thank you.
Finland (Finnish Meteorological Institute)	All SRREN	-	-	-	-	-	-	-	The analysis presented in the report indicates that bioenergy will be the most important source of RE for several decades. Many scientific studies have at the same time given evidence that the production of bioenergy is not without severe problems. Bioenergy is CO2-neutral under stable conditions where the land use does not change, the carbon content of the soil does not change and the total amount of vegetation does not change. Several studies have indicated that the deviations from these preconditions may change drastically the consequences of specific bioenergy projects. At worst their effects may be much worse than those of any other energy production. Better knowledge is urgently needed and care must be taken in starting major bioenergy projects when all direct and indirect consequences have not been carefully analyzed. This report should emphasize these problems much more strongly at all levels: SPM, TS, and relevant chapters 2, 9, 10, and 11. In addition, the problems related to bioenergy (eg. conflicting landuse situations and nature conservation), should be taken into consideration in the large scale bioenergy production. Therefore, it is also very important to strengthen the research on the impacts of large scale bioenergy production.	issue will be addressed in 10.3 and is already part of 10.6
China (China Meteorological Administration)	All SRREN	-	-	-	-	-	-	-	The Chinese government also holds that both Summary for Policy Makers (SPM) and Technical Summary of the report have all emphasized the positive contributions of the renewable energies, when exploited, to mitigation of climate change. To increase their reference values for formulating relevant policies by governments, we believe that some aspects should be added addressing the pathways to achieve massive development of the renewable energies in the developing countries, including their potential social and economic costs, etc. Moreover, considering that now the biggest obstacle of renewable energies development is the high economy costs, the development of renewable energies not only requires policies of respective governments in their own countries, but also needs international cooperation to achieve global synergy in this sector, especially the financial and technological assistance of the developed countries to the developing countries, therefore the report should provide some analyses in these aspects accordingly.	Accepted. International cooperation covered in Chapter 11. Social costs covered in Chapter 9.
China (China Meteorological Administration)	All SRREN	-	-	-	-	-	-	-	The Chinese government appreciates and thanks all lead authors of the Special Report on "Renewable Energy Sources and Climate Change Mitigation (SRREN)", the Bureau and the Technical Support Unit (TSU) of the Working Group III contributing to IPCC AR5 for the hard work in preparing the Special Report. The Chinese government welcomes the opportunity for making comments on this report. In fact, the Chinese government attached great importance to the review process by governments and experts, and it organized its agencies concerned and dozens of experts in relevant disciplines to carefully review all the chapters/sections of the Special Report. It is hoped that the comments and suggestions made by the Chinese government can play a constructive role in revising and improving the report.	Thank you.
Fernando Farías (CONAMA)	All SRREN	-	-	-	-	-	-	-	The glossary is needed.(Comment by Maritza Jadrijevic)	Recognized. The glossary will remain.

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Gerrit Hansen (TSU)	All SRREN	-	-	-	-	-	-	-	The integration of the technology sections on Potential Deployment with chapter 10 results, and specifically section 10.2.3 with the according points in x.8/9.2 needs reconciliation in most cases. Generally, the critical discussion of chapter 10 results (also regarding assumptions/conditions of the models) as agreed by the OOA and layed out in 10.2.3 so far takes place to a limited extent in most chapters. The underlying narrative is not easily accessible throughout most technology chapters, and could be improved by structural/editorial changes, though in some cases information is missing.	there was already an intensive discussion between chapter 10 and the technology chapter in Mexico (LA 4) regarding this aspects which might help to improve consistency
Frank Krysiak (University of Basel)	All SRREN	-	-	-	-	-	-	-	The main argument of the report is based on three presumptions: a) RE has a reasonable mitigation potential, b) this potential can be realized at costs that are competitive to other mitigation options, and c) governmental support for RE is necessary and socially beneficial. While a) and (to a lesser extent) b) are backed up well by the evidence presented in the report, no strong evidence is presented for c). In fact, c) is rather controversially discussed in many economic studies and the report does not reflect this discussion (a very good review of this discussion (which arrives at similar conclusions as the report but in a more balanced way) is given in Fischer and Preonas (2010, RFF, http://www.rff.org/documents/RFF-DP-10-19.pdf)).	we will address the third point
Netherlands (KNMI (Royal Dutch Meteorological Institute))	All SRREN	-	-	-	-	-	-	-	The Netherlands congratulates the authors on this excellent draft.	Thank you.
Robert Siveter (IPIECA)	All SRREN	-	-	-	-	-	-	-	The overall length of the report is too long. While the report indeed strives to be very comprehensive, some of the chapters have exceeded their page limits and need to be cut back.	Accepted.
United Kingdom (Department of Energy and Climate Change)	All SRREN	-	-	-	-	-	-	-	The primary customer for the SRREN will be Governments with a need for a comprehensive assessment of the future potential of renewable energy. Industry will already have a detailed knowledge of these issues. It should therefore be framed to give information on the advantages and disadvantages of mitigation action, for example to help with the development of low carbon transition plans. In this case it is important to ensure the report is framed correctly and gives realistic but positive messages. It would be useful to outline what the challenges may be in different types of countries - mature industrialised countries, middle income countries and the Least Developed Countries. This distinction is not currently made explicit. This is something which could be emphasised throughout the report and especially in the SPM.	Good observation. Framing of topics in these terms may be difficult due to available literature, but an effort will be made to better clarify challenges in different types of countries.
Frank Krysiak (University of Basel)	All SRREN	-	-	-	-	-	-	-	The report consists of chapters that are largely independent. Thus interesting links are missing and if links are given, they typically relate to a complete chapter not too specific content.	An attempt will be made to better coordinate information across chapters for a coherent storyline across the SRREN.
United Kingdom (Department of Energy and Climate Change)	All SRREN	-	-	-	-	-	-	-	The report is currently too long to be of practical use. It could be cut back significantly by removing much of the text book type writing on the background of the issue. Instead, references to useful reviews of these issues could be included. Technical detail could also be moved to annexes, leaving only summary technical information in the chapters.	Accepted. Text will be shortened in subsequent drafts.
Finland (Finnish Meteorological Institute)	All SRREN	-	-	-	-	-	-	-	The report is still too long, it has to be shortened.	Accepted.
Muhammad Mohsin Iqbal (Global Change Impact Studies Centre (GCISC))	All SRREN	-	-	-	-	-	-	-	The report is very concise and comprehensive. It gives an exhaustive review of renewable energies and their technologies; some of these technologies are fully developed, some are in infancy and some are at embryo stages of development. The development of these energy sources and their technologies in the developing countries, particularly in Pakistan, will depend on a host of factors including transfer of technology, financial resources and relevant policy changes. The report is so well written that it is hard to find any lacuna in the write-up. However, these comments/corrections may be considered.	Thank you.
Oluf Ulseth (Statkraft AS)	All SRREN	-	-	-	-	-	-	-	The report would benefit from a systematic review on how the attribute "sustainable" and "sustainability" are used throughout the whole document. (See more detailed comments under chapter 9) Since sustainability implies a balanced consideration of all three dimensions (environmental, social and economic) it is conceptually incorrect to use "environmentally sustainable" (e.g. SPM, p.4, line 9 - something can only be qualified as sustainable if it is environmentally sound, socially acceptable and economically robust) or to state "sustainability and social impact" (e.g. SMP, p.5, line 11 - there is no sustainability without due considerations of social impact, hence there is no need to add "and social impacts" after sustainability).	Agreed. Sustainability by its definition encompasses the three pillars environmental, social and economic. An effort will be made to remove any incorrect use of the term as noted in the comment.
Ladislav Rybach (Geowatt AG Zurich (company))	All SRREN	-	-	-	-	-	-	-	The SOD is profiting from significant changes of the FOD. The two new chapters ζ Summary for Policymakers ζ and ζ Technical Summary ζ are essential additions. There is still a need for a synoptic summary Table to enable a comparison of the different Renewables, showing the relevant numbers: resource potential, land use, currently installed capacity, annual production, capacity factor, installation and production costs, development trends (e.g. annual rate of increase estimates in deployment, future cost development) for bioenergy, direct solar energy, geothermal energy, hydropower, ocean energy, and wind power. This Table should be established at least for power generation; I leave this work to the Authors of ζ Summary for Policymakers ζ . The Table should also appear in the ζ Technical Summary ζ . The informative power of the Executive Summaries of Chapters 1 ζ 10 (as they stand now) is quite different: it ranges from all key numbers given in the Summary to no numbers given at all. The page numbers in Chapters 1 ζ 10 are all over the target. The only feasible solution would be to reduce the text in individual paragraphs (=lots of work). Deleting whole sections would cause real loss of value. The current volume of SRREN assembles a wealth of information; it is rather preferable to handle the large number of pages than sticking to a rigid default (total number of pages, strict proportions (%) assigned to the individual Renewables).	SPM and Technical Summary revised to better present cross-chapter information in figures, e.g. on technical potential, LCOEs, contribution to primary energy supply, etc. Capacity factors are covered in Chapter 8.
Frank Krysiak (University of Basel)	All SRREN	-	-	-	-	-	-	-	The term "sustainability" is used with different meanings throughout the report. For example, in Ch. 1, p. 10 the given definition of sustainability is much more specialized than the one used in Ch. 9. The same holds for the definition given in Ch. 11 (p. 11).	Sustainable development defined in Glossary and effort made for consistent use across chapters.

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United States (U.S. Department of State)	All SRREN	-	-	-	-	-	-	-	The U.S. Government's (USG's) technical review of the Report took place over a 45-day period from June 18 through July 30, 2010. More than 180 technical experts were invited to review and comment, in addition to the U.S. public via Federal announcement. Eighty-six (86) experts provided comments. All comments were subsequently deliberated by 13 panels of subject matter experts in breakout and plenary sessions over a two-day period. From these deliberations, more than 1,900 text-specific comments were put forward.	Thank you.
Gerrit Hansen (TSU)	All SRREN	-	-	-	-	-	-	-	Theoretical Potential should be defined in the glossary and used consistently throughout the SRREN. At the moment, the term is widely used throughout the Technology chapters and chapter 1, but not defined. Chapter 4 reports total stocks of thermal energy in the earth crust to a certain depth as the theoretical potential whereas other chapters report fluxes (in line with the other "potentials" defined for the SRREN. TSU suggests to use a flux definition as well for the theoretical potential, and find a special term for chapter 4, to keep results comparable in overview tables.	Definition now appears in Glossary.
Dave Renne (National Renewable Energy Laboratory)	All SRREN	-	-	-	-	-	-	-	Theoretical Potential" is first mentioned in the Technical Summary on page 7 (this term is not used in the SPM), however, it is not defined. The chapter then goes on to refer to "Technical Potential", but this term also is not defined.	Definition now appears in Glossary.
Taishi Sugiyama (Central Research Institute of Electric Power Industry (CRIEPI))	All SRREN	-	-	-	-	-	-	-	There are criticisms to the benefits estimate of RE, and they must be reviewed. For example, Lesser, J.A. Renewable Energy and the Fallacy of 'Green Jobs', Electr. J. (2010), doi:10.1016/j.rej.2010.06.019.	Accepted.
Taishi Sugiyama (Central Research Institute of Electric Power Industry (CRIEPI))	All SRREN	-	-	-	-	-	-	-	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. ; Another example is Simon Less, editor, "Greener, Cheaper", Policy Exchange, www.policyexchange.org.uk, ISBN 978-1-906097-82-0.	Accepted
HONGGUANG JIN (Thermophysics engineering, Chinese Academy of Sciences)	All SRREN	-	-	-	-	-	-	-	There are many boring words in the text.	A professional editor will go through the final SRREN text assuring proper wording choice.
Finland (Finnish Meteorological Institute)	All SRREN	-	-	-	-	-	-	-	There are summary texts at three levels of SRREN: Executive summaries in each Chapter, Technical Summary and Summary for Policymakers. The summary texts at various levels of SRREN do not support each others. There are to some extent different weightings in the text and even slightly contradictory views.	In revisions will emphasize consistency across summaries.
Modesto Fernandez Diaz-Silveira (Ministry of Science, Technology and Environment)	All SRREN	-	-	-	-	-	-	-	There is a need to focus a little bit more in the political implications of some findings and recommendations. When dealing with bioenergy, mainly with biofuels, there is a special sensitivity in developing countries regarding the negative consequences to food security and to access to food in sufficient quantities for populations (mostly poor populations) and prices that could avoid them to reach what they need even to survive. The design of very well balanced strategies for biofuels must consider the priorities for producing food for national inhabitants, and after that, to use land and resources (like water and other natural resources) for biofuel production. Only in this case will be ethically acceptable by most developing countries	Accepted. The interaction between biofuel production and food prices, particularly in developing countries, has been highlighted in Section 2.5, as well as in the summary of that chapter.
Frank Mastiaux (EON Climate & Renewables)	All SRREN	-	-	-	-	-	-	-	There is no hint to subsidies on energy products in developing countries and no wording on market driven demand reduction. So some wording on the role of subsidies may be helpful.	Will consider as we revise text.
Frank Mastiaux (EON Climate & Renewables)	All SRREN	-	-	-	-	-	-	-	There is no hint to subsidies on energy products in developing countries and no wording on market driven demand reduction. So some wording on the role of subsidies may be helpful.	Accepted
Japan (the Japanese Ministry of Foreign Affairs)	All SRREN	-	-	-	-	-	-	-	There should be more mention of end-use solutions.	Noted.
United States (U.S. Department of State)	All SRREN	-	-	-	-	-	-	-	This comment is for the entire SRREN report. Thus far, the indirect GHG impacts of fossil fuel use have not been estimated. This is probably an important issue to mention in this report. For example, methane release from warming permafrost regions could add several hundred gigatons of methane over a century. D. Archer. Biogeosciences, 4, 521-544, 2007 www.biogeosciences.net/4/521/2007/	A complete LCA GHG analysis is now included in Ch 9.
Taishi Sugiyama (Central Research Institute of Electric Power Industry (CRIEPI))	All SRREN	-	-	-	-	-	-	-	This draft says : RE is cheap, but policy is unfair, that is why RE is not developing fastly, and strong policy should be in place. But, in reality, RE is costly in most occasion, and that is why RE is not developing fastly despite costly policy interventions.	A thorough LCOE comparison across technologies presents a balanced assessment of RE costs.
Haroon Khesghi (ExxonMobil Research and Engineering Company)	All SRREN	-	-	-	-	-	-	-	This special report draft is very long, which increases the resources required for its review. To ensure the quality of the SRREN it is important to ensure that reviews do provide a sufficient control on its quality throughout the report. Suggest that the quantity and quality of review be tracked to manage improvement of the review process and correct for any under-reviewed sections of the report.	Accepted.
United Kingdom (Department of Energy and Climate Change)	All SRREN	-	-	-	-	-	-	-	Throughout the report, statements need to be made more succinct. If the statement doesn't add anything to the assessment of the issue, think about whether it should be included at all. Focus on what is known and frame it in a more factual way, this way the reader can pick out the headline messages.	Accepted.

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China (China Meteorological Administration)	All SRREN	-	-	-	-	-	-	-	To begin with, it must be pointed out that some serious mistakes in common-sense nature have been found in the corresponding contexts of the Chapter 3 concerning the direct solar energy as well as in the Technical Summary of the report. Specifically, there are seven contexts in the aforementioned texts, where the references to the Taiwan Province of China are not consistent with the "one China policy" adhered by the United Nations and IPCC. Therefore, the Chinese government requests to delete all content concerning the Taiwan Province of China from the current report. Considering the fact that relevant data concerning the Taiwan Province of China are of little value to this report, and no separate description of the Taiwan Province of China occurs in the remaining chapters of the report, this change will not have any impact on the integrity of the Special Report as a whole.	Any reference of Taiwan is changed to "Chinese Taipei"
Zoltán Somogyi (Hungarian Forest Research Institute)	All SRREN	-	-	-	-	-	-	-	To summarize the main message of the whole document from the point of view of both energy AND GHG mitigation, and from the point of view of both recent situation and future options/potentials, I suggest a summary table where the all the mentioned information is included for each RE source and in total. If this table cannot be fully filled in, than it is in itself an important information. I find such a table very important also to make the whole report, the priorities and availability/lack of data and information, transparent for both decision makers and researchers.	Summary information is presented in the SPM, which includes a detailed description of knowledge gaps. A single table combining all information in the SPM would be too multifaceted to be of any use for policymakers.
Herbert Wade (none)	All SRREN	-	-	-	-	-	-	-	Too little information about energy storage which is essential to the large scale application of variable energy input sources such as wind, solar, wave and to some extent, tidal energy	Energy storage is covered in Section 8.2.1 as one of a number of options.
Rainer Walz (Fraunhofer Systems and Innovation Research)	All SRREN	-	-	-	-	-	-	-	Various parts of SRREN, e.g. section 9.5.4, 11.5.2 and 11.6 imply that technological development is not following a linear path, but is embedded in a system of innovation, which can hinder or accelerate technology development. On the other hand, the sections on future cost development mainly argue with extrapolating experience curves. The systemic nature of innovations and learning, and the dependence of a functioning innovation system are not taken up by this approach. It is suggested that the sections which deal with future cost development also refer to the sections dealing how technological development is happening, in order to prevent the reader of chapters 2-8 to gain a oversimplistic view about the underlying dynamics of cost reductions.	Noted.
United Kingdom (Department of Energy and Climate Change)	All SRREN	-	-	-	-	-	-	-	We feel it would be best to focus on a consistent time frame throughout, such as what could be achieved by 2050. This would mean feasibility of different technologies etc can be more easily compared.	The SRREN uses three different years as a comparative base: 2020 short-term, 2030 medium-term and 2050 long-term.
Finland (Finnish Meteorological Institute)	All SRREN	-	-	-	-	-	-	-	What is the emphasis of this report? As this is an IPCC report, we consider that the emphasis should be on greenhouse gas and climate change impacts. Other impacts should be considered when necessary, such as particle emissions constraints.	The interplay of RE with CC mitigation is explored thoroughly in Chapter 9 (with an LCA GHG analysis) and Chapter 10.
David Klein (PIK)	All SRREN	-	-	-	-	-	-	-	When Dollars of year x from a given reference are converted into Dollars of year y: which calculation method or price index was used? Especially important for investment costs.	Data for conversions originates from the IMF IFS Database.
Taishi Sugiyama (Central Research Institute of Electric Power Industry (CRIEPI))	All SRREN	-	-	-	-	-	-	-	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.	Quantifying benefits of RE is a knowledge gap, yes. Whether or not policy interventions are justified is a decision that the IPCC leaves to policy-makers.
Taishi Sugiyama (Central Research Institute of Electric Power Industry (CRIEPI))	All SRREN	-	-	-	-	-	-	-	While the draft include many valuable information, they are masked by cheap 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 substantiation. Without major revision, I am afraid that the reputation of IPCC may be in danger.	An effort will be made to remove all policy prescriptive language and to assure a balanced, unbiased draft across chapters.
Taishi Sugiyama (Central Research Institute of Electric Power Industry (CRIEPI))	All SRREN	-	-	-	-	-	-	-	You must address costs, intermittency, and stability of supply in the first place. These three are the key barriers of RE.	Noted. A comparison of cost across technologies is presented in the SPM. Intermittency is covered in Ch. 8 and Security of supply in Chapter 9.
Taishi Sugiyama (Central Research Institute of Electric Power Industry (CRIEPI))	All SRREN	-	-	-	-	-	-	-	You must mention that the capacity credits (or kW-value) to intermittent renewable, in particular PV, is over-estimated (or not appropriately modeled) in the current integrated assessment model (IAM)s. While IAM tends to attach high capacity credits to RE, they are close to zero in many situation in reality, PV in particular.	general aspect of intermittency is mentioned in several parts of the SRREN (incl. Technology chapter and chapter 8, partly chapter 10), some of the integrated assessment models consider capacity credits
Zoltán Somogyi (Hungarian Forest Research Institute)	All SRREN	-	-	-	-	-	10.3.9	-	Because one of the main points of the whole document is related to the mitigation of climate change, I suggest that graphs 10.3.9-10.3.11, and/or a short analysis of their information content, appear both in the executive summary of this Chapter, and also in the SPM and in the Technical Summary.	part of the figures will be integrated in SPM and TS
Steffen Schlömer (IPCC WGIII)	All SRREN	-	-	-	-	Cost	-	-	Generally, if you use the terms "learning rate" or "progress ratio", please include a cross-reference to chapter 10.5.2, where both are explained, and the glossary, where both should be explained. An explanation of both should also be included in the glossary.	learning rate definition to be included in the glossary

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Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table info	Comments	Consideration by writing team
Steffen Schilömer (IPCC WGIII)	All SRREN	-	-	-	-	Cost terminology	-	-	I am concerned that there might be some confusion with respect to the terms and concepts used to discuss different types of cost. First and foremost, this applies to the technology chapters' discussion of costs, but also to the cost terminology used in the integrative chapters. Even though there is probably no right or wrong way of describing costs nor one correct terminology, some standardization on the use of cost concepts should be agreed on. This terminology should be included in the glossary and used consistently throughout the SRREN. To give some examples: 1) There are multiple terms that are partly used synonymously, e.g. investment cost, cost of installed capital, capital costs, capex, upfront capital expenditures, etc. and partly to describe slightly different issues, e.g. capital costs are sometimes used to describe the cost of electromechanical equipment only, while the costs of labour, e.g. to install the generating device are excluded. 2) Also unit cost is mostly used as a synonym for LCOE, sometimes as a synonym for the levelized cost of capital (including O&M costs that occur during the lifetime) and sometimes equivalent to the unit cost of installed capital (excluding costs that occur at later stages). 3) LCOE is sometimes called life-cycle cost of a technology, ...	An effort will be made to streamline terminology pertaining to cost across the SRREN.
Steffen Schilömer (IPCC WGIII)	All SRREN	-	-	-	-	Costs	-	-	Maybe it is worth mentioning that the economics of repowering, e.g. for wind power projects, retrofitting and expansion projects, e.g. for geothermal, are usually better than those of greenfield investments. This seems to be an overarching message that probably applies to almost all types of RE projects and does not seem to be a very technology specific insight, hence, deserves mentioning in one of the integrative chapters, e.g. chapter 10.	Noted.
Steffen Schilömer (IPCC WGIII)	All SRREN	-	-	-	-	Future Costs Projections	-	-	Chapter 7 presents future LCOEs as percentage cost reductions over time based on a review of more complex models that take into account feedbacks between deployment and costs as well as engineering cost models. Presenting future LCOEs independent from deployment levels is masking feedback effects from learning-by-doing and, hence, should be used with caution (as rightly pointed out by chapter 7 authors). Nonetheless, it might make sense to present future cost ranges as a function of time. However, there's a risk that the cost ranges, e.g. by 2020, are inconsistent with the deployment levels projected until that time. In order to maintain consistency with the general theoretical framework of learning-by-doing and the scenario analysis in chapter 10, i.e. in order to avoid inconsistencies between future cost projections and projections for cumulative deployment, the scenario analysis should be integrated in this approach. This could be done as follows: Collect the following data: - current deployment figures, e.g. for 2008 -> should be available for all technologies - ranges of current LCOEs -> available in AnnexIII - ranges of LRs for all technologies -> partly available, negative for hydro (resource constraint)? - lower and upper bound of future deployment forecasts from scenario analysis by 2020, 2030, 2050 -> available from scenario analysis? The lower range of LCOE by each respective year could then be calculated as $LCOE(2020) = f(\text{current deployment, high current LCOE, low LR, lower bound of deployment by 2020})$. The upper range and LCOEs for 2030, and 2050 could be calculated accordingly. This approach would ensure consistency between a presentation of future LCOE as a function of time and future LCOE as a function of future deployment.	Rejected: The suggested methodology would result in very broad ranges for future LCOE that are very sensitive to the underlying assumptions. Furthermore, it is not widely applied in the peer-reviewed literature. The prospects for cost reductions will be discussed in a more appropriate fashion
Steffen Schilömer (IPCC WGIII)	All SRREN	-	-	-	-	Intro	-	-	Make sure that the introduction provides an overview of your chapter, briefly outlining the content of the individual sections, rather than summarizing the main messages. The later should be done in the ES according to the decision made in Oxford.	An effort will be made to address this across chapters.
Steffen Schilömer (IPCC WGIII)	All SRREN	-	-	-	-	Tech Chapters	-	-	Include in cost section the figures provided in SRREN_Draft2_TSU-Review_Schloemer_Steffen_LCOE_graphs_2. These are based on the cost data provided in Annex III and should serve the purpose to make the influence of key cost drivers, such as capacity factors and discount rates more transparent.	We will review these graphics when provided to us to determine if they are superior to the ones that we currently have, considering value provided to the individual chapters and to the consistency of the entire SRREN.
Steffen Schilömer (IPCC WGIII)	All SRREN	-	-	-	-	Tech Chapters	-	-	When discussing technical potentials, cross-references to the glossary and to the section on technology and applications should be included to make it more clear to the reader that technical potentials can increase over time with technological advance.	Accept. Will be included in glossary and a reference made wherever discussed in underlying text.
Steffen Schilömer (IPCC WGIII)	All SRREN	-	-	-	-	Tech Chapters, Policy Issues	-	-	Use standard sentence to refer to chapter 11, when discussing technology-specific policies in technology chapters.	comment not understood - what is meant by "standard sentence"