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

Chapter 10

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

Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table Info	Comments	Consideration by writing team
United Kingdom (Department of Energy and Climate Change)	10	0	-	-	-	10.3.1	-	-	Talk about max technical potential of different renewables but are less clear on max feasible potentials, i.e. taking into account non-financial barriers, max build rates as well as financial barriers to deployment. And how these barriers might differ between the developed countries & less developed countries. It's not clear whether their more ambitious scenarios factored in all relevant barriers and were therefore feasible or not.	rejected - potential definitions are given in chapter 1
United States (U.S. Department of State)	10	0	-	-	-	-	-	-	As currently framed, this section does not adequately capture the value of analyzing 165 scenarios. It would be beneficial to discuss the broad benefits of the discussion of the scenario review, e.g., knowledge gaps and uncertainty. Also, more information on the share of renewables and the cost of deployment would be useful.	Due to unavailability of data for the full set of 165 scenarios, the dimensions mentioned in the comment are discussed for the four selected scenarios in Sections 10.3 and 10.5. The knowledge gaps sections will be improved.
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	10	0	-	-	-	-	-	-	Chapter 10 assesses mitigation scenarios for different RE strategies, regional cost curves for mitigation with RE sources and costs of commercialization and deployment. Nevertheless, all these scenarios show considerable ranges and a high level of uncertainties in their results when it comes to forecasts of long-term development and deployment of RE - often due to differing assumptions on which they are based. Furthermore, the scenarios partly lead to contradicting results, e.g. concerning the development or deployment of a specific RE technology. Thus, the results can only give an orientation regarding possible future development and an open discussion on the best future energy mix for reaching a sound balance of sufficient energy supply at fair price, reduction of environmental and social costs, mitigation of climate change.	We agree to this comment.
¿vind Christophersen (Climate and Pollution Agency)	10	0	-	-	-	-	-	-	Chapter 10 should make more professional use of quantitative measures and units of measure: a. The chapter should distinguish between electricity (measured in TWh-el) and heat (measured in TWh-heat). The two should never be mixed into one concept of energy measured in TWh, which only adds to the confusion. b. The chapter should use rounded numbers, perhaps 3 significant digits at most. The precision level in the topic does not warrant the use of more digits. For example 321.457 TWh should be written as 320.000 TWh. c. The chapter should use the same units throughout, and particularly avoid omissions of the time period. As an example, the chapter often says TWh, when what is meant is TWh/yr. d. The chapter should distinguish clearly between marginal cost of a type of RE and the investment cost involved in getting the capacity ready to generate the RE. The costs must be related to a certain time, since they have changed and will change dramatically. e. If levelized cost of energy (LCOE) is used, the same assumptions must be used each time. And most important, the chapter must stress that the results change dramatically if the assumptions are changed slightly.	see above, digits will be changed

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¿vind Christophersen (Climate and Pollution Agency)	10	0	-	-	-	-	-	-	Comments on the technical detail presented in Chapter 10: a. Much information is given with too many significant digits, implying a higher level of precision than warranted given the great underlying uncertainties. This can be solved by reducing the number of significant digits throughout the text. b. Information has been selected for inclusion in a manner which does not help the reader focus on the essentials, but derails him/her into secondary issues. This is difficult to solve without a total rewrite, a simpler way would be to delete those sections which treat secondary issues.	Accepted, text will be revised
United States (U.S. Department of State)	10	0	-	-	-	-	-	-	In seeking places to shorten Chp 10, this reviewer noted that numerous sections began by repeating common themes to set up key points or assertions for that section. While this approach is stylistically appealing, there are perhaps ways to shorten Chp 10 by reducing the repetition of phrases such as the one that openings 10.5 on page 59, line 9-11. However, the effort required may not be worth the result.	Will be revised
United Kingdom (Department of Energy and Climate Change)	10	0	-	-	-	-	-	-	Is there any consideration of ¿embodied energy¿?	No considerationof embodied energy in the scenarios
¿vind Christophersen (Climate and Pollution Agency)	10	0	-	-	-	-	-	-	It is not helpful to use equilibrium models to describe the dynamics of RE. The rate of deployment of RE during this century is not well described by a general equilibrium model. The rate of deployment is much better described by a non-linear dynamic simulation model based on differential equations, a model where deployment decisions (in the model system) are based on the information available at the time of decision.	Unsubstantiated comment without any reference to literature that would support the opinion expressed here.
United Kingdom (Department of Energy and Climate Change)	10	0	-	-	-	-	-	-	It¿s not clear whether there is internal consistency in all of their assumptions e.g. do their high deployment scenarios involve more rapid cost reductions, which in turn drives greater uptake? Likewise, do the higher deployment scenarios affect assumptions on CO2-intensity of the grid?	While it is acknowledged that a full scale analysis of cost assumptions and deployment would be desirable, this is not considered to be feasible within the SRREN, but would have to be carried out be the integrated modeling community. It is not clear what is meant by the CO2 intensity on the grid.
United States (U.S. Department of State)	10	0	-	-	-	-	-	-	Much of this chapter goes beyond the scope of the title - mitigation potential and cost. Included is also benefits, or social costs of carbon. This may be relevant, but too much attention is given to this matter and much of the discussion should be scaled back. The chapter should focus more on the pure economics and the potential to reduce GHGs through a quantitative approach, not as a qualitative discussion of aspects of RE that go beyond the scope of the Chapter. Section 10.6 in particular should be pared back significantly.	Chapter is being revised and in particular 10.6 will be more focused on external costs
United States (U.S. Department of State)	10	0	-	-	-	-	-	-	On multiple occasions, there is reference to negative costs. Suggest using the terms "economic" or "non economic", or otherwise more thoroughly explain how building something can be done at negative cost and in what context (e.g. models typically don¿t have a framework for including negative costs which should be noted).	Concept of negative costs is widely used in the literature and it seems to convey better the meaning authors are trying to give in the chapter than the terms "economic" and "non economic
United Kingdom (Department of Energy and Climate Change)	10	0	-	-	-	-	-	-	On scenario development, suggest including discussion on competition between renewables or the max potential of different renewables. It would be useful to have an idea about the driving forces behind technology shares, technology scales etc.	A discussion of the renewable potentials and the deployment seen in the scenarios is included in Section 10.3.

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)	10	0	-	-	-	-	-	-	Scenarios are broken down into several categories without any explanation why. Categories I-IV are not adequately explained in terms of cost and RE share, although classification by CO2 concentration is very useful, but the rationale for categorizing scenarios should be made more clear to the reader.	The categorization in terms of CO2 concentration goes back to Fisher et al. 2007 (AR4 WG3 Ch.3) and is meant to introduce some consistency across IPCC reports. We add some explanation of the rational.
United States (U.S. Department of State)	10	0	-	-	-	-	-	-	The chapter becomes much more valuable in highlighting areas that need greater emphasis ¿ both in future research and in policy or implementation ¿ rather than simply compiling well-known research results. This comment applies in particular to Sec 10.3.2.2 (Line 22, pg 34 -- worth expanding significantly on the analytic gaps and the potential contributions from renewable heat), and similarly to 10.3.2.3, 10.3.6, and to p 68 line 6 in 10.5.4.	Accepted
¿vind Christophersen (Climate and Pollution Agency)	10	0	-	-	-	-	-	-	The logic of the structure of this chapter should be improved, since the chapter headings do not form a pedagogic route towards the message. The content often does not match the chapter headings, and in many cases the content is not presented in a systematic manner. A new edit is necessary in order to make chapter 10 understandable for both experts, policy makers and other readers. The best parts are the two subchapters on marginal cost curves and learning curves.	Chapter is being revised
¿vind Christophersen (Climate and Pollution Agency)	10	0	-	-	-	-	-	-	The selection of scenarios used is not representative. a. It is interesting, but not helpful in predicting what will actually happen in this century, when Chapter 10 seeks to describe the ¿average use of RE¿ in an ensemble of different scenarios. This is because the ensemble is not representative of all possible futures. The ensemble selected for inclusion probably has a strong overrepresentation of scenarios based on a policy of cost effectiveness. To be representative of what will happen to RE in this century, the ensemble must include a good mix of scenarios ¿ some based on cost considerations alone, but many based on societal policy which deviate from least cost. It should also include an extremely optimistic scenario - one where the climate problem is solved. A much better approach in the first part of Chapter 10 would have been to collect an ensemble of scenarios which all achieve the same reduction in GHG emissions, and then compare the policies used in the representative set of scenarios to achieve this goal.	While it is agreed that the scenario sample collected for the SRREN is not exhaustive, it is sufficiently large to be representative for the recent literature. The modeling apporaches used to generate the scenarios cover a broad range methodologies. Selecting scenarios with only particular stabilization goal is seen problematic, because there is no globally agreed upon stabilization target that could be used to justify such a choice.

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¿vind Christophersen (Climate and Pollution Agency)	10	0	-	-	-	-	-	-	The summary would benefit from a rewrite, ideally to highlight policy relevant key findings such as: a. A strategy to reduce GHG emissions is likely to involve different elements such as replacement of fossil based energy (both electricity and heat) with renewable energy (both electricity and heat) in combination with increased efficiency in production, transmission and end use of energy (both electricity and heat), expanded use of carbon capture and storage both in fossil based and biomass based energy (both electricity and heat) production plants and industry and implementation of emissions reductions in forestry, agriculture and waste treatment. The structure of such packages will influence the cost structure of renewable energy. b. There are a number of different RE sources (hydro, wind, solar, biomass, geothermal, wave, etc) available for implementation. The important ones are plentiful compared to likely human energy need in this century c. The current production cost varies dramatically between different types of RE. d. RE tends to be more expensive than fossil based energy ¿ this is also the case if the fossil based energy is charged with a ¿normal¿ cost for its GHG emissions. It will require a GHG emissions cost several times higher than the current EU trading system cost of 15 euro/ton CO2e to make various forms of RE cost competitive. e. The production cost of any RE will decline with increased use (following a learning curve). The cost of immature sources will decline more than the cost of mature sources. f. The future production cost for various types of RE will depend on the extent to which that type of RE is used in the meantime. High use in the short run will lead to lower costs in the long term. g. The rate of introduction of various forms of RE in the future will primarily be determined by policy (ie subsidies legislation) and not according to cost competitiveness. h. Near term cost effective solutions (which is to introduce RE only when it is cheaper than the alternatives) is only one of many possible strategies and does not take into account all costs and benefits related a energy system. It is possible to choose to use RE before it is the cheapest energy source, and this is commonly being done for numerous reasons throughout the world. Limiting oneself to a cost effective policy, will lead to much less use of RE ¿ and must less reduction in GHG emissions - than if one chooses other deployment policies.	better introduction to explain the flow and add more analysis
United States (U.S. Department of State)	10	0	-	-	-	-	-	-	The term 'innovative technology' is used for RE. The term 'emerging technologies' may be more appropriate, but the term is not applicable to all RE since some technologies have been around for many decades. The report would benefit from more clarity and greater distinction across RE techs and it maybe worthwhile to use the common lexicon used in past IPCC reports regarding mature and emerging technologies and markets.	Text will be revised
United States (U.S. Department of State)	10	0	-	-	-	-	-	-	The use of the terms "1st Best" and "2nd Best" seems to be incorrect according to standard economic usage. If that is the intent, they should be renamed (i.e. more aggressive renewable, more optimistic renewable scenarios).	We will adjust the terminology used in this context.

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United States (U.S. Department of State)	10	0	-	-	-	-	-	-	There is no explanation for why four scenarios are highlighted, other than they present a range of results for RE. Before describing the scenarios chosen, there should be a description for why they were chosen and why they are useful to highlight. The specific scenarios also need greater explanation of what assumptions are used in particular, but also what policies are modeled and why, key differences between the models that may influence results, and why these scenarios are essentially superior to others in the context of this chapter whereby they are worthy of additional attention.	Accepted
United States (U.S. Department of State)	10	0	-	-	-	-	-	-	There should be a better description of how the models are projecting into the future when looking at scenarios that seek to limit GHG emissions globally. Something is leading to greater renewable deployment in various scenarios. What are the key assumptions and policy parameters that are driving that change?	Will be done
Australia (0)	10	0	-	-	-	-	-	-	This chapter is missing a clear written view to suggest that a portfolio of mixed technologies is required in the future to reduce GHG emissions, that there will need to be a transition period and that policy positions need to be implemented to enable those transitions to be made. That is, 'transitions' should be considered the norm and policy should recognise this.	The chapter provides na overview of different pathways
United Kingdom (Department of Energy and Climate Change)	10	0	-	-	-	10.2.2.6	-	-	It says it¿s not possible to provide mitigation costs for the scenarios, but it would still be useful to set out key drivers, uncertainties etc.	The statement just refers to the fact that it is not possible to allocate mitigation costs to specific technologies, such as renewables. We will try to make this point in a clearer way.
United States (U.S. Department of State)	10	4	1	-	-	-	-	-	The executive summary should be limited to 1-2 pages.	will try to shorten significantly
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	10	4	3	4	5	-	-	-	Up to date, hydro power is the most market competitive and mature RE. Wind onshore is well on its way of becoming cost competitive with conventional power energy sources.	Text will be revised
Timm Zwickel (IPCC WG III)	10	4	7	4	8	-	-	-	for better understanding change structure of sentence to ¿... an integrative perspective and consideration of interactions with other mitigation technologies and the overall energy system.¿	Text will be revised
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	10	4	14	-	-	-	-	-	<comment> Making a tangible improvement for this text, "all other things being equal". <reason> I don't understand that what is this "all other things" means in this context. This would be important imformation and assumption.	Text will be revised
Gunnar Luderer (Potsdam Institute for Climate Impact Research)	10	4	17	-	19	-	-	-	it would be helpful to further elaborate on the drivers for RE costs and their relative competitiveness, such as assumptions on technical potential, investment costs, technological learning, integration, policy environment,...	will be done in the main chapter but not possible in ES
Gunnar Luderer (Potsdam Institute for Climate Impact Research)	10	4	17	-	19	-	-	-	The authors may want to consider adding cost of renewable energy supply in addition to (1) scale of the enery system, and (2) relative competitiveness as determining factors for the role of RE in climate change mitigation	By competitiveness authors mean exactly that.
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	10	4	20	4	22	-	-	-	Other options for reducing GHG emissions would be measures on the supply side to improve the efficiency in energy conversion and transmission processes (e.g. by modern conventional power plants with higher efficiency rates, by optimized grid infrastructure, interconnections and management, etc.).	Text will be revised

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United States (U.S. Department of State)	10	4	25	4	25	-	-	-	Change "assessments" to "assumptions"	Accepted
United States (U.S. Department of State)	10	4	35	-	-	-	-	-	change to "reach 200 EJ/yr up to 400 EJ/yr"	text and numbers will be revised
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	10	4	36	4	39	-	-	-	A short definition of Annex 1 and non Annex 1 countries (to UNFCCC) might be useful here.	see glossary
China (China Meteorological Administration)	10	4	36	4	39	Executive Summary	-	-	That's not the "General Result", which depends on mitigation targets over time in Annex 1 countries. It is suggested to delete the whole paragraph.	Text will be revised
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	10	4	37	4	39	-	-	-	This is a misleading statement. One could misinterpret it in that sense that IC do not have to mitigate or only a small share. Moreover, the burden sharing issue between IC and LDCs should be mentioned.	Text will be revised
United States (U.S. Department of State)	10	5	0	-	-	-	-	-	Approximately is misspelled	Accepted
United States (U.S. Department of State)	10	5	0	-	-	-	-	-	This term is not one commonly seen in the context of a particular renewable technology. The term needs to be defined, but it may be that the author means to say 'life cycle emissions" rather than "emissions factors"	Comment could not be understood
Steve Sawyer (Global Wind Energy Council)	10	5	9	5	9	-	-	-	should be '¿deployment rates are still significantly¿'	Text will be revised
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	10	5	9	5	10	-	-	-	<comment> Descriptions between "technological limits" and "technical potential" should be unified. <reason> Are these descriptions same mean, or not?	Technical potential is defined in the glossary and it is related to technological limits
China (China Meteorological Administration)	10	5	9	5	10	Executive Summary	-	-	Here it one-sidedly emphasizes on technical potential, but it does not refer to the market and economic potential. It is suggested to delete lines 9-10, or give additional wording on the other two potentials, otherwise such descriptions will mislead the readers and decision makers.	Technological potentials are well defined, while economic and market potentials are more subjetive and because of that are not included in this text
Timm Zwickel (IPCC WG III)	10	5	11	5	22	-	-	-	If electricity and heating are mentioned here, transport has also to be mentioned.	This is a problem of data availability in the models
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	10	5	11	5	22	-	-	-	The extremely wide range of projected future shares of RE in power production and heating/cooling derived from the analised set of data makes it difficult to draw concrete conlusions and recommendations for economic and political decision-makers.	Nothing can be done with this respect. We can only report what is in the scenarios literature
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	10	5	14	-	-	-	-	-	are the numbers the mean of all or of the 4 scenarios?	Text has been clarified
China (China Meteorological Administration)	10	5	15	-	-	Executive Summary	-	-	The percentage "95% (2050)" should be presented with the special assumptions behind it, otherwise such results will mislead the readers and decision makers. The assumption of unreasonable mitigation targets and limited access to competing technologies is not the robust scientific conclusion shared by UNFCCC Parties.	Details of the assumptions are shown in the main text

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Timm Zwickel (IPCC WG III)	10	5	16	-	-	-	-	-	probably should read ¿limited¿ instead of ¿limiting¿	Will be clarified.
Steve Sawyer (Global Wind Energy Council)	10	5	17	5	17	-	-	-	should be "¿all scenarios by 2050 lies between¿" et seq.	Accepted
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	10	5	21	-	22	-	-	-	"requires" is misleading, better: "¿RE technologies does not take advantage of the full technical potential."	Text will be revised
United States (U.S. Department of State)	10	5	23	5	25	-	-	-	Language can be improved	Text will be revised
Emmanuel Branche (Electricité de France)	10	5	23	5	31	-	-	-	Precise the current situation of RE (in % and EJ) in order to be more accurate	Text will be revised
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	10	5	23	-	25	-	-	-	Concerning the numbers: if you give a range for the mitigation scenarios, also for the business-as-usual scenario a range should be given. Indicate that it is a mean of all scenarios.	Out of the 4 scenarios selected, IEA scenario is already a business as usual, and as such already shown as the lower bound
China (China Meteorological Administration)	10	5	25	-	-	Executive Summary	-	-	Again, the percentage "80%" should be presented with the special assumptions behind it, otherwise such results will mislead the readers and decision makers. The assumption of unreasonable mitigation targets and limited access to competing technologies is not the robust scientific conclusion shared by UNFCCC Parties.	Details of the assumptions are shown in the main text
Emmanuel Branche (Electricité de France)	10	5	28	5	31	-	-	-	The sentence "The most ambitious ¿ baseline scenario" is not clear	Text will be revised
Steve Sawyer (Global Wind Energy Council)	10	5	32	5	34	-	-	-	Suggest rewording this sentence to something like: "Cost abatement curves and energy supply curves are an approach that is very often used at present for defining mitigation strategies and prioritising abatement options.	Text will be revised
Steve Sawyer (Global Wind Energy Council)	10	5	36	5	36	-	-	-	should be 'at first glance,'	Accepted
Steve Sawyer (Global Wind Energy Council)	10	5	39	5	39	-	-	-	should be 'also has'	Accepted
Steve Sawyer (Global Wind Energy Council)	10	5	40	5	45	-	-	-	to this list I would add, 'they do not take into account the speed of deployment of the technologies considered, which is fundamental,'	Text will be revised
United States (U.S. Department of State)	10	6	4	6	8	-	-	-	The introduction of $/ton estimates needs to be introduced better since there is a policy in context in which that would occur, and the specific language is very unclear and needs to be revised.	Text will be revised
Emmanuel Branche (Electricité de France)	10	6	5	6	5	-	-	-	Is the value USD100/tCO2 with year 2005 as a reference ?	Text will be modified to make clear that such precision does not exist due to different reference years for the different studies
Timm Zwickel (IPCC WG III)	10	6	5	-	-	-	-	-	Convert to US$2005	Text will be modified to make clear that such precision does not exist due to different reference years for the different studies

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Steve Sawyer (Global Wind Energy Council)	10	6	6	6	6	-	-	-	single digits' of what? Percentage? GTCO2/yr? please clarify	Text will be clarified
Gunnar Luderer (Potsdam Institute for Climate Impact Research)	10	6	6	-	-	-	-	-	"typically in the single digit range" - in what unit is this order of magnitude given. Deployment in %? EJ?	Text will be clarified
Garcia Javier (Garcia Monge Consultant)	10	6	16	6	16	ES	-	-	The experiencies curves are not referred to any parameter, such year or capacity installed.	Text will be revised
China (China Meteorological Administration)	10	6	16	-	-	Executive Summary	-	-	The empirical experience learning rates of "10 and 17% (wind onshore)" and "15 to 21% (photovoltaic)" is not consistent with Table 10.5.2. Please double check these percentages.	Text will be revised
United States (U.S. Department of State)	10	6	20	6	29	-	-	-	Suggest deleting paragraph.	Authors believe this information is important
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	10	6	21	6	25	-	-	-	Bearing in mind projected annual investment needs of 100-1,000 billion USD (for reaching the 2° mean temperature change limit) raises the crucial question of funding. Only a close cooperation of the public and private sectors within the countries and international cooperation - within regions such as the EU and on a global scale - would provide sufficient funding for reaching these ambitious climate goals. In this context development and implementation of sophisticated energy policy concepts as well as reliable political and legal frameworks within individual countries and on regional and global level is necessary to foster private investment in RE.	Nothing to add
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	10	6	26	6	29	-	-	-	<comment> What does this "additional cost" mean?, "deployment cost" as well. In whole on this summary, some "cost" would be loosely defined, therefore it is better to define "cost" mean.	An executive summary is not the place to present definitions
Garcia Javier (Garcia Monge Consultant)	10	6	30	6	30	ES	-	-	The sentence states: RE, which is abundant in many developing countries (¿).”" It must state: RE resources, that are abundant in many developing countries (¿)”"	Text will be revised
United States (U.S. Department of State)	10	6	30	-	-	-	-	-	There should be a better description (including costs and mitigation potential) of distributed generation and the role of RE, and this paragraph should be revised to do so.	could not understand
Emmanuel Branche (Electricité de France)	10	6	35	6	35	-	-	-	This sentence does not only match with biomass, but for other RE technologies. Proposition to remove ", e.g. in the case of energy biomass production"	Text will be revised
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	10	6	38	6	40	-	-	-	<comment> Amend the sentence "cause significant" to "could cause some". <reason> Concerns of fossil fuels about human health rather deminish because of its less toxic emissions. <reference> TEPCO Enviromental Action Report (http://www.tepco.co.jp/eco/report/data/index-j.html)	Authors disagree
Timm Zwickel (IPCC WG III)	10	6	40	-	-	-	-	-	insert ¿estimates on¿ at ¿In particular ESTIMATES ON social costs of ....¿	Text will be revised

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Steve Sawyer (Global Wind Energy Council)	10	6	43	6	44	-	-	-	Please reword the sentence beginning with 'However,¿.' I'm not sure what it means.	Text will be revised
United States (U.S. Department of State)	10	6	44	-	-	-	-	-	Recommend deleting the whole paragraph and replacing with a discussion of the trade-offs involved with replacing fossil fuel with RE, a qualitative discussion of the costs and benefits of less polluting techs.	Text will be revised
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	10	6	47	-	-	-	-	-	<comment> Add the sentence "There are considerable uncertainties in the assessment and valuation of external impacts of energy sources. More studies, articles and reports are needed to provide information on them." after "... economic growth in certain situations". <reason> The most important finding here is that the impact analysis have not been progressed enough because it is difficult to implement such analysis. <reference> Line44 of page76, line20 of page80 in Chapter10	Reference for the uncertainties associated to external costs is already made in the beginning of the paragraph
Germany (Federal Ministry for the Environment, Nature Conservation and Nuclear Safety)	10	7	7	7	19	-	-	-	This report is about renewable energies and without an in depth consideration of the associated risks and challenges regarding the nuclear options, this report should therefore keep focussed in regard to mitigation options related to RE. In particular, change the sentence on line 7 to read "The following mitigation options related to energy supply are relevant regarding RE:". Then, delete bullet number 2 on line 10; ammend bullet number 3 on line 11 to read "using carbon capture and storage (CCS) technologies in combination with fossil fuels or biomass"; delete bullet 5 on line 14& 15.	Text will be revised
Patrick Matschoss (TSU)	10	7	7	7	21	-	-	-	Delete; the list is identical to the one in chapter 1 (p. 12, l. 5-31) and it should stay there as it makes a more general point that goes beyond chapter 10	Text will be deleted
Timm Zwickel (IPCC WG III)	10	7	7	7	23	-	-	-	The entire list should be moved to Chapter 1 as this is very general in nature and to the entire report and hence should be mentioned in the beginning.	Text will be deleted
Marc Darras (GDF SUEZ)	10	7	7	-	25	-	-	-	This may be deleted from the introduction for streamlining.	Text will be deleted
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	10	7	8	-	-	-	-	-	Check below; SPM P5 L30 - P6 L6	will be checked
Steve Sawyer (Global Wind Energy Council)	10	7	11	7	11	-	-	-	It should be noted here and elsewhere that CCS is (and has been for some time) in the demonstration phase	Text will be revised
Gunnar Luderer (Potsdam Institute for Climate Impact Research)	10	7	17	-	-	-	-	-	Does "increasing energy efficiency of buildings" also include appliances? If not, these should be mentioned explicitly	Text will be revised
Steve Sawyer (Global Wind Energy Council)	10	7	18	7	18	-	-	-	should be 'behaviour' -	Accepted

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)	10	7	18	7	19	-	-	-	Delete parenthetic.	Text will be revised
Steve Sawyer (Global Wind Energy Council)	10	7	20	7	23	-	-	-	Why not mention forests here, as their potential is much larger than agriculture?	Text will be revised
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	10	7	24	7	25	-	-	-	In fact, the mentioned "cost effects or specific policy incentives" seem to be the strongest - if not in many cases the only - triggers for the implementation of mitigation technologies.	Text will be revised
Emmanuel Branche (Electricité de France)	10	7	40	7	40	-	-	-	Replace "systems" by "system"	Accepted
Marc Darras (GDF SUEZ)	10	8	8	-	9	-	-	-	this should read: to gain a better evaluation of the role of RE in mitigation scenarios under different assumptions, and single out the role of specific technologies under these assumptions.	Text will be revised
Patrick Matschoss (TSU)	10	8	24	8	26	-	-	-	In terms of primary energy calculation the direct equivalent methodology is being used here. In that context, Box 1.1 in chapter 1 (Page???) as well Appendix II refer to the implications of different primary energy accounting conventions for energy and emission scenarios.	Accepted
¿vind Christophersen (Climate and Pollution Agency)	10	8	-	-	-	-	10.1.1	-	The text in the upper blue box should be changed to: Summary of the use of RE to reduce GHG emissions in 165 scenarios. The text in the lower blue box should be changed to: "Analysis of the use of RE to reduce GHG emissions in 4 selected scenarios".	The scenarios revised did not have these purposes -figure will be deleted
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	10	9	0	-	-	-	-	-	Figure and table within Box 10.1 should have a numeration. Legend of table should indicate to which year or time frame its data refers.	Table will be removed from the Box to save space and because table is similar to the one present in Chapter 1. But figure can be numbered if that fits the editorial style of the reports
United States (U.S. Department of State)	10	9	0	-	-	-	-	-	This seems like an area that could be downsized to save space. Recommend reducing by half by downsizing text and removing figure. Table is useful but needs a year identified.	As previous IPCC reports have not been explicit about the methods used for primary energy accounting, it was decided to make the definition used and the implications of this choice very explicit in the SRREN. The main purpose of Box 10.1 is to discuss the implications of using different accounting methods for the presentation of results of long-term transition scenarios. The more comprehensive picture is given in Appendix II.5 which integrates impacts on current statistics with those on scenario results. The table will be removed from the Box to save space and because table is similar to the one present in Chapter 1. But figure convey an important message which the authors want to retain.
Canada (Environment Canada)	10	9	1	9	1	Box 10.1	-	-	These methods should be clarified by stating the relation between primary energy and useful (or end use) energy. These relations depend on technology used and therefore, have different values in the long term.	The main purpose of Box 10.1 is to discuss the implications of using different accounting methods for the presentation of results of long-term transition scenarios. The more comprehensive picture, including the role of different energy indicators (primary, secondary, final) is given in Appendix II.5 which integrates impacts on current statistics with those on scenario results. Lack of space does not allow to fulfill the request. Also, the concept of useful energy is different from the concept of end-use energy. End use energy is the same as final energy. Useful energy is related to the concept of energy service.
Emmanuel Branche (Electricité de France)	10	9	-	9	-	-	-	-	Box 10.1. It is not easy to understand the implications of different primary energy accounting conventions ¿ the range for RE is wide (from 194 EJ to 390 EJ !)	The direct-equivalent method is explained in more detail in Chapter 1.3.1.2 and Appendix II.5. We will make more explicit reference to these sections which were still in flux by the time of the SOD submissions. There is no much space for further explanations here.
Patrick Matschoss (TSU)	10	9	-	9	-	-	-	-	Box: There is no single, unambiguous accounting method for calculating primary energy from non-combustible energy sources: REST OF SENTENCE UNCLEAR End of 2nd Para in Box: Please refer to Annex II for more detailed explanations.	Will be clarified. Text will be revised

Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table Info	Comments	Consideration by writing team
Steve Sawyer (Global Wind Energy Council)	10	9	-	9	-	Box 10.1	-	-	I would suggest using the same table as in chapter 1 here¿i.e., table A.1 from Annex I, as table A2 used here is not transparently from 2050 scenario, and real, current figures as in table A.1 will help readers more readily make the comparison between the different methods.	Table will be removed from the Box to save space and because table is similar to the one present in Chapter 1. The main purpose of Box 10.1 is to discuss the implications of using different accounting methods for the presentation of results of long-term transition scenarios. The more comprehensive picture is given in Appendix II.5 which integrates impacts on current statistics with those on scenario results.
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	10	9	-	-	-	10.1	-	-	label of y-axis of the figure looks strange	This will be corrected.
¿vind Christophersen (Climate and Pollution Agency)	10	9	-	-	-	-	10.1	-	First part of Box 10.1 should give brief description of all three methods: direct eq., physical energy content and substitution method	Lack of space to provide a more in deep discussion - already defined elsewhere in the report
Juan Llanes (Centre for Environmental Studies)	10	9	-	-	-	-	-	-	box 10.1 is the same as chapter on methodology a.ii.5 page 6. a possibility for saving space	Because it is a cross-cutting issue, primary energy accounting is addressed in Chapter 1.3.1.2 and more comprehensively in Appendix II.5 of the whole report. Box 10.1 just revisits the definitional issues in the context of long-term transition scenarios. We will make more explicit reference to the above mentioned sections in Box 10.1.
Timm Zwickel (IPCC WG III)	10	9	-	-	-	-	-	-	Box 10.1 should be moved to Chapter 1 so that everything concerning the accounting methods is there in one place. You could refer from this chapter then and if necessary quote important parts	Because it is a cross-cutting issue, primary energy accounting is addressed in Chapter 1.3.1.2 and more comprehensively in Appendix II.5 of the whole report. Box 10.1 just revisits the definitional issues in the context of long-term transition scenarios. We will make more explicit reference to the above mentioned sections in Box 10.1. This box is relevant for the analysis performed in this chapter.
Timm Zwickel (IPCC WG III)	10	9	-	-	-	-	-	-	in second paragraph it should say ¿when applying the methods to long-term scenarios¿, i.e. ¿over¿ should be deleted	Will be corrected.
Marc Darras (GDF SUEZ)	10	9	-	-	-	-	-	Box 10.1	Since the accounting of primary energy is a question for the whole report it should be put either in annex or in chapter 1, then reflected in TS and in a simpler version (without examples for instance) in the Executive summary of the report.	Because it is a cross-cutting issue, primary energy accounting is addressed in Chapter 1.3.1.2 and more comprehensively in Appendix II.5 of the whole report. Box 10.1 just revisits the definitional issues in the context of long-term transition scenarios. We will make more explicit reference to the above mentioned sections in Box 10.1. This box is relevant for the analysis performed in this chapter.
¿vind Christophersen (Climate and Pollution Agency)	10	9	-	-	-	-	-	Box 10.1	The "direct equivalent method" must be explained - or better distinguish explicitly between TWh-electricity and TWh-heat throughout the report	No space available. The direct-euqivalent method is explained in more detail in Chapter 1.3.1.2 and Appendix II.5. We will make more explicit reference to these sections which were still in flux by the time of the SOD submissions.
United States (U.S. Department of State)	10	10	17	10	18	-	-	-	The way this language is framed and the explanation that follows seems like an ineffective way to discuss issues related to RE. Instead of focusing on the investment needed to ensure that RE is a key part of addressing climate change, it would be more useful to determine how important RE is to addressing climate change across scenarios, how cost effective it is, and what happens if we do not greatly expand RE, and what are the implications if we fail to deploy a wide array of technologies, including RE.	These aspects are addressed in 10.2 and not in 10.5, to where text in question makes reference
Timm Zwickel (IPCC WG III)	10	10	20	-	-	-	-	-	maybe add ¿and 10.4¿ at the end of the line	Text refers to 10.3 only
Marc Darras (GDF SUEZ)	10	10	28	-	31	-	-	-	You may suppress the second sentence.	Unsubstantiated comment.
Timm Zwickel (IPCC WG III)	10	10	28	-	-	-	-	-	add the number of models assessed between ¿from¿ and ¿global¿	Will be added

Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table Info	Comments	Consideration by writing team
Timm Zwickel (IPCC WG III)	10	10	39	10	45	-	-	-	Maybe this paragraph could (additionally) be turned into a figure; the figure could look like this: in the center ¿RE deployment¿ (1) above it two text fields with two-way arrows to 1, one with the text ¿CO2 concentration goals¿ (2) the other with ¿cost of mitigation¿ (3). Below 1 there are three text areas linked to 1 with a line, they read ¿time frame¿, ¿where?¿ and ¿differences by technologies¿. At the left of the graphic is a listing with ¿resource availability¿ (4), ¿characteristics of competing mitigation options¿ (5) and ¿... ¿ (6). From this listing (4,5,6) there is an arrow to a big bracket enclosing 1,2,3.	Visulization is in principle possible, but will most likely not allow us to entirely remove the description. Due to space constraints it is currently unclear whether we will be able to take this suggestion on board.
¿vind Christophersen (Climate and Pollution Agency)	10	10	-	-	-	10.2	-	-	Suggest that the title of section 10.2 is changed to "A summary of the use of RE in an ensemble of scenarios for future GHG emissions"	The headings at the 2nd level cannot be changed by the authors, but need to be approved by the IPCC plenary.
Juan Llanes (Centre for Environmental Studies)	10	11	17	-	-	-	-	-	Economic criteria. See Page 25, rows 11-16, first statement on economic criteria sounds controversial because cost assessment, specially on the long run is characterized by substantive and irreducible uncertainty	The aim of the comment remains unclear. This description just summarizes that most models rely on some economic criterion for decision making (e.g. maximizing welfare, minimizing cost). On the other hand, it is acknowledged that assumptions on future costs differ widely across scenarios, largely reflecting uncertainties in long-term cost projections.
Marc Darras (GDF SUEZ)	10	11	24	-	-	-	-	-	Add for clarification: Scenarios are a tool for understanding potential futures, but not ¿.	Will be adjusted.
¿vind Christophersen (Climate and Pollution Agency)	10	11	29	11	42	-	-	-	These two paragraphs may be deleted.	Unsubstantiated comment.
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	10	11	39	-	-	-	-	-	Consistency: Use term either "RES" or "RE sources".	This will be harmonized.
Marc Darras (GDF SUEZ)	10	11	-	-	-	-	-	Box 10.2	Box mentioned but not found	An error in the compilation of the SOD resulted in Boxes 10.2 and 10.3 being absent from the SOD revision 1 which was fixed in the SOD revision 2 made available on 16 July 2010.
Garcia Javier (Garcia Monge Consultant)	10	12	13	12	13	10.2.1	-	-	Any sentence of the form: "some members of a set <are> <have> <do>, [more] [less] than other members of the same set" is almost true when the set has at least three members. The exception is when all the members are equals. For instance: some pupils are smarter than other pupils; some countries are less developed than others, etc. I suggest to omit "Some modelling groups provided substantially more secenarios than others."	The main purpose of this note is to draw attention to the reader that the scenario assemble is not unbiased, because of very different numbers of scenario per model (ranges between 1 and 28). However, we will try to make this clearer in the revision.
Juan Llanes (Centre for Environmental Studies)	10	12	24	-	26	-	-	-	¿The value of using these scenario sets is that there is consistency within these sets that allows for comparison of how the role of RE might change with the alteration of one or several key factors¿. Comment: Can you please highlight these results and the key factors mentioned.	These issues are addressed in Section 10.2.1.
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	10	13	-	-	-	10.2	-	-	citation is missing for AIM/CGE	Will be added.
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	10	13	-	-	-	10.2	-	-	there is a bold line between WIATEC and WITCH, it should be a thin line	Will be changed.

Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table Info	Comments	Consideration by writing team
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	10	14	2	-	-	10.2	-	-	the technology scenarios are not just a variation of nuclear and CCS deployment: biomass and renewables are also varied (biomin/max, norenew scenarios)	We will adjust the caption and refer to these scenarios as variations of the technology portfolio.
Steve Sawyer (Global Wind Energy Council)	10	14	4	14	5	-	-	-	this is a bit confusing. Are you using CO2 or CO2 eq? In which case the baseline for category IV is being extended from 570 to 'just over 600'? Please specify in relation to AR4 WG III SPM table SPM.5	Throughout the section CO2 concentration is used as indicated by the term "CO2 concentration" as opposed to "CO2-equivalent concentration". The match between the categories and the CO2 concentrations used here is not perfect, but we did not want to introduce an additional category for the gap between category IV and the baselines in this set. In addition, it should be mentioned that the categorization in the AR4 is not perfect either, because their the separation was made for both CO2 and CO2-equiv. at the same time which in general does not hold across larger ensembles of scenarios, but is probably rooted in the small number of multigas scenarios available at the time.
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	10	14	4	-	-	10.2	-	-	from... XXX (number is missing)	Will be corrected.
Timm Zwickel (IPCC WG III)	10	14	4	-	-	-	-	-	¿here from 570 ppmv to 600ppmv¿ with 570 taken from AR4	Will be corrected.
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	10	14	5	-	-	10.2	-	-	could you separate between CAT I and CAT II? From the other figures one gets the impression that there are many more scenarios in CAT I compared to CAT II, what would be interesting to know.	If space and time limitations allow, we will disaggregate the categories in the table.
Marc Darras (GDF SUEZ)	10	14	7	-	19	-	-	10.2.1 10.2.2	Clarification: the text and table 10.2.1 refer to 1st best and 2nd best while the comment of table 10.2.2 underline only delayed participation or CCS. This is confusing. Maybe re introduce 1st bets and second best in the comment. Furthermore Policy scenarios 1st best should be already constrained scenarios, other are further constrained. The notion of 1st best and 2nd best is unclear here in term of optimal solution.	We will adjust the terminology used in this context and provide a better definition of the classification.
Marc Darras (GDF SUEZ)	10	14	8	-	10	-	-	-	This sentence is declarative. Could you give substance to it.	The sentence just emphasis that the scenarios are the most recent ones from the peer-reviewed literature.
Timm Zwickel (IPCC WG III)	10	14	10	-	-	-	-	-	¿earth¿ not ¿Earth¿	Will be corrected.
Timm Zwickel (IPCC WG III)	10	14	15	-	-	-	-	-	is it Edenhofer 2009 or Edenhofer 2010?	Will be clarified.
Timm Zwickel (IPCC WG III)	10	14	16	-	-	-	-	-	¿capture¿ without ¿d¿ in the end	Will be corrected.
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	10	14	21	-	-	10.2	-	-	"¿ was collected at a level of detail¿" insert examples of these details: e.g. including parameters such as x and assumptions such as y	If space limitations permit, we will add examples.

Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table Info	Comments	Consideration by writing team
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	10	14	24	19	10	10.2	-	-	Genaral comment: There has been major progress compared to the FOD. I find it now much more useful and interesting, but I am missing some important analyses of the scenarios. The section is more on the relative competitiveness between RE and other mitigation options and not solely on the contribution of RE to mitigation. Therefore, Figure 10.2.3. is very interesing, but in the SRREN the same figure with total RE on the y-axis is much more important. I strongly recommend to include a figure like that. Additionally I miss figures where the percentage share of RE on total PE is given. I expect that some more robust conclusions can be drawn from this analyses. Making a check with some modeling results one can show that 1) concerning RE deployment, very much is happening between 2050 and 2100, so RE seem to be a robust long-term strategy, and 2) the strategy concerning RE does not change so much with the target, so RE are a robust strategy independend of the mitigation target. Perhaps the analysis of your scenarios would lead to a different conclusion, but the whole analysis is missing to extract statements such as the ones above. Perhaps a figure where %share of RE is plotted against the absolute amount is enought to show that the one indicator is as good as the other (what I doubt and what is especially not true for the years around 2050). As space is limited, I suggest to skip Figure 10.2.4., I do not find it very informative, as on both axis variables are given that are not related to RE at all. Moreover, the relationship is somewhat trivial. I would also skip Figure 10.2.5. and instead give the percentage share of RE or relate it directly to Fig. 10.2.2. so that it can be directly compared. Moreover Fig. 10.2.1. needs a lot of space for the limited information that is given in the figure.	The reviewer raises several issues. The first issue is the inclusion in the chapter of text and figures that take the reader through the reasons why renewable energy magnitudes vary so substantively across the scenarios. The reviewer suggests that some portions of this story (e.g. Figure 10.2.3, 10.2.4, and 10.2.5) are not needed in the chapter. We disagree. We believe that telling a clear story in this regared is critical to explain to readers why there is subsantial uncertainty in renewable energy deployment levels for any mitigation goal. Figure 10.2.4 and Figure 10.2.5 are particularly important in this regard. The reviewer also suggests two key themes from the chapter. We agree with these two themes, and have will continue to emphasize them, albeit with different language and a different focus in the chpater and in the SPM. Indeed, we feel that the chapter pretty clearly emphasizes that renewable energy has a large role in climate mitigation over the long-term and that deployments are higher than those of today even in the reference scenarios. We will make sure to mention the 2050 to 2100 period explicitly. The reviewer also suggests figures based on renewable shares. We agree that these would be illuminating figures, but for reasons of space, we do not feel that we can include figures based both on percentages and on totals, and we believe that totals are more important.
Steve Sawyer (Global Wind Energy Council)	10	14	28	14	28	-	-	-	processed' should be 'processes'	Will be corrected.
Timm Zwickel (IPCC WG III)	10	14	28	-	-	-	-	-	¿processes¿ instead of ¿processed¿	Will be corrected.
United States (U.S. Department of State)	10	14	28	-	-	-	-	-	Replace "processed" with "processes"	Will be corrected.
Mark Fulton (Deutsche Asset Management, Deutsche Bank)	10	14	30	16	26	10.2.2	-	-	Fossil fuel subsidies don¿t make the discussion. Perhaps better left out, but they do play a huge role in determining pathways.	While it is agreed that fossil fuel subsidies are important for understanding the status quo as well as barriers for deploying renewables, the discussion should be placed in Chapter 11 which focuses of policy instruments, etc.
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	10	14	31	-	-	10.2	-	-	is "allocation" here the right word?	Intertemporal models explicitly allocate their emission budgets over time which is influenced by the previously metnioned factors. In recursive dynamic models this allocation typically happens via exogenous assumptions, like a carbon price that grows with the discuout rate (Hotelling's rule).
Timm Zwickel (IPCC WG III)	10	14	34	-	-	-	-	-	¿goals¿: calling it goals here is a bit confusing, as people might read it as goals that might not be met, looking ex-post at models they have been met, though, so I suggest: ¿CO2 concentration in 2100¿ (in caption it is already like this)	Text will be revised
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	10	14	37	-	39	10.2	-	-	Does this statement also hold for the percentage of RE of the total energy use?	Yes, it does.

Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table Info	Comments	Consideration by writing team
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	10	14	37	-	-	10.2	-	-	"are" is missing at the end of the line	Will be corrected.
Marc Darras (GDF SUEZ)	10	14	38	-	39	-	-	-	This sentence can be used throughout this section, and is not pertinent to the analysis: it is the real basis of the selection of the scenarios. Here the conclusion should be that CO2 concentration does not explain alone the RE deployment; other drawing variable should be looked for (which is done in the following section).	Within space limitations we will try to expand on this.
Emmanuel Branche (Electricité de France)	10	14	-	-	-	-	-	10.2.2	Define different categories (Cat I to Cat IV) in regards to their CO2 concentration prior to this table.	As indicated in the table caption the categorization originates from AR4 and its usage is meant to introduce continuity. Given space limitations, we cannot present the definition multiple times. Moreover, essentially all figures imply the definition in addition to the category names.
HONGGUANG JIN (Thermophysics engineering ,Chinese Academy of Scinces)	10	15	1	-	-	-	10.2.1	-	The are many different colors and lines in this figure which make reader confused.	We will look into the possibility to introduce shaded ranges rather than showing indivdual lines
United States (U.S. Department of State)	10	15	5	-	-	-	-	-	It would be useful to highlight the assumptions that underpin plant turnover, expected lifetime, capitol stock turnover. Also, include how energy demand assumptions influence this dynamic.	The challenge to collect and evaluate input assumptions of the scenarios analyzed here is beyond reach within the SRREN for several reasons: (i) technology description differs across models and thus finding a suitable set of technology descriptors for all models is not straight forward and would most likely require an interactive process (which could be embedded in a,model comparison exercise), (ii) some assumptions vary across regions (e.g. costs) and therefore cannot be compared easily in an aggregate way, (iii) collecting data is an enormous task that was not doable within the scope of the SRREN synthesis,
Timm Zwickel (IPCC WG III)	10	15	12	15	13	-	-	-	For the reason given in this sentence it might be good to also include 2100 as further graph in Fig. 10.2.2	While the graph is in principle available, space limitations will not permit to include the 2100 graph.
¿vind Christophersen (Climate and Pollution Agency)	10	15	-	-	-	-	-	10.2.1	The "Energy Revolution" scenario is missing in this table, although it is central in later parts of Chapter 10 - see for example Box 10.3	Table 10.2.1 is organized by model, not by scenario name, because listing individual scenario identifiers or names would simply be too space consuming. The model that was used to generate the Energy Revolution scenario is named Mesap/PlaNet. We will point this out in table in 10.3 section.
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	10	16	1	-	5	10.2	10.2.2	-	In your paper you added a figure for the year 2100 which looks subtantially different from 2050. The interpretation could also be included here: the range of RE that the different models report does depend on the mitigation target (as the range in 2100 is nearly the same for all CATs). Moreover, the medium of RE deployment seems to double from 2050 to 2100 (again independent of the CAT, so it is a kind of robust result that RE will expand independent of the mitigation target). It would be good if the share of RE could also be given and not just the total amount as it might turn out the the percentage share of RE is a more robust indicator.	Within the space limitations we will try to add the suggested long-term interpretation. Regarding the suggestion to present shares, we agree that a dual approach of presenting both absolut numbers and shares can be insightful, but given the space limitations, we prefer to stick with absolute numbers only rather than shares only, since the absolute amount matters for the upscaling of a technology and the prospects for market sizes etc. Note that Figure 10.2.6 uses shares, but to avoid misinterpretation additional interpretation of results is required (an increasing share could correspond to a reduction in absolute deployment, if the total system size decreses more.
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	10	16	3	-	-	10.2	-	-	2100: figure for 2100 is not given	Caption will be corrected.
Australia (0)	10	16	3	-	-	-	-	-	There is no 2100 figure	Caption will be corrected.
Steve Sawyer (Global Wind Energy Council)	10	16	4	16	4	-	10.2.2	-	vertical' should be 'horizontal',	Will be changed.

Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table Info	Comments	Consideration by writing team
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	10	16	4	-	-	10.2	-	-	"vertical" should be "horizontal". But a vertical line for today's emissions could be included as well.	Will be corrected. We will add the vertical line for emissions as well if still possible (given that figures are already with graphics designers).
Australia (0)	10	16	4	-	-	10.2.2.2	10.2.2	-	"vertical' should be 'horizontal'.	Will be changed.
massimo tavoni (FEEM and CMCC)	10	16	16	-	18	-	-	-	Integrated assessment models have find much easier to feature the supply side rather than the demand side of the climate economics equation, not only because demand is poorly understood, but also because of their very nature, which is aggregate and rooted into planning of capacity.	We agree.
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	10	16	19	-	20	10.2	-	-	It is hard to figure this out from Figure 10.2.4. Could you provide the range, mean and the stdv on the right side as always shown in the temperature projection figure of WGI? This would be very helpful.	We will try to add and visualize statistical measures that illustrate the ranges of variables in the scatterplots.
Australia (0)	10	16	-	-	-	-	10.2.2	-	Graphing the share of energy produced rather than absolute values of energy produced would take out the influence of economic and energy growth	We agree that a dual approach of presenting both absolut numbers and shares can be insightful, but given the space limitations, we prefer to stick with absolute numbers only rather than shares only, since the absolute amount matters for the upscaling of a technology and the prospects for market sizes etc. Note that Figure 10.2.6 uses shares, but to avoid misinterpretation additional interpretation of results is required (an increasing share could correspond to a reduction in absolute deployment, if the total system size decreses more.
Peter de Haan (Ernst Basler + Partner AG)	10	16	-	-	-	-	10.2.2	-	shortening potential: although the work with 165 scenarios is excellent and figure 10.2.1 very illustrative, the level of detail of the analysis of these scenarios regarding non-RE issues is too much into depth. Fig. 10.2.2. could be omitted	Figure 10.2.2 shows total RES deployment and is therefore central for the analysis.
Garcia Javier (Garcia Monge Consultant)	10	16	-	-	-	-	10.2.2 footnote	-	It is stated: the black vertical line. It should state: the black horizontal line.	Will be changed.
HONGGUANG JIN (Thermophysics engineering ,Chinese Academy of Scinces)	10	17	1	-	-	-	10.2.3	-	The same problem with Fig 10.2.3	We don't understand the comment. Figure 10.2.3 has the same problem as 10.2.3?
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	10	17	2	-	-	10.2	-	-	a reference to Box 10.1. should be included.	Will be added.
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	10	17	-	-	-	10.2	10.2.3	-	The range, mean and stdv of each CAT should be given on the right side of the figure.	We will try to include this suggestion into the final revision of the figure.
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	10	17	-	-	-	10.2	10.2.4	-	This figure should be skipped as it has no relationship to RE and the value of information is limited.	While it is acknowledged that the figure is not directly related to RES, it is important to for the line of reasoning. The analysis shows that there is no common agreement on RES deployments for a given stabilization level, but as made very clear in this figure, there are a number of things that all models do agree upon.

Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table Info	Comments	Consideration by writing team
Peter de Haan (Ernst Basler + Partner AG)	10	17	-	-	-	-	10.2.4	-	shortening potential: although the work with 165 scenarios is excellent and figure 10.2.1 very illustrative, the level of detail of the analysis of these scenarios regarding non-RE issues is too much into depth. Fig. 10.2.4. could be omitted	While it is acknowledged that the figure is not directly related to RES, it is important to for the line of reasoning. The analysis shows that there is no common agreement on RES deployments for a given stabilization level, but as made very clear in this figure, there are a number of things that all models do agree upon.
Marc Darras (GDF SUEZ)	10	18	1	-	13	-	-	-	In this paragraph it could be easier to go directly to the total emissions of the energy sector and compare it with the carbon cycle limit as evaluated in IPCC 4AR WG1.	It is correct that the emissions from freely-emitting fossil energy (and non-energy and non-CO2 sources) are essentially determined by the carbon cycle which could be covered by making reference to AR4. However, it is deemed important to illustrate how the degree of correlation goes down when looking at CO2 emissions and freely-emitting fossil energy, CO2 emissions and low-carbon energy, and finally CO2 emissions and renewable energy.
Steve Sawyer (Global Wind Energy Council)	10	18	11	18	13	-	-	-	should be, "¿; and differences in the timing of the emissions reductions as a result of differing underlying model structures, assumptions about technology and emissions drivers, the technologies chosen for emission reductions, and representations of physical...'	Will be changed.
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	10	18	15	-	-	10.2	-	-	Explain what is meant by "low carbon energy" in the legend as well.	A definition in the text seems sufficient given space limitations.
Timm Zwickel (IPCC WG III)	10	18	21	-	-	-	-	-	insert before ¿Total low-carbon ...¿ ¿The rough correlation to be seen in the graphs shows that the more there is low carbon energy supply the less CO2 emissions are there from fossil fuels and industry.¿ as this correlation should be written out somewhere	We will introduce a formal measure of correlation (Pearson's correlation coefficient) to illustrate the decling degree of correlation when looking at CO2 emissions and freely-emitting fossil energy, CO2 emissions and low-carbon energy, and finally CO2 emissions and renewable energy.
Marc Darras (GDF SUEZ)	10	18	22	-	-	-	-	-	Add "energy" after freely emitting fossil	Will be added.
Marc Darras (GDF SUEZ)	10	18	23	-	25	-	-	-	Mitigation efforts do not rise the price of fossil fuel, rather lower it by decreasing the demand. Now it depends how this is done in term of regulation: the fuel price may not be higher but the cost of the energy service under mitigation constraints might be. Could you clarify?	We will clarify that energy services tend to get more expensive while the prices of fossil fuels may actually decline due to a penalty for their use.
Timm Zwickel (IPCC WG III)	10	18	25	-	-	-	-	-	footnote: bracket missing in the very end	Will be corrected.
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	10	18	28	18	31	-	-	-	<comment> Give examples and assumptions for this reference(*2) in detail. <reason> There are no assumption of the description below; "primary energy increases because of large-scale electrification.". Include it.	Due to space limitations we cannot go into much extra detail here, but have to point the interested reader to the original publications. However, we will try to add explanation if possible within a few words.
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	10	18	-	-	-	10.2	10.2.5	-	Does this figure give any new information compared to Fig. 10.2.2.? If yes, the conclusion should be given in the text.	We will try to emphasize the insights generated from including the three sets of scatterplots 10.2.2, 10.2.4 and 10.2.5 more clearly in the final revision of the SRREN. The degree of correlation of CO2 emissions with freely-emitting fossil energy, low carbon energy and renewable energy decreases in that order.
Peter de Haan (Ernst Basler + Partner AG)	10	18	-	-	-	-	10.2.5	-	shortening potential: although the work with 165 scenarios is excellent and figure 10.2.1 very illustrative, the level of detail of the analysis of these scenarios regarding non-RE issues is too much into depth. Fig. 10.2.5. could be omitted	While it is acknowledged that the figure is not directly related to RES, it is important to for the line of reasoning. The analysis shows that there is no common agreement on RES deployments for a given stabilization level, but as made very clear in this figure, there are a number of things that all models do agree upon.
Timm Zwickel (IPCC WG III)	10	19	4	19	5	-	-	-	¿the left panel in Figure 10.2.5)¿ - why only the left? Give reasoning.	This appears to be a left over from a previous draft. Will be corrected.
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	10	19	4	-	-	10.2	-	-	what means the reference to "the left panel" here? Why only for 2030?	This appears to be a left over from a previous draft. Will be corrected.

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)	10	19	4	-	-	-	-	-	(the left panel in...) why only the left panel?	This appears to be a left over from a previous draft. Will be corrected.
Timm Zwickel (IPCC WG III)	10	19	17	-	-	-	-	-	¿study¿: either call it ¿assessment¿ or refer explicitly to ¿Krey and Clarke, 2010¿ here	Will be adjusted.
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	10	19	18	-	23	10.2	-	-	Perhaps the reference to the other chapters could be given, where these questions are addressed.	Reference to chapter 8 will be added.
United States (U.S. Department of State)	10	19	22	-	-	-	-	-	Replace the word "intermittent" with the words "variable resource" here and throughout the report	Will be adjusted.
Timm Zwickel (IPCC WG III)	10	19	23	-	-	-	-	-	after ¿grid¿ insert ¿(see discussions on this in 7.x and 8.x)¿	Reference to chapters 7 and 8 will be added.
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	10	19	25	19	27	-	-	-	Nevertheless, it should be made clear which technical or societal issues potentially influencing RE deployment levels are captured by these models.	The task of synthesizing information on these model dimensions cannot be completed within the space limitations of the section, because modeling approaches are heterogenous and thus cannot be captured in a few sentences.
Emmanuel Branche (Electricité de France)	10	19	31	19	31	-	-	-	According to me, it is not possible to add CCS on existing power plants if they hadn't been designed as "CCS ready"	Unsubstantiated comment without reference to literature.
United States (U.S. Department of State)	10	19	41	-	-	-	-	-	Is this analysis based on the lack of competing options? If so, that is a significant assumption that may or may not actually be true. This comment refers to the following sentence: All other things being equal, when competing options are not available, RE deployments will be higher (Figure 10.2.6).	The main information used in section 10.2.2.6 are scenarios with restricted technology portfolios such as "no CCS" or "limited Nuclear". The impacts on the deployment of renewable energy in response to reducing these competing low carbon options is then assessed (see Figure 10.2.6.). Switching off certain technologies from the mitigation portfolio has become a standard tool in climate scenario analysis over the past few years (e.g. Edenhofer et al. 2010; Luderer et al. 2009; Akimoto et al. 2009; Krey et al. 2009).
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	10	20	1	20	6	-	-	-	In this context it is worth mentioning that with growing maturity of certain RES (e.g. biomass, biogas, solar thermal power with thermal storage systems) their ability to provide base-load power is likely to rise as well.	The linkage between maturity and the ability to provide base-load power is speculative. Systems integration issues, including demand side management, storage, backup and regulatory measrues, seem more relevant.
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	10	20	3	-	-	10.2	-	-	I do not buy the base-load argument. I doubt that the most of the models distinguish between base and peak-load.	The coverage of load characteristics in models differs significantly. We will address this issue in the knowledge gap section and point at ongoing community activities to improve the representation of these systems integration aspects.
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	10	20	4	-	-	10.2	-	-	"would have provided" has to be omitted	The statement is more accurate as it is.
Steve Sawyer (Global Wind Energy Council)	10	20	6	20	6	-	-	-	replace 'intermittent' with 'variable'	Will be replaced.
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	10	20	6	-	-	-	-	-	<comment> Add following sentense after last one on this line, "Therefore, in this assessment, RE might not take a major role as a base-load power rather than the two low carbon competitors." <reason> It should be clearer from this result that nuclear and fossil with CCS.	Some renewable technologies are well capable of providing base load power as well (e.g. biomass power, goethermal power, CSP with thermal storage, OTEC).
HONGGUANG JIN (Thermophysics engineering ,Chinese Academy of Scinces)	10	20	7	-	-	-	10.2.6	-	In this figure, the additional renewable energy shares are showed at different scenarios. At the scenario ""no CCS + lim Nuclear"", the renewable energy is the main way to reduce CO2 emission, but its share is zero. It is not reasonable.	This is a misinterpretation of the figure. There are no 0% renewable increases in this set of scenarios, but often the combination of "no CCS + lim. nuclear" was not included in the analysis.Therefore, we will add marks that allow to distinguish "scenario was attempted, but turned out to be infeasible" and "scenario was not attempted".

Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table Info	Comments	Consideration by writing team
Steve Sawyer (Global Wind Energy Council)	10	20	8	20	8	-	-	-	¿primary energy share by 2050 is constrained in the¿'	Will be corrected
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	10	20	-	-	-	10.2	10.2.6	-	very nice figure! Does the figure change very much when the absolute amount of RE is given?	While using shares rather than absolute numbers of RES deloyment has the benefit of making the results across models comparable, the drawback is that a higher share does not necessarily correspond to higher absolute RES deployment. In an intermediate version of the draft, we tried to address these differences (higher absolute RES deployment vs. lower total energy consumption) and which of them dominate for the individual models included in Figure 10.2.6, but had to remove the paragraph due to space constraints. We will consider putting it into the final revision of the SRREN.
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	10	20	-	-	-	10.2	10.2.6.	-	the scenario names are a bit misleading concerning REMIND: in ADAM the ppm refer to ppm-eq (in 2150), in RECIPE to ppm-CO2-only.	This will be clarified.
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	10	20	-	-	-	-	10.2.6	-	<comment> Delete this Figure 10.2.6. <reason> An assumption of CCS and one of nuclear are too different for us to compare them properly.	The comment is unsubstantiated. Constraining different mitigation options is a well-established approach in climate scenario analysis (e.g. Edenhofer et al. 2010; Akimoto et al. 2009; Luderer et al. 2009; Krey et al. 2009).
¿vind Christophersen (Climate and Pollution Agency)	10	20	-	-	-	-	10.2.6	-	Something is wrong in the first line of the caption - not possible to understand as is currently formulated	Will be fixed.
Timm Zwickel (IPCC WG III)	10	21	3	-	-	-	-	-	automated reference error: should read ¿Fig. 10.2.7¿	Will be corrected
Timm Zwickel (IPCC WG III)	10	21	15	-	-	-	-	-	you intended reference to read ¿Fig. 10.2.7¿ but it actually should be ¿Fig. 10.2.6¿	Will be corrected
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	10	21	19	-	-	10.2	-	-	The reference to Clarke et al 2009 is probably not the best reference for the importance of BECS . There are many more, e.g. Tavoni and Tol, 2010, Azar et al. 2006, Edenhofer et al. 2010, van Vuuren 2007, ...	We will add other references.
Timm Zwickel (IPCC WG III)	10	21	19	-	-	-	-	-	insert ¿through negative emissions¿ before the bracket for better understanding, as this might not be obvious to all readers	Will be added.
Christoph von Stechow (IPCC WGIII TSU)	10	21	19	-	-	-	-	-	Please insert a cross-reference to the relevant section in chapter 2 (2.6.3.3).	Not appropriate in this context
Youba SOKONA (Sahara and Sahel Observatory)	10	21	24	24	6	-	-	-	Regional dimension of RES deployment is missing	A breakdown to Annex I and Non-Annex I regions is shown in Figure 10.2.8 and a more detailed regional breakdown of selected scenarios is presented in Section 10.3.
Oluf Ulseth (Statkraft AS)	10	21	24	-	-	2.2.5	-	-	It is stated that hydropower growth is limited in the scenarios reducing GHG emissions. This does not correspond to the fact that hydropower presently is the RE-technology that has the least or no financial support in a majority of markets but still are developed. All other technologies presently require investment support to be economic viable. The basis for the scenarios are then questioned in terms of developments costs, O&M costs and potential for emissions reduction. The results does not correspond to the actual merit order of development of RE. This is also supported on page 1026, line 14 - 17 and on page 1031, line 10 and the report seems to lack consistency.	We rely on what sceanrios tell, but will make transparent that sceanrios results very much depend on specific assumptions

Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table Info	Comments	Consideration by writing team
Gunnar Luderer (Potsdam Institute for Climate Impact Research)	10	21	27	30	-	-	-	-	"Bio-energy deployment is of dramatically higher scale..." The deployment of bioenergy deserves further attention. As Fig 10.2.9 shows, bioenergy use increases strongly with decreasing stabilization target. This is due to the fact that (a) bioenergy is the most versatile low-carbon energy carrier, which can be used for many types of secondary energy, and (b) because its use in combination with CCS offers the possibility to generate negative emissions. These dynamics are crucial for the understanding of the role of biomass, and should be discussed here in further detail.	We will add some more discussion on bioenergy if space limitations permit.
Gunnar Luderer (Potsdam Institute for Climate Impact Research)	10	21	27	-	29	10.2.2.5	-	-	"Bio-energy deployment is of dramatically higher scale..." - This statement is contingent on the accounting method. The direct equivalent method tends to understate the role of electricity from wind, solar and hydro, as these substitute a much higher quantity of fossil primary energy.	It is acknowledged that the secondary energy derived from a given amount of primary biomass is dependent on the fuels produced, because the efficiency of different conversion processes (e.g. biomass to electricity, heat or liquid biofuels) differs significantly. We will add a caveat to the cross RES comparison in Section 10.2.2.5, although it has to be kept in mind that even the secondary energy level bears some ambiguity, depending on the energy system architecture (e.g. electrified transport vs. liquid fuel transport sector).
Emmanuel Branche (Electricité de France)	10	22	5	22	6	-	-	-	This sentence is too restrictive in regards to the dedicated technology chapters (hydro and geothermal) for potential deployment	We will make clear that this is an outcome of the scenario analysis.
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	10	22	13	-	29	10.2	-	-	links should be given to the other technology chapters of the SRREN	Reference to the discussion in the technology chapters is currently only made in Section 10.2.3, but can be added here as well.
Marc Darras (GDF SUEZ)	10	22	13	-	29	-	-	-	In this section to elements are not underlined: for Solar the fact that it covers PV, CSP, thermal for heating and cooling is confusing because the various technologies have not the same potential of evolution and the same technological and economic barriers: in this chapter this should be reflected in the comments.	Several renewable energy sources, among them solar, but also ocean and in particular bio-energy include multiple conversion routes and technologies with different potentials. For the specific case of solar, the section on "Potential Deployment" (Section 3.9) also shows solar technology deployment from the scenario analysis (graphs imilar to the ones in Figure 10.2.9), but broken down to at least PV and CSP for electricity generation. Due to space limitations, these more detailed results cannot be presented again in this section.
United States (U.S. Department of State)	10	22	22	-	-	-	-	-	Replace "at bio-energy" with "as bio-energy"	Will be replaced.
Marc Darras (GDF SUEZ)	10	22	23	-	25	-	-	-	Traditionnal biomas is area of progress both in term of more sustainable use of the ressource and more efficient appliance for domestic and industrial use. This will not reflect in the primary energy numbers, but on final service delivered. This is mentioned in the Biomass chapter, but in a rather limited manner. Because of the volume concerned it may have an important impact if such policy succeed. (see UNDP site for various demonstration including biogas)	As current biomass consumption is dominated by traditional use (about 3/4 or more), an improvement of equipment efficiency (e.g. advanced stoves) should also show up at the primary consumption level, due to fewer fuel consumed for a given amount of service demand. However, the improved effiency may result in a service demand increse. It has to be noted though that traditional biomass use is typically not well captured in integrated models (with a few recent exceptions) and in addition statistics of traditional fuel use are often poor and/or difficult to compile.
Timm Zwickel (IPCC WG III)	10	22	26	22	29	-	-	-	Consider referencing Ch.2 to show that this reasoning of models is in line with Ch.2 expertise.	Cross reference to chapter 2 will be added.
Emmanuel Branche (Electricité de France)	10	22	-	-	-	-	10.2.8	-	Axis labels are missing	The error appeared in the collation of the SOD version for review and will be fixed in the final revision.
Peter de Haan (Ernst Basler + Partner AG)	10	22	-	-	-	-	10.2.8	-	shortening potential: Fig. 10.2.8. could be omitted	Figure 10.2.8 is important as it allows a cross-region, cross technology comparison. Regional analysis is typically underrepresented in IPCC and this is one of the few occasions in Section 10.2 that shows at least some regional breakdown of otherwise global results.
Emmanuel Branche (Electricité de France)	10	23	-	-	-	-	10.2.9	-	Axis labels are missing	The error appeared in the collation of the SOD version for review and will be fixed in the final revision.

Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table Info	Comments	Consideration by writing team
¿vind Christophersen (Climate and Pollution Agency)	10	23	-	-	-	-	10.2.9	-	The caption does not explain the difference between the two columns of graphs on page 23	The six panels of Figure 10.2.9 are described in the caption from upper left to lower right.. For the next revision it is planned to have the panels numbered consecutively so that matching between panels and caption becomes easier.
Marc Darras (GDF SUEZ)	10	24	7	-	13	-	-	-	"driven mostly by climate policy" on which basis this is said. Tarifs consider various aspect CC, cost of transmission system avoided, energy security¿ Furthermore, examples of public policies in Tunisia or Morocco show clearly interests on various aspects including energy mix to face fossil fuel price variation. Could you give ground to this assertion. However the second sentence of this paragraph is true and further CC policy will have less impact in more developed sources such as hydro where potential as been already largely taped in some countries. Concerning wind since the potential is still largely unexploited, CC policy may have an impact depending of how they are formulated. The question is how that is reflected in the models.	This statement refers to the fact that some RES are deployed to a considerable extent in baseline scenarios, i.e. independent of climate policies, while for others the deployment is much more prononced in climate policy cases that include at a minumum a price on carbon.
Emmanuel Branche (Electricité de France)	10	24	10	24	13	-	-	-	Even if hydro is considered as a mature technology, IEA considered that climate change will/may have an impact on its deployment. For instance the IEA WEO 2008 double the annual installed capacity of hydro in the 450ppm scenario (+44 GW/year) in comparison to the baseline scenario (+22GW/year), see Chapter 5.9.2	Unarguably there is a significant response in hydroelectricity production also in the scenarios analyzed here (factor 1.5 to 3 higher than today under stringent stabilization scenarios). However, the relative increase seen for other renewables is much higher than for hydro.
China (China Meteorological Administration)	10	24	26	24	35	10.2.2.5	-	-	The example is not clear enough, it is suggested to delete the example of the study.	The results quoted here are from an international study that looked into effects of delayed participation in a global climate regime and came up with a number of insights for developed and developing countires. While regional analysis in greater depths is desirable, it is often not possible to include many examples due to space limitations. To maintain a fair amount of regional detail, we are reluctant to remove this paragraph, but will try make the statement clearer.
China (China Meteorological Administration)	10	24	26	24	35	10.2.2.5	-	-	This modeling result has not been peer reviewed by Chinese modelers, and lots of arguments still exist. Hence it is not appropriate to include such an example in IPCC Report is not proper. It is suggested to delete it.	The statement relies on a peer-reviewed publication which is the only requirement for including it into an IPCC report. As the reviewers remain anonymous, there is no possibility to check whether Chinese experts were among them.
Steve Sawyer (Global Wind Energy Council)	10	24	26	24	40	-	10.2.10	-	I don't think this is a good example to use here, as it is so obviously counter-factual: China is leading the world in pv manufacture, it has the largest wind market globally, and has twice as much solar hot water installed as the rest of the world combined. RE deployments in China are only driven (very) secondarily at this point by mitigation concerns,...See REN21. (2009a). Renewables Global Status Report: 2009 Update. Paris, France: RE and Policy Network for the 21st Century. Or better yet, the 2010 version which was published in July of this year.	We will remove the figure
United States (U.S. Department of State)	10	24	26	24	40	-	-	-	Years for this graphic are not consistent. Other tables are using 2050, 2030. Why is this using 2020, 2040?	The figure will be removed.
Marc Darras (GDF SUEZ)	10	24	28	-	31	-	-	-	Because the question is not of formal accession but of policies, one should formulate this sentence without reference to the political question of accession but only to delayed action. Furthermore this is a very complex political issue as shown in Copenhagen, and taken into account pledges of various countries including China.	We will add amore sophisticated discussion.
Timm Zwickel (IPCC WG III)	10	24	29	-	-	-	-	-	Is is sensible to take ¿China takes no climate action until 2030¿ as the example graph, as this is already now outdated looking at national climate policy implemented by China?	We will add amore sophisticated discussion.
United States (U.S. Department of State)	10	24	30	24	31	-	-	-	Not surprisingly, ... (this sentence appears to be incomplete).	Will be completed.

Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table Info	Comments	Consideration by writing team
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	10	24	30	24	31	-	-	-	Sentence incomplete.	Will be completed.
Garcia Javier (Garcia Monge Consultant)	10	24	30	24	31	10.2.2.5	-	-	The conclusion of the sentence is missing: Not surprisingly, the relative deployment of RE in 2020, when China is not taking on mitigation actions (¿).””	Sentence will be completed in the revision.
Timm Zwickel (IPCC WG III)	10	24	31	-	-	-	-	-	sentence ending in this line is incomplete	Will be completed.
China (China Meteorological Administration)	10	24	36	-	-	10.2.2.5	10.2.10	-	The figure is not clear, it is suggested to delete the figure.	We will remove the figure
United States (U.S. Department of State)	10	25	6	-	-	-	-	-	...(right panel of Figure 10.2.11). The panels are not right and left. they seem top/bottom. Same issue in line 19, same page.	This change of figure orientation happened in the compilation of the SOD version for review and will be corrected in the final revision.
Juan Llanes (Centre for Environmental Studies)	10	25	11	-	16	-	-	-	¿It was not considered feasible to provide mitigation cost results using the scenarios in this assessment¿¿ these analyses are not accounting for the benefits of climate mitigation.¿ Also page 26, row 11-13 not a clear correlation between RE deployments and carbon prices. Comment: 37 pages are devoted to scenario analysis, suggest reduce and condensate important findings, including subjective assumptions made by scenario developers (Page 22, rows 2-4).	It is not clear what this comment is supposed to say.
Timm Zwickel (IPCC WG III)	10	25	11	-	-	-	-	-	¿cost can IT be provided¿ - ¿it¿ was missing	Will be added.
Timm Zwickel (IPCC WG III)	10	25	13	-	-	-	-	-	¿particular¿ instead of ¿particularly¿	Will be corrected.
Supachai Panitchpakdi (United Nations Conference on Trade and Development)	10	25	16	25	19	-	-	-	"¿these analysis are not accounting for the benefits of climate mitigation¿A more detailed discussion of co-benefits can be found in section 10.6" It would be appropriate to mention the main results of chapter 10.6 here already, as not all readers will read all sub-chapters, and not having the alternative view of "benefits" seems too biased of a discussion.	Due to space constraints, it is not possible to summarize the main findings of Section 10.6 in Section 10.2. A more condensed presentation of the main findings can be found in the TS and SPM.
¿vind Christophersen (Climate and Pollution Agency)	10	25	-	-	-	10.2.2.6	-	-	We propose that the title of section 10.2.2.6 is changed to "The cost of reducing GHG emissions through increased use of RE"	The proposed title would be misleading, because it creates the impression that an increases of mitigation costs could be solely attributed to the deployment of renewables which is not the case. Moreover, many of the examples provided in the section are showing cost increase due to absence of competing low carbon options (which partly lead to an increase of RES deployement) or the other way around, due to limited availability of renewable options.,
Emmanuel Branche (Electricité de France)	10	26	3	26	4	-	-	-	e.g. AR4	Reference to AR4 is already included (IPCC, 2007c).
Emmanuel Branche (Electricité de France)	10	26	5	26	5	-	-	-	$50/tCO2 (is it in USD 2005 ?)	Yes, the y-axis label will be changed accordingly.
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	10	26	5	-	6	10.2	-	-	I fully disagree with the conclusion that higher RE deployments are associated with higher CO2 prices, I cannot see this at all in Fig. 10.2.11. Highest CO2 prices are associated with medium deployment rates.	The statement will be corrected.

Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table Info	Comments	Consideration by writing team
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	10	26	6	-	-	-	-	-	"(right panel of Figure 10.2.11)": There does not seem to exist a "right" and left panel, but an upper and a lower one.	This change of figure orientation happened in the compilation of the SOD version for review and will be corrected in the final revision.
Timm Zwickel (IPCC WG III)	10	26	6	-	-	-	-	-	should read ¿bottom panel¿ not ¿right¿ - though this will change anyway	This change of figure orientation happened in the compilation of the SOD version for review and will be corrected in the final revision.
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	10	26	12	-	13	10.2	-	-	This sentence is a complete contradiction to line 5 to 6. (but I think it is the correct one)	We will correct the statement.
Timm Zwickel (IPCC WG III)	10	26	12	-	-	-	-	-	remove ¿here¿	Will be changed.
Frank Krysiak (University of Basel)	10	26	14	27	9	-	-	-	Whether costs or marginal costs need to be considered depends on whether the question of RE deployment is a yes/no question (for instance, if a given project that cannot be changed in scale is evaluated) or whether the scope of RE deployment is considered. In the latter case, marginal costs are the appropriate measure.	The argument is not clear.
Marc Darras (GDF SUEZ)	10	26	14	-	19	-	-	-	Following the preceding paragraph, it is important to precise what is included in the mitigation cost: my guess is that it is the cost of deplyement and not the net cost (cost of deployement-benefit) which will results from a global model. The time horizon should be mention as the parallel GDP growth.	Within the existing space constraints, a short definition of mitigation cost will be provided.
massimo tavoni (FEEM and CMCC)	10	26	16	-	19	-	-	-	This paragraph is confusing. What does it mean that other forces will exert a larger influence? That even with mitigation GDP will continue to grow? This is rather obvious. What implications does it have on RE?	Formulation will be clarified.
United States (U.S. Department of State)	10	26	18	-	-	-	-	-	Is this a conclusion, or just a modeling assumption? GDP is most likely very closely linked to the price of electric power. More expensive power will likely have a negative impact on GDP. This comment refers to the sentence: "This means that RE deployments in response to climate mitigation will not be tightly linked to total global GDP."	Formulation will be clarified.
Timm Zwickel (IPCC WG III)	10	26	19	-	-	-	-	-	reference to 10.2.11 left should be deleted if spaghetti graph is removed	Figure 10.2.11 will be replaced, but the information conveyed in the figure is deemed important enough that it should be included in the final revision of the SRREN.
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	10	26	-	26	-	-	10.2.12	-	Comment on the left figure: need to explain that the mitigation costs of "nonuke" options are approximately the same as those of "all options", and are extremely lower than "norenew"options. Comment on the right figure: Does this mean that it will not be possible to meet 400ppm target without CCS or RE, even with more expected installed capacity of nuclear?	Given space limitations, the ability to provide additional interpretation for the figures as suggested for the left panel is unfortunately limited and will most likely not be possible to address. The attainability indicates that the respective models could not reach the very ambitious 400ppm target without additional renewables or CCS.
Taishi Sugiyama (Central Research Institute of Electric Power Industry (CRIEPI))	10	26	-	26	-	-	10.2.12	-	If you assume very cheap RE and limit to nuclear and CCS you come up with this results, but it is not a robust conclusion. You can have cheap energy systems with nukemax and CCSmax, if you assume that they are cheaper than RE (and it is more likely). I suggest to delete this diagram	The figure represents insights gained from a modeling comparison exercise with three participating models which by definition already introduces some robustness as opposed to a single model analysis. Also, the scope of the figure goes beyond just renewable energy sources, but includes mitigation cost implications of non-availability of renewable options, CCS and nuclear energy.
Taishi Sugiyama (Central Research Institute of Electric Power Industry (CRIEPI))	10	26	-	26	-	-	10.2.13	-	If you assume very cheap RE and limit to nuclear and CCS you come up with this results, but it is not a robust conclusion. You can have cheap energy systems with nukemax and CCSmax, if you assume that they are cheaper than RE (and it is more likely). I suggest to delete this diagram	The figure represents insights gained from a modeling comparison exercise with three participating models which by definition already introduces some robustness as opposed to a single model analysis. Also, the scope of the figure goes beyond just renewable energy sources, but includes mitigation cost implications of non-availability of renewable options, CCS and nuclear energy.

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)	10	27	2	-	-	-	-	-	What "costs" are being referred to here? Cost of electricity? Power price? Capital cost? As written, this lacks precision and as a result the discussion is difficult to follow. This comment refers to: "More important is the relative magnitude of the costs in these studies when RE growth is constrained relative to cases in which fossil with CCS and nuclear energy are constrained."	Reference to the cost of mitigation in the previous sentence is made here. We will clarify this in the final revision.
United States (U.S. Department of State)	10	27	4	27	9	-	-	-	This sentence is hard to follow and more explanation is needed because this is a major conclusion that needs to be discussed further.	We will rewrite the sentence in a way that it is easier to undertstand.
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	10	27	5	-	-	10.2	-	-	"¿each involving three models" should be expanded by "for this analysis", as in ADAM five models are analysed but not for the technology scenarios.	Adding "for this analysis" to the sentence would make it more difficult to read. We will rewrite the sentence in a way that it is easier to follow.
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	10	27	6	-	7	10.2	-	-	This conclusion is not valid for the 400ppm ADAM scenario: the mitigation target gets infeasible without CCS. Moreover from Fig 10.2.12 it can be concluded that the constraint cases have a larger influence the more ambitious the mitigation target is.	In the ADAM 400ppm case, the outcome of restricting renewables is comparable to that of restricting CCS, i.e. both lead to infeasibility of the target.
Emmanuel Branche (Electricité de France)	10	27	9	27	9	-	-	-	I assume to replace "Figure 10.2.12" by "Figure 10.2.13"	Reference to both figures will be made.
Steve Sawyer (Global Wind Energy Council)	10	27	9	27	18	-	10.2.13	-	Please clarify 'FIX NUC', 'FIX Biomass' etc., what is 'FIX'?	Similar to Figure 10.2.12 we will add a more precise definition of terms to the caption of Figure 10.2.13.
Timm Zwickel (IPCC WG III)	10	27	9	-	-	-	-	-	should read ¿see Figure 10.2.13¿	Reference to both figures will be made.
Gunnar Luderer (Potsdam Institute for Climate Impact Research)	10	27	-	28	-	10.2.3	-	-	In the list of barriers I am missing barriers related to public opposition to renewables deployment and conflicts with conservation goals. This is relevant both for RE technologies themselves (e.g. wind parks), and large scale transmission, which is a key prerequisite for large scale RE deployment.	Within the space limitations we will try to extend the list. However, Section 10.6 and Chapter 11 will deal with barriers in more detail.
Gunnar Luderer (Potsdam Institute for Climate Impact Research)	10	27	-	-	-	10.2	-	-	The authors write that "the absence of the option to expand on RE deployment is not of a distinctly different order of magnitude than the cost increase from the absence of the option to implement fossil energy with CCS or expand production of nuclear energy (...)". As one of the authors of the studies cited I would suggest to add that the option value of renewables increases disproportionately with the level of ambition (because of the relevance of biomass for low stabilization) and with time-horizon (because of the long-term pay-off of learning investments in renewables).	Within space limitations we will try to make this point.
United States (U.S. Department of State)	10	28	0	-	-	-	-	-	More information on the assumptions regarding developing countries choices would be helpful	The page/line information provided does not allow to identify the statement that the comment refers to.
United States (U.S. Department of State)	10	28	0	-	-	-	-	-	Rewrite this paragraph with more precise language. Could reference ranking of cost effectiveness.	The page/line information provided does not allow to identify the statement that the comment refers to.

Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table Info	Comments	Consideration by writing team
Gerrit Hansen (TSU)	10	28	5	-	7	10.2.3	-	-	Please reconcile statement with chapter 5, there is a contradiction in content (compare e.g. 5.2.1 [...]These charts illustrate that undeveloped capacity ranges from about 70 percent in Europe and North America to 95 percent in Africa indicating large opportunities for hydropower development worldwide [¿] North America and Europe, that have been developing their hydropower resources for more than a century still have the sufficient potential to double their hydropower capacity; belying the perception that the hydropower resources in these highly developed parts of the world are ¿tapped out¿.) "available potential" is not defined, and should be substituted by a more specific term (e.g. economically viable)	The statement is based on Section 5.9.4 on Regional Deployment of a pre-SOD draft that we received for synthesis. We will check with the hydro chapter whether this needs updating.
United States (U.S. Department of State)	10	28	5	-	-	-	-	-	Minor point: Hydro power in OECD countries is only at about 50% penetration rates. Large-scale dam projects may be mature, but small hydro and run-of-river are largely untapped, and could approximately double today's production levels, as I hope is described in the hydro chapter. Similarly, line 22, today's hydropower is significantly cheaper than conventional thermal power plants, not just competitive.	We will restict the statement to large-scale hydropower.
Supachai Panitchpakdi (United Nations Conference on Trade and Development)	10	28	7	28	10	-	-	-	China is a good example to show the deployment of wind technology by the developing nations. So we might add the underlined part: (Line 8 - 9) ", a greater geographical distribution of deployment than currently observed (e.g. China) is likely to be needed to achieve¿" See: Wu, Dong (2010). "Powering the green leap forward: China's wind energy sector", in UNCTAD (ed.), Trade and Environment Review 2009/10. New York and Geneva: United Nations. (available at http://www.unctad.org/Templates/webflyer.asp?docid=12579&intItemID=5304&lang=1&mode=downloads).	China is currently the World's biggest market for wind power. Therefore, additional expansion of wind power in China would not count as "greater geographical distribution of deployment". To reflect that, we will add "…and more recently in China…" to the statement.
Steve Sawyer (Global Wind Energy Council)	10	28	8	28	8	-	-	-	should be, '¿mostly in Europe, China and North America over the past decade, ¿'	Accepted
Gerrit Hansen (TSU)	10	28	10	-	12	-	-	-	please reconcile statement with chapter 3; which reports high deployment of solar e.g. in china and India	By the time of writing, a pre-SOD draft of the Potential Deployment section was available with no information on regional deployment. With the emergence of this additional information the statement in 10.2.3 will be updated.
United Kingdom (Department of Energy and Climate Change)	10	28	13	-	19	-	-	-	It says there are no foreseen global supply chain issues, but I think in reality it might be more complicated than this as individual countries would surely face various, differing supply side constraints.	We are synthesizing information from the "Potential Deployment" sections of the technology chapters, all of which state that supply chain issues will not be a problem, if necessary action is taken. This does not mean that supply chain issues will not be a problem under any conditions.
Juan Llanes (Centre for Environmental Studies)	10	28	20	-	-	-	-	-	technology and economics, ¿technology and costs¿ is best	Section 10.2.3 synthesizes information from the "Potential Deployment" sections of the technology chapters, the structure of which has been harmonized. Therefore, we will not be able to change this heading uniliterally.
Garcia Javier (Garcia Monge Consultant)	10	28	23	28	23	10.2.3	-	-	it is stated: ""(¿), commercial-scale ocena energy demonstration plants do not yet exist."" AFAIK, there are more than 200 MW installedn (France, Normandy), mainly on tidal dams.	We are aware of the French tidal power plant, but were mor ebroadly referring to the whole suite of ocean energy technologies, including wave energy and OTEC which tend to have higher deployment potentials than tidal which is restricted to specific locations. However, we will clarify this point in the final revision.
Australia (0)	10	28	23	-	-	-	-	-	Carbon price with influence the need for production cost reductions	The line referred to deals with ocean energy technologies and cannot be linked to the review comment.
Christoph von Stechow (IPCC WGIII TSU)	10	28	30	-	-	-	-	-	Please add a cross-reference to the respective sections in chapter 2.	We will add a cross-reference.

Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table Info	Comments	Consideration by writing team
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	10	28	32	-	37	10.2	-	-	It should be stated somewhere at the beginning that all these aspects are not covered in the models.	As stated in the initial paragraph of Section 10.2.3 the information provided in this section is supposed to identify enabling factors and potential barriers for the deployment levels that the scenarios show, because not all of these "real world issues" are taken into account in the integrated models.
United States (U.S. Department of State)	10	28	33	-	-	-	-	-	Replace parenthesis with "(e.g., flexible reserve capacity, inter-connection wide planning and operations, and storage) and institutional (e.g., market design and operations, market access, and tariff structure)	We will modify the parenthesis accordingly.
Steve Sawyer (Global Wind Energy Council)	10	28	39	28	39	-	-	-	hydrothermal'?	Hydrothermal is the most common form of geothermal power generation to date (see e.g. Box SPM1).
United States (U.S. Department of State)	10	28	43	-	-	-	-	-	Clarify the term "carriers" and possibly include hydrogen	We will change the sattement to … secondary energy carriers derived from RES such as....
Gunnar Luderer (Potsdam Institute for Climate Impact Research)	10	28	-	29	-	10.2.4	-	-	A striking result of the scenario analysis is the huge range of outcomes with respect to RE deployment levels in IAM scenarios. I would see it is an knowledge gap and an important research priority for the future to improve our understanding why model results are so different and to attribute these differences in model outcomes to differences in assumptions and methodologies.	We agree that looking deeper into the model-specific reasons for low/high renewable energy deployment levels are an important issue that should be taken on board by the respective community and will add a statement along these lines to the next revision of the section.
United States (U.S. Department of State)	10	29	0	-	-	-	-	-	Since this is a technical report being read by a presumably technical audience, suggested to use another word besides "huge." It is a relative word that could have different meanings to different people. Suggest providing the magnitude instead.	Accepted
Steve Sawyer (Global Wind Energy Council)	10	29	10	29	13	-	-	-	Suggest, 'Section 10.2, coming from a more statistical perspective, gave a comprehensive overview¿technologies in mitigation paths. This chapter focuses on¿'	Accepted
Timm Zwickel (IPCC WG III)	10	29	13	29	16	-	-	-	I suggest to rephrase: ¿For this in-depth analysis four scenarios have been chosen representing different illustrative energy and emission pathways (see Table 10.3.2). Primary data for this analysis going beyond so far published data has been provided by the scenario authors and institutions.	Accepted
Timm Zwickel (IPCC WG III)	10	29	13	-	-	-	-	-	¿focuses¿ not ¿focus¿	Accepted
Timm Zwickel (IPCC WG III)	10	29	14	29	15	-	-	-	Please give reasons for the selection taken, specify ranges and scope of models.	Accepted
Timm Zwickel (IPCC WG III)	10	29	18	-	-	-	-	-	grammar: rephrase: ¿Before looking at the role of RE in different scenarios, ...¿	Accepted
Steve Sawyer (Global Wind Energy Council)	10	29	21	29	21	-	-	-	as' should be 'than'	Accepted
Timm Zwickel (IPCC WG III)	10	29	21	-	-	-	-	-	¿seems to be huge¿: such colloquial phrasing can not be use in an IPCC report, instead ¿supersedes the current demand by orders of magnitude¿	Accepted
Timm Zwickel (IPCC WG III)	10	29	25	-	-	-	-	-	Is this reference correct or Krewitt, 2009, which is given in Table 10.3.1	it is correct!
Emmanuel Branche (Electricité de France)	10	29	32	29	32	-	-	-	"new calculation from the authors" this sentence should be explained	Accepted
Timm Zwickel (IPCC WG III)	10	29	33	-	-	-	-	-	¿no ranges given¿: colloquial expression	Accepted

Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table Info	Comments	Consideration by writing team
Emmanuel Branche (Electricité de France)	10	29	34	29	34	-	-	-	I am not sure that those potentials could be added ¿ some land/area competition may occur between different RE technologies across the world resulting in a global RE potential lower than the sum of all RE technology potential	add a line on th needed landspace
Timm Zwickel (IPCC WG III)	10	29	34	-	-	-	-	-	¿it can be seen¿: colloquial, be precise: Is it additive or not?	Accepted
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	10	29	35	-	-	10.3	-	-	Give for comparison the number of primary energy that is used today.	Accepted
Timm Zwickel (IPCC WG III)	10	29	35	-	-	-	-	-	11,941 EJ/y: please round this according to significant digits agreement to be announced soon	Accepted
Timm Zwickel (IPCC WG III)	10	29	35	-	-	-	-	-	11,941 EJ/y: This number should be explicitly in Table 10.3.1	Accepted
¿vind Christophersen (Climate and Pollution Agency)	10	29	-	-	-	10.3.1	-	-	Suggest that the title of section 10.3 is changed to "Discussion of the reduction of GHG emissions achieved through increased use of RE in the ensemble of scenarios"	title can not be changed
¿vind Christophersen (Climate and Pollution Agency)	10	29	-	-	-	10.3.1	-	-	This section must be changed based on estimations of technical potential in Chapter 4, Section 4.2 and 4.8.	crosscutting agreement
Timm Zwickel (IPCC WG III)	10	30	5	-	-	-	-	-	add ¿assessed by DLR (2009)¿ after ¿In the literature¿, remove ¿generally the assessment about¿	Accepted
Timm Zwickel (IPCC WG III)	10	30	7	30	10	-	-	-	As there is sufficient discussion about accounting methods there is no need to discuss it here, the resp. Ch.1 section can be referenced here. In case something is missing in Chapter 1, please add it there. From this sentence remove most so that it says: ¿Based on the global primary energy demand in 2007 (IEA 2009) 482 EJ/y using the direct equivalent methodology (cf. Chapter 1.X) the total technical potential ...¿	Accepted
Timm Zwickel (IPCC WG III)	10	30	10	30	11	-	-	-	¿upper limit¿: please also write about lower limit	Accepted
Steve Sawyer (Global Wind Energy Council)	10	30	14	30	15	-	-	-	Suggest 'It is particularly complex to calculate RE potentials as these technologies are comparatively new, and undergoing rapid improvement and evolution of their performance parameters.'	Accepted
Timm Zwickel (IPCC WG III)	10	30	14	-	-	-	-	-	Is it actually the ¿complexity¿ that makes potential calculations comparable? I expect it rather to be the uncertainties.	potential are discussed in chapter 1
United States (U.S. Department of State)	10	30	19	-	-	-	-	-	A technology breakthrough or improvement would change the economic potential, not the technical potential	rejected as this is not true
Steve Sawyer (Global Wind Energy Council)	10	30	21	30	22	-	-	-	Suggest 'even though RE technologies have not yet reached their full technological development limits.'	Accepted
Timm Zwickel (IPCC WG III)	10	30	21	-	-	-	-	-	does ¿though¿ (or ¿even although¿) make sense here? I think it should rather say ¿the currently assessed RE technical potential is not the limiting factor to RE expansion and due to technological development the potential is even expected to increase further¿; for the latter there needs to be a reference!	potential are discussed in chapter 1
Timm Zwickel (IPCC WG III)	10	30	21	-	-	-	-	-	grammar: ¿though¿ instead of ¿even although¿	Accepted

Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table Info	Comments	Consideration by writing team
Australia (0)	10	30	24	30	30	-	-	-	The issues around biomass production are not restricted to the location of RE	reference to bio energy chapter
Timm Zwickel (IPCC WG III)	10	30	24	31	1	-	-	-	The beginning of this paragraph seems to give just one opinion. If these very worthwhile issues are discussed here, there have to be references for everything and cross-links to other chapters in the report.	Accepted
Timm Zwickel (IPCC WG III)	10	30	26	30	27	-	-	-	In the sentence ¿Due to the decentralized ...¿ gives only one of a number of existing views. Others would argue that only centralized undertakings as Desertec will deliver the great shares on RE needed. As there is no need to discuss this here, I suggest deletion.	will delete the sentence
Gunnar Luderer (Potsdam Institute for Climate Impact Research)	10	30	26	-	27	10.3.2.	-	-	The authors write "due to the decentralized character of many RE technologies, energy will move closer consumers." This statement lacks scientific reference or underpinning. In fact, many visions of RE based energy systems involve industrial-scale energy production away from demand centers (e.g. offshore wind, CSP in deserts), thus requiring large-scale transport. If this statement is to be retained, a more balanced perspective of centralized vs. decentralized power production would be necessary.	Accepted
Steve Sawyer (Global Wind Energy Council)	10	30	27	30	30	-	-	-	Suggest, 'Without public acceptance, market expansion will be difficult or even impossible. The use of biomass has been especially controversial recently, as issues have arisen over competitions with other land use, food production, nature conservation needs, etc.'	Accepted
United States (U.S. Department of State)	10	30	29	-	-	-	-	-	There is another reason why the use of biomass is controversial. Researchers are questioning the a priori assumption that biogenic carbon emissions from biomass combustion do not have a deleterious effect on the carbon cycle. The absorption rates of various biomass types varies and could lead to more nuanced views of biomass carbon emissions and their impact on GCC.	reference to bio energy chapter
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	10	30	30	-	-	10.3	-	-	link to biomass chapter should be given here	Accepted
Japan (the Japanese Ministry of Foreign Affairs)	10	30	-	-	-	-	-	10.3.1	It should be clarified whether technical potential includes only new installations or also existing installations, with consideration for quality deterioration, such as that for PV cells, which have been recently reported.	potential are discussed in chapter 1
Japan (the Japanese Ministry of Foreign Affairs)	10	30	-	-	-	-	-	10.3.1	Table should include current figures for comparison.	Accepted
Emmanuel Branche (Electricité de France)	10	30	-	-	-	-	-	10.3.1	Why to add different values that the one provided by Krewitt et al. (2009) in the column "sources for Range of Estimates". According to me only Krewitt et al. (2009) values should be provided, and the column "Sources for Range of Estimates" should be delated. Reference to the relevent technical chapters for accurate data should be mentioned	potential are discussed in chapter 1
Timm Zwickel (IPCC WG III)	10	31	1	31	11	-	-	-	This part of the paragraph dealing with market potential should either be deleted or moved where it is introduced and discussed in Chapter 1. This is for the reason that the worthwhile points here are so general in nature, that is not particular to the context of market potential that is dealt with here.	Accepted

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)	10	31	1	-	-	-	-	-	Please add a cross-reference to the respective sections in chapter 2 (e.g. 2.4 and 2.5).	Accepted
Steve Sawyer (Global Wind Energy Council)	10	31	2	31	3	-	-	-	suggest, '¿for policy purposes than the technical potential is¿.defined in Chapter 1, but is often used in a different way.'	Accepted
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	10	31	6	31	8	-	-	-	A short definition of the terms "market potential" and "economic potential" as used in this context would be helpful to distinguish them properly.	Accepted
United States (U.S. Department of State)	10	31	7	-	-	-	-	-	Is there a need to use the term "market potential" when we are already using economic potential and technical potential? This comment applies to the whole chapter and not just page 31.	Accepted
Steve Sawyer (Global Wind Energy Council)	10	31	12	31	12	-	-	-	omit 'via'	Accepted
Steve Sawyer (Global Wind Energy Council)	10	31	15	31	17	-	-	-	Suggest, 'With that as background, the goal of this chapter is, in addition to the more general overview in the previous section, to come up with a range of possible futures based on four representative global¿¿The four scenarios sected provide substantial information...'.	Accepted
Timm Zwickel (IPCC WG III)	10	31	15	31	20	-	-	-	The beginning of this paragraph is phrased rather complicated. I suggest to replace it with the following which preserves all the previous content: ¿The four global scenarios from four different models assessed (cf. description of models and scenarios in Box 10.3) are respectively taken from ¿ (IEA WEO), ¿ (ER), ¿ (ReMind), ¿ (MiniCAM). Their emissions span the above four categories (see Table 10.3.2). Additionally ¿¿	Accepted
Garcia Javier (Garcia Monge Consultant)	10	31	18	31	18	10.3.2	-	-	The sentences states: ""The selected four scenarios (¿) and represent a wide range of emissions categories (¿)"" It should say ""(¿) a wide range of concentrations categories (¿)""	Accepted
Timm Zwickel (IPCC WG III)	10	31	28	-	-	-	-	-	¿Feedback loops¿: This is not a feedback effect!	Accepted
Timm Zwickel (IPCC WG III)	10	31	31	-	-	-	-	-	does this refer to data available in general or info considered in models; clarify; explain how this is covered or not in resp. Models; without relation to the 4 scenarios assessed this should not be here	Accepted
Timm Zwickel (IPCC WG III)	10	31	35	-	-	-	-	-	"greatest detail" - what detail: geographical (probably not)	Accepted
Timm Zwickel (IPCC WG III)	10	31	36	-	-	-	-	-	"compared to renewable heating" - why comparison to that? Not of interest	Accepted
Timm Zwickel (IPCC WG III)	10	31	37	-	-	-	-	-	"very good" is not scientific terminology, this has to relate to s.th. E.g. improvement w/in recent years	Accepted
Gunnar Luderer (Potsdam Institute for Climate Impact Research)	10	31	38	32	16	10.3.2	-	-	I appreciate this section on "Factors for market development in the renewable power sector." However, these factors go well beyond investment costs for PV, and the assumptions should thus be made more explicit. Not only the one example on PV investment costs, but rather the full set of assumptions/outcomes for the four in-depth scenarios with respect to investment costs, technological learning, average capacity factors, discount/interest rates,... should be provided for the relevant RE technologies.	will add one additional paragraph and the box 10.4

Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table Info	Comments	Consideration by writing team
Garcia Javier (Garcia Monge Consultant)	10	31	39	32	1	10.3.2.1	-	-	It is stated that solar PV technology is young. This is not true. It could be put as ""youngest and/or more expensive technologies	Accepted
Emmanuel Branche (Electricité de France)	10	31	-	-	-	-	-	10.3.2	I have not found in the IEA WEO 2009 any reference to the year 2050, and in particular to the potential role of RE in the energy mix? Check the reference	Accepted
Emmanuel Branche (Electricité de France)	10	32	1	32	1	-	-	-	"Tide rise and fall" is a mature technology. Proposition "¿ (CSP) and ocean energy (except for tide rise and fall)." cf. chapter 6	unclear
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	10	32	3	32	5	-	-	-	Comment: need to convert the lowest cost projection to US$ 2005 as has been done with the higest cost projection. Comment: need citation of both costs, highest and lowest.	Accepted
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	10	32	3	32	9	-	-	-	Comment: define that the costs described in this paragraph indicate the system cost including installation.	Accepted
Timm Zwickel (IPCC WG III)	10	32	5	-	-	-	-	-	footnote: do not give any non-US$ currency values, only US$2005 allowed, see tables for conversion provided by TSU	Accepted
Timm Zwickel (IPCC WG III)	10	32	5	-	-	-	-	-	grammar: delete "so far"	Accepted
Timm Zwickel (IPCC WG III)	10	32	8	-	-	-	-	-	"underestimated" - or overestimated! Rather write" where numbers in scenarios are often superseded by recent developments"	Accepted
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	10	32	10	-	16	10.3	-	-	link to wind chapter should be given here	Accepted
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	10	32	12	-	-	10.3	-	-	due TO the ...	Accepted
Timm Zwickel (IPCC WG III)	10	32	15	-	-	-	-	-	"tremendous" is not scientific vocabulary; please give numbers here concerning impact	Accepted
Garcia Javier (Garcia Monge Consultant)	10	32	16	32	16	10.3.2.1	-	-	May I suggest to add at the end of the paragraph: Finally, prices for kWh for different technologies affect the rate of introduction of each technology in the energy markets, the higher the price (ex. In a Fedd-in-tariff scheme) the higher the penetration.""	Accepted
Timm Zwickel (IPCC WG III)	10	32	21	-	-	-	-	-	¿needed¿ instead of ¿in order¿	Accepted
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	10	32	22	-	-	10.3	-	-	What means "repowering"?	Accepted
Timm Zwickel (IPCC WG III)	10	32	23	-	-	-	-	-	first and second part of sentence are related, i.e. due to different assumed growth rates the expectations vary greatly, please rephrase	Accepted

Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table Info	Comments	Consideration by writing team
Steve Sawyer (Global Wind Energy Council)	10	32	27	31	29	-	-	-	the name is 'Sawyer', not Swayer	Accepted
Timm Zwickel (IPCC WG III)	10	32	27	32	31	-	-	-	delete ¿plants¿ from line 28, so that ¿industry¿ relates to all previous three; would be good to add references to resp. technology chapters in the report detailing expected growth rates	Accepted
Timm Zwickel (IPCC WG III)	10	32	32	32	36	-	-	-	rephrase ¿In addition to the projections for RE technologies, the future of electricity demand will determine the future role of RE sources. In the scenarios high energy demand does not necessarily coincide with high deployment of RE. Both, ReMind-450 and MiniCAM-450 scenarios assume high increase in demand, but whereas MiniCAM predicts a low RE market share, ReMind expects a high one.¿	Accepted
Timm Zwickel (IPCC WG III)	10	32	38	-	-	-	-	-	Not sure what ¿in that context¿ refers to: to ER or all scenarios ¿ please make clear	Accepted
Timm Zwickel (IPCC WG III)	10	32	40	32	43	-	-	-	As the problem pointed out in this paragraph has been raised above this should be mentioned in one go to be more concise.	Accepted
Steve Sawyer (Global Wind Energy Council)	10	32	40	32	43	-	-	-	Suggest '¿are quite different. For example, in the IEA's WEO 2009 assumes a lower global manufacturing capacity for wind power in 2020 than currently exists. This shows once more the prolem of dealing with a very dynamic (and in this case policy driven) sector within scenario analysis.'	Accepted
Timm Zwickel (IPCC WG III)	10	33	4	-	-	-	-	-	unclear what is meant by ¿under the demand projection of the scenarios¿ - as it is written there this means that wind power provides 85-88% (100-15 & 100-12) of projected demand in 2030, this contradicts the numbers in Table 10.3.3 (11,9% and 19% resp.)	Accepted
Gunnar Luderer (Potsdam Institute for Climate Impact Research)	10	33	5	-	-	-	-	-	"The highest global wind share has the ReMIND scenario of 24% by 2020" should read "24% by 2030".	Accepted
Timm Zwickel (IPCC WG III)	10	33	5	-	-	-	-	-	its 2030 instead of 2020 for the ReMind scenario	Accepted
Timm Zwickel (IPCC WG III)	10	33	5	-	-	-	-	-	rephrase to ¿The highest global wind share in 2020 of 24% (ReMind) is reached only in 2050 by ER¿; but still with that chance: what is the relevance of this? as the global demand increases from 2020 to 2050 this is comparing apples with oranges, right?	will be rewritten
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	10	33	6	-	-	10.3	-	-	ER 2010 has not been introduced as an abbreviation	Accepted
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	10	33	10	-	-	10.3	-	-	Dollar-cent or Euro-cent?	Accepted
Timm Zwickel (IPCC WG III)	10	33	12	33	17	-	-	-	This paragraph describes the numbers given in the table without any further interpretation. It would be good to relate these outcomes to model or assumption differences, if possible.	Accepted

Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table Info	Comments	Consideration by writing team
Gunnar Luderer (Potsdam Institute for Climate Impact Research)	10	33	15	-	17	-	-	-	"The ER 2010 assumes that annual manufacturing capacity will go up to over 65 ¿, while all other scenarios assume an annual production capacity of¿". The authors should be careful in distinguishing between scenario assumptions and results. In the case of ReMIND, the increase in manufacturing capacity is not an assumption, but the result of an economic optimization.	Accepted
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	10	33	-	-	-	10.3	-	10.3.3	For REMIND the numbers for bioenergy should be changed: those for power generation are those for heat&power and vice versa (to be fully sure ask Gunnar Luderer)	Accepted
Emmanuel Branche (Electricité de France)	10	33	-	-	-	-	-	10.3.3	"Solar" title is missing (yellow). I don't understand how annual market volume (GW/yr) have been calculated (on which period) ? I have not found the value for year 2050 in IEA WEO 2009 (the latest year available is 2030 with a declinaison per technology)	will add ref
Emmanuel Branche (Electricité de France)	10	33	-	-	-	-	-	10.3.3	% of global demand for hydropower in the Energy[R]evolution scenario are not correct (they are different from 0%). For 2020 the value is 15.7%, for 2030 it is 14.3% and for 2050 it is 11.7%.	Accepted
Garcia Javier (Garcia Monge Consultant)	10	33	-	-	-	-	-	10.3.3	IN the footnote it is stated that the capacity factor is shown in the table, but this is not the case.	Accepted
Timm Zwickel (IPCC WG III)	10	34	6	-	-	-	-	-	looking at table 10.3.3: bio-energy is actually for early years comparatively high	Accepted
Timm Zwickel (IPCC WG III)	10	34	7	-	-	-	-	-	should be, I think, ¿an annual INCREASE IN market volume and HENCE required manufacturing capacity of ...¿	Accepted
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	10	34	16	34	19	-	-	-	The IEA WEO 2009 study with an assessment of total renewable power market potential with 24% by 2050 and only 9% above 2008 level seems be quite concervative.	It is one ref
Timm Zwickel (IPCC WG III)	10	34	17	-	-	-	-	-	to make it read better ¿with A 24% SHARE by ...¿	Accepted
Taishi Sugiyama (Central Research Institute of Electric Power Industry (CRIEPI))	10	34	-	34	-	-	10.3.1	-	Make distincion between large and small hydro.	doesn´t work as the scenarios will not provide these informations
Timm Zwickel (IPCC WG III)	10	34	-	-	-	-	10.3.1	-	a few scenarios do not deliver certain technology information, in order to distinguish from 0 Twh/y please mark with ¿x¿ or so	Accepted
Timm Zwickel (IPCC WG III)	10	34	-	-	-	-	10.3.1	-	Compare difference between Fig. 10.3.1 and Fig. TS.10.3: should be same figure	Accepted
¿vind Christophersen (Climate and Pollution Agency)	10	35	5	35	6	-	-	-	The statement is not correct. Geothermal is only an established technology for conventional hydrothermal resources; see Chapter 4, and ground source heat.	Accepted
United States (U.S. Department of State)	10	35	8	-	-	-	-	-	Use "important drivers" instead of "huge incentives"	Accepted

Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table Info	Comments	Consideration by writing team
Supachai Panitchpakdi (United Nations Conference on Trade and Development)	10	35	11	35	12	-	-	-	The fact that oil and gas price developments are not taken into account (and they will be going up with near certainty, and there will be a substitution effect and an income effect taking place!), is weak. There are several incidences in the text, where a reference to this lack is made, e.g. on page 35, line 11-12. At least it should be mentioned that the used scenarios can therefore only by regarded as a lower bound, as higher fossil material prices will for sure induce higher deployments rates for RE. For future work, analysis should to be able to take rising fossil fuel prices into account.	will add an explaination
United States (U.S. Department of State)	10	35	13	-	-	-	-	-	There is considerable discussion of heating and cooling for RE, but the chapter also states that none of the scenarios provide any detailed information on these technologies (ch 10, pg 35, lines 4-5). If the authors think that these technologies are important, but the models do not seem to think they are (otherwise they would be included in the models), then this seemingly contradiction should be addressed.	knowledge gaps - problem is the available statistics
Timm Zwickel (IPCC WG III)	10	35	19	35	24	-	-	-	please reference Ch.3's and Ch.4's predicted growth rates to confirm that rates given here are found realistic by the resp. technology experts	Accepted
Timm Zwickel (IPCC WG III)	10	35	20	-	-	-	-	-	¿which might be due¿ - please ask developers/read about ReMind and MiniCAMs allocation of solar/geothermal heating, this will avoid speculation here	Accepted
Timm Zwickel (IPCC WG III)	10	35	35	35	36	-	-	-	instead ¿could be listed¿ rather ¿provides electricity as well as heat¿ as the subjunctive does not apply as it is listed here	Accepted
Timm Zwickel (IPCC WG III)	10	35	46	-	-	-	-	-	instead ¿less about 35¿ write ¿less than 35¿	Accepted
United States (U.S. Department of State)	10	36	0	-	-	-	-	-	The claim of H2 as an indirect RE should be expounded upon. Hydrogen is not naturally occurring, and production of H2 will result in CO2 emissions, unless the reviewers are misunderstanding the context, this seems to be a misstatement.	Accepted
Emmanuel Branche (Electricité de France)	10	36	-	-	-	-	-	10.3.4	"Solar" title is missing (yellow)	Accepted
Timm Zwickel (IPCC WG III)	10	37	1	-	-	-	-	-	delete ¿as a numerical exercise¿ as superfluous	Accepted
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	10	37	2	-	7	10.3	-	-	Include link to biomass chapter	Accepted
Timm Zwickel (IPCC WG III)	10	37	4	37	7	-	-	-	The statements in this sentence are very general in nature and not supported by a reference. I suggest to phrase it more openly and reference Ch.2 and Ch.9 writing that bioenergy competes landwise with food production and that especially for bioenergy sustainability is a crucial issue. Writing ¿competition with [¿] food production must be avoided¿ would need further explanation (e.g. what is meant by avoided). The last part of the sentence ¿used where most efficiently¿ is normative and not necessarily what will happen. This can probably be dropped.	Accepted
Christoph von Stechow (IPCC WGIII TSU)	10	37	7	-	-	-	-	-	Please add a cross-reference to the respective sections in chapter 2 (e.g. 2.2 and 2.5).	Accepted

Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table Info	Comments	Consideration by writing team
Timm Zwickel (IPCC WG III)	10	37	11	37	20	-	-	-	this paragraph lacks analytics, it just states the different outcomes of the models, this is not helpful in understanding the reason; please give the numbers in tables or figures and focus on the analysis in the text	Accepted
Timm Zwickel (IPCC WG III)	10	37	15	37	16	-	-	-	as in other sections the DEM is discussed, there is no reason to mention it specifically here ¿ it generates the impression that it is only mentioned since the RE shares would be higher	Author thinks it is important to point out here.
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	10	37	16	-	-	10.3	-	-	inlcude link to Box 1	Accepted
United States (U.S. Department of State)	10	37	17	-	-	-	-	-	This sentence contradicts with previous statements, where it was said that RE expands greatest when energy demand is high, targets are low, and assumed costs are low.	Accepted
Timm Zwickel (IPCC WG III)	10	37	18	37	20	-	-	-	as this is the section about primary energy I suggest to delete this sentence as it refers to previous sections and the section structure does not indicate that this is the place for a summary	Accepted
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	10	37	18	-	-	-	10.3.3	-	use EJ/yr on the y-axis.	Accepted
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	10	37	18	-	-	-	-	-	how can you show the "successfully implemented energy efficiency strategy"? It was not mentioned before	Accepted
Emmanuel Branche (Electricité de France)	10	37	22	37	22	-	-	-	Replace "Figure 10.3.3" by "Figure 10.3.2"	Accepted
Timm Zwickel (IPCC WG III)	10	38	5	-	-	-	-	-	¿the table¿ - which? ¿Table 10.3.5¿ probably	Accepted
Emmanuel Branche (Electricité de France)	10	38	10	38	13	-	-	-	Energy [R]evolution 2010 scenario forecasts the highest market projection for RE, but some RE technologies are more deployed in other scenarios (IEA WEO 2009 ¿ if those figures are relevant)	Accepted
Marc Darras (GDF SUEZ)	10	38	10	-	13	-	-	-	Because the following section depends very much of the hypothesis of Energy Revolution scenario it is important to recall its hypothesis, and as noted it is the most favorable to RE.	Accepted
Timm Zwickel (IPCC WG III)	10	38	10	-	-	-	-	-	¿illustrative purposes¿: as other IAMs also operate with world regions, why are they not able to provide the data?	will be added
Timm Zwickel (IPCC WG III)	10	38	10	-	-	-	-	-	¿illustrative purposes¿: in 10.3.3.1 the ER data is discussed, so the tables are not just for illustrative purposes but function as the basis of a discussion; as the selection of ER is arbitrary and it is the scenario with RE having the greatest shares this is not representative; discussion the ER numbers only will irritate the reader into believing this gives a balanced insight in e.g. RE power by region	will be rewritten
Emmanuel Branche (Electricité de France)	10	38	15	38	22	-	-	10.3.5	As mentioned potential and deployment do not match in this analysis, which leads to deployment rates bigger than the potential !!! This table should be analysed in another way, maybe change the reference scenario (choose IEA for instance), otherwise this tabale may discriminate the whole report. Potential is a key issue for RE, and criticises may appear due to this table	will be rewritten

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)	10	38	19	38	27	-	-	-	The following numbers are questionable: 1) 100% technical hydro deployed in China, 2) over 100% wind in China and India; there is a minor reference in the text body (line 19/20) as to why. But that statement could use strengthening (maybe be more explicit in terms of assumptions used in that study).	potential are discussed in chapter 1
Timm Zwickel (IPCC WG III)	10	38	19	-	-	-	-	-	They line of arguing here gives the notion that the technical potential assumed is relatively random, as the assumptions of ER are different than the ones from the SRREN technology chapters than McElroy 2009. If this is the case this has to be discussed. Also if this is not the case a discussion has to occur, because the above 100% deployment puts the entire Table 10.3.5 into question.	potential are discussed in chapter 1
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	10	38	28	-	32	10.3	-	-	it should be clearly stated that these percentage numbers come from just one model. Or where do these numbers come from?	Accepted
Timm Zwickel (IPCC WG III)	10	38	30	38	32	-	-	-	Does it make sense to assess the deployment rate as share of technical potential accumulation across technologies? Such a number is in my view meaningless, as this can mean everything as no deviation is given	part of the analysis
United States (U.S. Department of State)	10	38	31	38	32	-	-	-	The second part of this sentence appears to contradict the numbers in the table (last column Total %deployed).	Accepted
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	10	38	31	-	-	10.3	-	-	"¿none of the analysed scenario..". I do not understand this, I thought this analysis is only based on a single scenario - the ER2010 scenario?	Accepted
Timm Zwickel (IPCC WG III)	10	38	33	-	-	-	-	-	in THE next sections¿	Accepted
Australia (0)	10	38	-	-	-	-	-	10.3.5	Need to add some explanation for the >100% deployments	will be rewritten
Emmanuel Branche (Electricité de France)	10	38	-	-	-	-	-	10.3.5	Why biomass has been excluded from this table ?	will be added
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	10	39	1	-	-	10.3	-	-	abbreviation for ER has to come at the beginning.	abbr deleted.
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	10	39	1	-	-	10.3	-	-	abbreviation for ER has to come at the beginning.	Accepted
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	10	39	1	-	-	10.3	-	-	Why is MiniCam not included here?	I wish I could have covered Minicam!! Unfortunately I did not get any data from Leon/Volker, only from PIK and Sven
Timm Zwickel (IPCC WG III)	10	39	1	-	-	-	-	-	footnote: as pointed out earlier as neither are part of the analysis in 10.2 this will maybe not be possible as 10.3. is supposed to be a subset of the scenarios assessed in 10.2	The supply curves will be updated (integration of WEO 2009 and ER 2010), both scenarios are part of the indepth scenario analyses (deep dive) in 10.3
Timm Zwickel (IPCC WG III)	10	39	1	-	-	-	-	-	please introduce abbreviation of ER either not at all or far earlier	deleted

Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table Info	Comments	Consideration by writing team
Timm Zwickel (IPCC WG III)	10	39	13	-	-	-	-	-	describe ¿not as detailed¿ clearer, maybe rephrase to ¿[ER and WEO] give one price for each technology, whereas ReMind ...¿	half a sentence added
Timm Zwickel (IPCC WG III)	10	39	14	39	19	-	-	-	as this is very general to cost curves this should go to section 10.4 and be briefly referenced here	this is not very general for cost curves. The point of a good cost curve is exactly to be able to prioritise sites, subtechnologies, etc.
Timm Zwickel (IPCC WG III)	10	39	17	39	18	-	-	-	If capacity can not be deduced from potential by cost level then explain how the relationship supply-price was deduced (or refer to the resp. section in 10.4)	do not understand the comment. The scenarios provided the data of the deployment potential as a function of cost.
Timm Zwickel (IPCC WG III)	10	39	17	-	-	-	-	-	¿presently existing¿ should probably read ¿existing in the resp. year¿	no, it should read presently existng. The point is that "potential" normally refers to what is not yet in place today; whereas the numbers we received were for the total deployment levels, including presently existing capacity.
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	10	39	19	-	-	10.3	-	-	I recommend to avoid the sentence "Due to the limited space availability". Is it possible that more cost curves are provided e.g. as supplementary material in an online version?	It would have been possible if this opportunity were known to us earlier. Unfortunately it is too late now to redo all the research/data collection and curve construction; mainly because of the lack of another review round.
Timm Zwickel (IPCC WG III)	10	39	20	-	-	-	-	-	semantics: last half of sentence should read ¿only curves from the electricity sector and there only for three regions are shown.¿	Sorry, the half sentence included here does not seem to make any grammatic sense to me. Please feel free to edit the sentence from a purely language perspective if an editor believes it should be.
China (China Meteorological Administration)	10	39	21	-	-	10.3.3.1	10.3.4	-	The renewable electricity supply curve for China is not appropriate to present here individually, the results are controversial.	Not sure I understand the comment, it is not substantiated. What is controversial? Is controversiality a reason for not presenting something? Sorry I can't address it until the comment becomes clear to me.
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	10	39	-	-	-	10.3	10.3.4	-	Often the arrows cannot be assigned to a specific line, especially in the lower left corner. Unfortunately, I have no idea how to do it better.	The problem is the little space available for these curves. In such a constrained space, I doubt it is possible to do a better job. I think it is only very tiny steps where it is hard to identify the explanatory text (and arrow), so the value lost is less than if we omit these explanations (that would be a solution option). We worked a lot on figuring out a way to find the most optimal representation...
¿vind Christophersen (Climate and Pollution Agency)	10	39	-	-	-	-	10.3.4	-	Figure captions should also refer to 2030	Many thanks for noticing! Changed for all three figures.
United States (U.S. Department of State)	10	40	0	-	-	-	-	-	Figure 10.2.6 should read 10.3.6	done
China (China Meteorological Administration)	10	40	1	-	-	10.3.3.1	10.3.5	-	The renewable electricity supply curve for India is not appropriate to be presented here singly, the results are controversial.	Not sure I understand the comment, it is not substantiated. What is controversial? Is controversiality a reason for not presenting something? Sorry I can't address it until the comment becomes clear to me.
Emmanuel Branche (Electricité de France)	10	40	5	40	5	-	-	-	Replace "Figure 10.2.6" by "Figure 10.3.6"	done
¿vind Christophersen (Climate and Pollution Agency)	10	40	-	-	-	-	10.3.5	-	Figure captions should also refer to 2030	done.
Timm Zwickel (IPCC WG III)	10	41	3	41	5	-	-	-	The increase ¿only at larger cost options¿ is in my view a wrong analysis, as ReMind gives more than one price per technology there are higher and lower prices for the same technology. So your ¿larger¿ relates the higher price for a technology to the lower one. This is (1) not of interest as this follows directly from the ReMind set-up and (2) irritating the reader as (s)he will associate that ¿larger¿ is in relation to the other scenarios, but in relation to the other scenarios it is small.	I deleted clause; although I do not see that any readers could be "irritated"

Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table Info	Comments	Consideration by writing team
Timm Zwickel (IPCC WG III)	10	41	3	-	-	-	-	-	¿significant¿ instead of ¿important¿ as the latter is normative	"important" occurs over 40 times in our chapter alone. significant is already overused; and other critics advise against this word claiming that it should be reserved to statistically relevant quantities. I do not believe "important" trend is normative - if this level of normativeness is not allowed for us, experts, we could not write this report. nevertheless, word changed to "large".
Timm Zwickel (IPCC WG III)	10	41	5	-	-	-	-	-	¿not envision a larger than¿: this interprets that a growth rate of 30% is low; though it is true that it is lower than in other regions, it should be taken into account that with a higher status of deployment even when the absolute growth stays the same the relative growth decreases. So please reconsider this judgment taking deployment level and for the absolute numbers population and/or geographical size into account	will be rewritten
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	10	41	6	-	-	10.3	-	-	deployment instead of potential	Accepted
Timm Zwickel (IPCC WG III)	10	41	8	41	20	-	-	-	this entire section is yet again purely descriptive ¿ if at all possible, it would be an great improvement to add some analysis	will be rewritten
Timm Zwickel (IPCC WG III)	10	41	9	-	-	-	-	-	¿typically¿: for what/in what regard? I suggest deletion	Accepted
¿vind Christophersen (Climate and Pollution Agency)	10	41	15	-	-	-	-	-	CSP (Condensed Solar Power) should be explained. CSP appears for the first time in this chapter here it seems.	Defined earlier
Timm Zwickel (IPCC WG III)	10	41	19	-	-	-	-	-	¿for THE SAME year¿ as ¿this¿ is not clear	text changed, although I really think "this" was very clear in the context, too
Timm Zwickel (IPCC WG III)	10	41	21	41	30	-	-	-	this paragraph is purely descriptive again, as this is the deep dive section there has to be some analysis of the underlying reasons (assumptions, etc.) for the differences between the scenarios; reduce the description to the minimum with the information contained in the resp. tables/figures	in section 10.3 a comprehensive overview of the assumptions of the four selected scenarios will be provided as basis for more analytical work, in that specific context due to missing more specific assumptions of the models there is no alternative as to be descriptive
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	10	41	21	-	22	10.3	-	-	In REMIND, CSP is not included as a technology options, so it is trivial that it does not play any role.	Accepted
Gunnar Luderer (Potsdam Institute for Climate Impact Research)	10	41	21	-	22	-	-	-	"This technology [CSP] virtually does not play any role in the ReMIND scenarios" - please note that CSP is not implemented in the ReMIND version that was used for the ReMIND-RECIPE scenario.	sentence edited.
Timm Zwickel (IPCC WG III)	10	41	21	-	-	-	-	-	¿virtually¿ is colloquial expression, please delete	deleted
Timm Zwickel (IPCC WG III)	10	41	35	-	-	-	-	-	¿illustrative scenario¿: the way of arguing here is contradictory, for one you argue that the scenario is only given for illustrative purposes and on the other hand you the go into detail about its numbers; it is necessary to have the numbers of the other scenarios, too, otherwise this is misleading	the 4 chapter have been chosen - more informations about the reasons
Timm Zwickel (IPCC WG III)	10	41	38	41	39	-	-	-	One example that the scenario is not just taken for illustrative purposes is this sentence, where it is phrased as if this describes THE (not one of four) plausible future	"in the scenario" is clearly stated.

Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table Info	Comments	Consideration by writing team
Timm Zwickel (IPCC WG III)	10	41	39	41	41	-	-	-	The sentence ¿This shows ...¿ is wrong on two accounts. Firstly, looking at the total technical potential given in Table 10.3.6 (436 EJ/a) is fully within the range given as total technical wind potential given in Table 10.3.1 (85-1130 EJ/a). Secondly, even if this was not the case, this would not show at all the ¿complexity of scenario analysis¿ but it would simply show that very different assumptions were made; Btw, it should say ¿once¿ and not ¿one¿.	will be rewritten
Dan McKenney (Great Lakes Forestry Centre)	10	41	42	-	-	-	-	-	the word ""mayor"" should be ""major""	Accepted
Steve Sawyer (Global Wind Energy Council)	10	42	2	42	4	-	-	10.3.6	This table shows the danger of using outdated or 'average' resource potential estimates. It is particular relevant for Chinese wind, as the latest estimate from the Chinese Meteorological Administration (see chapter 7 of this SOD, box 7.2) is that the technical potential for onshore and offshore wind in China is almost 20 EJ/y, most of it onshore, which would make the % utilisation of technical potential in this table 30%, rather than 132%. Please at least note this. As for India, the wind resources have never been properly assessed.	potential are discussed in chapter 1
Timm Zwickel (IPCC WG III)	10	42	3	41	5	-	-	-	The increase ¿only at larger cost options¿ is in my view a wrong analysis, as ReMind gives more than one price per technology there are higher and lower prices for the same technology. So your ¿larger¿ relates the higher price for a technology to the lower one. This is (1) not of interest as this follows directly from the ReMind set-up and (2) irritating the reader as (s)he will associate that ¿larger¿ is in relation to the other scenarios, but in relation to the other scenarios it is small.	Clear as written
Timm Zwickel (IPCC WG III)	10	42	3	-	-	-	-	-	¿significant¿ instead of ¿important¿ as the latter is normative	Accepted
Timm Zwickel (IPCC WG III)	10	42	7	42	9	-	-	-	This sentence does not inform that this is just based on the ER data but might generate the impression that it is a more general outcome. Please give in text numbers for all four scenarios, it is random to give the numbers of one and does not yield any insight for the recipient.	delete the sentence
Garcia Javier (Garcia Monge Consultant)	10	42	13	42	13	10.3.3.2	-	-	It is stated: While the overall (¿) exceeds current global primary energy by on order of magnitude (¿)"" By an order or by one order of magnitude?	Accepted
Timm Zwickel (IPCC WG III)	10	42	13	42	16	-	-	-	The analysis of share of deployment from technical potential is not of such great interest that it legitimizes Table 10.3.5 and Table 10.3.6 and the description in this paragraph. The result from Ch.2-7 is that the technical potential is not the limiting factor for RE deployment. So to briefly confirm this in this section is a good idea. But instead of spending space on that, e.g. this section should rather focus on the factors that are actually limiting RE deployment or model assumptions that have significant effects on RE deployment. It might be necessary to access external expertise from scientists having deep insight into the resp. models to do this.	tables will be changed
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	10	42	16	-	-	10.3	-	-	the statement with the 6.7% for China was already given on p. 41, line 35.	Accepted
Timm Zwickel (IPCC WG III)	10	42	19	-	-	-	-	-	¿for THE SAME year¿ as ¿this¿ is not clear	can´t find it there

Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table Info	Comments	Consideration by writing team
Timm Zwickel (IPCC WG III)	10	42	21	41	30	-	-	-	this paragraph is purely descriptive again, as this is the deep dive section there has to be some analysis of the underlying reasons (assumptions, etc.) for the differences between the scenarios; reduce the description to the minimum with the information contained in the resp. tables/figures	clarify
Gunnar Luderer (Potsdam Institute for Climate Impact Research)	10	42	21	-	22	-	-	-	"This technology [CSP] virtually does not play any role in the ReMIND scenarios" - please note that CSP is not implemented in the ReMIND version that was used for the ReMIND-RECIPE scenario.	Accepted
Timm Zwickel (IPCC WG III)	10	42	21	-	-	-	-	-	¿virtually¿ is colloquial expression, please delete	Accepted
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	10	42	-	-	-	10.3	10.3.7	-	make clear, which of these scenarios are baseline scenarios and which are mitigation scenarios.	Accepted
Timm Zwickel (IPCC WG III)	10	42	-	-	-	-	-	10.3.6	As the numbers in this figure are not only used as an example but as the discussion in 10.3.3.2 is based on it, numbers from all 4 scenarios should be given here; if for some reason it is only possible to have this for one scenario it might be advisable to use one of the medium scenarios.	no data from ReMind and MiniCam available for these regions
Emmanuel Branche (Electricité de France)	10	42	-	-	-	-	-	10.3.6	This table provides the same information as in table 10.3.5 (one in EJ and the other in primary energy, but % vs. technical potential are exactly the same). Proposition to remove 10.3.5 or 10.3.6 .	tables will be changed
Timm Zwickel (IPCC WG III)	10	43	1	43	2	-	-	-	Make explicit here that and how DLR has extended IEA data to 2050 and give reference!; please provide confirmation of IEA (as already required above) that extension to 2040 and 2050 is compatible with their model, scenarios and results	IEA has been contacted
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	10	43	1	-	-	10.3	-	-	give abbreviation instead of full title of ER2010	Accepted
Timm Zwickel (IPCC WG III)	10	43	3	43	11	-	-	-	this paragraph is purely descriptive again, as this is the deep dive section there has to be some analysis of the underlying reasons (assumptions, etc.) for the differences between the scenarios; reduce the description to the minimum with the information contained in the resp. tables/figures	will be rewritten
Timm Zwickel (IPCC WG III)	10	43	15	43	16	-	-	-	instead ¿has been calculated¿ (when? where?) write ¿is presented in this section¿	Accepted
Timm Zwickel (IPCC WG III)	10	43	16	43	17	-	-	-	To me it is not clear what the function of this factor is. The way it is phrased here sounds like that the factor defines a percentage that is substituted.	will be rewritten
Timm Zwickel (IPCC WG III)	10	43	17	43	21	-	-	-	This is phrased imprecise/unscientific, I suggest: ¿Taking the scenarios assessed here, roughly estimating we assumed that the RE share in each scenario has fully substitute fossil fuel compared to a business-as-usual scenario. On this we based the following simplifying computations.¿	Accepted

Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table Info	Comments	Consideration by writing team
Timm Zwickel (IPCC WG III)	10	43	20	43	21	-	-	-	It is unclear how the purely-by-RE-substitution is done. Looking at MiniCAM and ReMind at least there are BAU cases that can be used for inferring how much different technologies substitute fossil fuels in a given scenario. Thus, there is no need for the speculation undertaken here assuming all substitution is done by RE. This is particularly important as the role of efficiency improvement vary greatly between the scenarios. To my understanding it is not sound to ignore the above mentioned information.	will be rewritten
United States (U.S. Department of State)	10	43	20	-	-	-	-	-	This seems to be a far reaching assumption. Perhaps at least some justification for this assumption is warranted. This comment refers to the sentence: "In that context RE applications are supposed to fully substitute fossil fuel use."	see above
Timm Zwickel (IPCC WG III)	10	43	25	43	29	-	-	-	it is described how upper and lower bounds are calculated but not how average is computed ¿ please add; please write about the standard variation resulting from this and its consequences ¿ this is important as the variation is so great that the results shown in the figures are not very reliable	calculation will be changed
Timm Zwickel (IPCC WG III)	10	43	25	43	29	-	-	-	please give reference where the numbers stem from/are based on	Accepted
Timm Zwickel (IPCC WG III)	10	43	25	43	36	-	-	-	For the description the method becomes not fully transparent;is each scenario compared with a different (baseline) scenario computed respectively with the same model or what is the baseline? Or is no baseline taken and just assumed that the CO2 saved is what would be emitted if the energy would come from sector specific fossil fuel generated power or power generated with the current energy mix? No matter which of the above ways is pursued this has to be described and argued for!	calculation will be changed
Emmanuel Branche (Electricité de France)	10	43	25	43	36	-	-	-	Is it possible to provide a sensitivity analysis retaining emission factors differentiated by region? As all countries/regions have a different energy mix, the CO2 emissions avoided by RE could be significantly different according to me	beyond the scope
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	10	43	25	-	36	10.3	-	-	better give all these numbers in a table. Also avoid the numbers in the footnote 11 and include it in the table.	Accepted
Emmanuel Branche (Electricité de France)	10	43	28	43	28	-	-	-	Emission factors of natural gas are too big for selected years (0,498 kg CO2/kWh for 2030 and 0,475 kg/kWh for 2050) in comparison to existing units. A current CCGT has a carbon emission emission factor lower than 400 kgCO2/kWh. This value is too big in comparison with coal fired power plants. IPCC SR on CCS (2005) also provides emission rate below 0,4 kg/kWh.	calculation will be changed
Timm Zwickel (IPCC WG III)	10	43	32	-	-	-	-	-	should read ¿decrease¿ instead of ¿increase¿ judging by the numbers	Accepted
United States (U.S. Department of State)	10	43	34	-	-	-	-	-	Footnote 11: Inconsistent use of commas and periods	will be edited by TSU
Timm Zwickel (IPCC WG III)	10	43	36	-	-	-	-	-	add ¿range¿ after ¿lower¿ to make it easier to read	Accepted

Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table Info	Comments	Consideration by writing team
¿vind Christophersen (Climate and Pollution Agency)	10	43	-	-	-	10.3.4	-	-	We propose that this section is deleted	part of the agreed structure
Australia (0)	10	43	-	-	-	-	-	-	Footnote 11 unclear does this describe global averages?	Accepted
Timm Zwickel (IPCC WG III)	10	44	13	44	14	-	-	-	please mind the to be announced regulatory about significant digits	Accepted
United States (U.S. Department of State)	10	44	13	44	14	-	-	-	Round the numbers (1169 and 6695) to 1.2 and 6.7 billion	round the numbers
Timm Zwickel (IPCC WG III)	10	44	15	44	17	-	-	-	please check with Ch.2 about this, as they discuss this, rather add a reference than starting own assessment	Accepted
Gunnar Luderer (Potsdam Institute for Climate Impact Research)	10	44	15	-	17	-	-	-	The bioenergy chapter probably addressed the issue of indirect GHG emissions from bioenergy use at length - this statement should be harmonized with their findings.	Accepted
Gunnar Luderer (Potsdam Institute for Climate Impact Research)	10	44	17	45	2	-	-	-	The sentence probably should read "share of traditional vs. modern". It shouldn't be a problem, to obtain these data from modelers. Just omitting the potential CO2 reductions from biomass use for heating is highly dissatisfactory.	Accepted
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	10	44	-	-	-	10.3	10.3.8	-	What do the vertical bars indicate? Stdv? Error of what?	graphs will be redone
Emmanuel Branche (Electricité de France)	10	45	1	45	1	-	-	-	Problem with the sentence as "modern biomass" is used twice: "did not identify the share of modern biomass versus modern biomass"	Accepted
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	10	45	1	-	-	10.3	-	-	one of the words "modern" must be "traditional."	Accepted
Timm Zwickel (IPCC WG III)	10	45	7	45	14	-	-	-	this paragraph is purely descriptive again, as this is the deep dive section there has to be some analysis of the underlying reasons (assumptions, etc.) for the differences between the scenarios; reduce the description to the minimum with the information contained in the resp. tables/figures	will be rewritten
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	10	45	13	-	-	10.3	-	-	where do these errors come from? Are they from the accounting factors? And what do they indicate? The error of the accounting factor in 2050?	Accepted
Jörn Scharlemann (United Nations Environment Programme World Conservation Monitoring Centre (UNEP-WCMC))	10	45	17	-	-	-	-	-	Footnote refers to Scharlemann & Laurance 2008, instead this should refer to Crutzen, R. J., A. R. Mosier, K. A. Smith, and W. Winiwarter, 2007. N2O release from agrobiofuel production negates global warming reduction by replacing fossil fuels. Atmos. Chem. Phys. Discuss. 7: 11191-11205.	Accepted
Gunnar Luderer (Potsdam Institute for Climate Impact Research)	10	46	5	6	-	-	-	-	"Again, these numbers exclude transport and biomass used for direct heating" - before this statement, at no point in this section the treatment of the transport sector is clarified. This is very confusing.	beyond the scope

Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table Info	Comments	Consideration by writing team
Timm Zwickel (IPCC WG III)	10	46	9	-	-	-	-	-	check grammar/semantic	Accepted
Timm Zwickel (IPCC WG III)	10	46	13	-	-	-	-	-	The WEO scenario can not be called ¿baseline scenario¿ as it does not define the baseline of any of the other scenarios. It might be called business-as-usual scenario, this would need to be argued in the beginning of 10.3	will clarify - "frozen policy" - footnote
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	10	46	14	-	-	10.3	-	-	instead of "3 out of 4" better "in all but the xy scenario¿"	Accepted
Timm Zwickel (IPCC WG III)	10	46	16	-	-	-	-	-	¿might¿ should be replaced, as there is a way to find out, whether accounting methods have an effect, by looking into the models	Accepted
Timm Zwickel (IPCC WG III)	10	46	16	-	-	-	-	-	should probably be ¿by¿ instead of ¿be¿	Accepted
Timm Zwickel (IPCC WG III)	10	46	17	-	-	-	-	-	you mean probably ¿different¿ rather than ¿distinguished¿	Accepted
Timm Zwickel (IPCC WG III)	10	46	19	-	-	-	-	-	grammar: ¿has the greatest share¿ not ¿plays¿ and not ¿important¿ as normative	Accepted
Timm Zwickel (IPCC WG III)	10	46	20	-	-	-	-	-	grammar: technologies can not be ¿players¿, maybe just use ¿technologies¿	Accepted
Timm Zwickel (IPCC WG III)	10	46	21	46	29	-	-	-	this paragraph gives some good starting points for the analysis of the reasons why the 4 scenarios have different outcomes ¿ this should be greatly expanded	Accepted
Timm Zwickel (IPCC WG III)	10	46	21	-	-	-	-	-	add after ¿comprehensive scenarios survey¿ ¿(Section 10.2)¿	Accepted
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	10	46	23	-	25	10.3	-	-	how do you come to this conclusion? It should be stated somewhat earlier in this section	Accepted
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	10	46	29	-	-	-	-	-	add: "¿what is/ is not figured in the models".	Accepted
Timm Zwickel (IPCC WG III)	10	46	30	-	-	-	-	-	don't use ¿baseline¿ - see comment above	Accepted
United States (U.S. Department of State)	10	46	34	46	43	-	-	-	The term "chosen technology pathways" is unclear. Another knowledge gap relating to the assessment of technical potential is the role grid integration and energy storage plays, particularly for variable renewables. It is not clear if the knowledge gap described on lines 38-39 is meant to be broad enough to include the role of grid integration and energy storage.	will, be explained
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	10	46	38	-	39	-	-	-	I do not understand that point	Re-phrase so point is more clear
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	10	46	40	-	41	-	-	-	Are you blaming the modelers or the data-collecting authors?	Accepted

Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table Info	Comments	Consideration by writing team
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	10	46	-	-	-	10.3.6	-	-	I think the most crucial gap is obvious that regional data are missing and that the regional differences between the models are very large. This implicates that much more regional analyses are needed.	Accepted
¿vind Christophersen (Climate and Pollution Agency)	10	47	3	47	5	-	-	-	Cumbersome sentence. Rewrite	sorry, I do not see how this would be cumbersome.
Australia (0)	10	47	22	47	24	10.4	-	-	This sentence could be re-drafted to "They are curves consisting typically of discreet steps, with each step representing the cost of abatement of an activity or energy generation technology or energy conservation activity. Graphically, the steps start at the lowest cost on the left with the next highest cost added to the right and so on, making an upward sloping left-to-right marginal cost curve."	suggested text mostly taken; however, it also has not included the word "potential" - which was really missing in the defition… Thanks for noticing!!
United States (U.S. Department of State)	10	47	22	47	24	-	-	-	"each step relating the marginal cost...to its marginal cost" ??? Change to "each step relating the marginal abatement level... to its marginal cost"	thanks for noticing the mistake! Done.
¿vind Christophersen (Climate and Pollution Agency)	10	47	-	-	-	10.4	-	-	Suggest that the title of section 10.4 is changed to "Current costs for reduction of GHG emissions through increased use of RE"	the title was confirmed by the plenary and can not be changed
Timm Zwickel (IPCC WG III)	10	48	17	-	-	-	-	-	formatting: brackets in IEA reference wrong	this will be up to endnote; but will try to make sure endnote does not redo this.
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	10	48	22	-	-	-	-	-	Explanation of of abbreviation "MACC" would be helpful in this context.	done
¿vind Christophersen (Climate and Pollution Agency)	10	48	22	-	-	-	-	-	MACC (Marginal Abatement Cost Curve) should be explained. MACC aapears for the first time in this chapter here it seems.	done
United States (U.S. Department of State)	10	48	22	-	-	-	-	-	MACC has not been defined in this chapter; change to: marginal abatement cost curves (MACC)	done
United States (U.S. Department of State)	10	48	32	-	-	-	-	-	There are other issues associated with supply curves for variable generation renewables (VGR). These include: The additional costs associated with VGR are not just a function of the amount of VGR deployed. They are also a function of the fraction of the load met by VGR (higher fractions require more ancillary services, e.g. operating reserves), the flexibility of the existing generation portfolio, the location of the VGR deployed relative to loads and existing transmission lines, etc. So that rather than a supply curve, a reduced form, multi-dimensional surface should be used. Interactions between VGR technologies are ignored, e.g. wind and solar generation are anti-correlated which reduces the cost of grid integration. When applied to large regions, supply curves may also be deficient in that the renewable resource may exist in only part of the region, largely precluding the application of that resource towards meetings the loads throughout the region without significant transmission issues.	some of these are good points and have been added. Others are only problems for poorly done curves, so not a problem of the method per se.

Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table Info	Comments	Consideration by writing team
Timm Zwickel (IPCC WG III)	10	49	12	-	-	-	-	-	As MACC is used here for the first time, it should either be defined here or in the glossary.	done
Timm Zwickel (IPCC WG III)	10	49	29	-	-	-	-	-	formatting: reference should say ¿Table 10.3.1¿	rather: 10.4.1
Timm Zwickel (IPCC WG III)	10	49	31	-	-	-	-	-	readability: make two sentences out of it, as content not that related: ¿... by the curves. The table also ...¿	done
Timm Zwickel (IPCC WG III)	10	49	37	-	-	-	-	-	formatting: reference should say ¿Table 10.3.1¿	rather: 10.4.1
Australia (0)	10	52	17	-	-	-	-	-	Table 10.4.2, does not show Australia: 13.4% under 200 USD/t CO2e by 2030, it shows this under 100 USD/t CO2e	corrected, thanks!
Christoph von Stechow (IPCC WGIII TSU)	10	52	29	52	34	-	-	-	Please add a cross-reference to the respective sections in chapter 2 (e.g. 2.2).	done
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	10	52	32	52	34	-	-	-	The assessment Hoogwijk et al. (2009) that biomass can supply 40-70% of the present primary energy consumption 130-270 EJ/year) by 2050 at costs below USD 2/GJ/year, which would be the present lower limit of the cost of coal seem to be very optimistic.	our job is to synthetise the literature and not to judge it except for its quality. This is one of the most respected and cited sources in the field.
Christoph von Stechow (IPCC WGIII TSU)	10	55	4	55	22	-	-	-	Please check these results for consistenty with chapter 2 findings (e.g. Table 2.7.2).	will check, although I do not see how I would cover the same literature differently.
Timm Zwickel (IPCC WG III)	10	55	13	55	17	-	-	-	As this issue is also discussed in Ch.2 please make sure that at both places all relevant literature is taken into account. If SRES scenarios are being referred to, there should be a brief description (as done for A2 in this paragraph) and a reference to the SRES.	cross-reference inserted.
Gerrit Hansen (TSU)	10	55	18	-	22	-	-	-	technical potentials based price ranges are not entirely in line with the TP definition provided in the glossary.	not sure if I understand the concern.
United States (U.S. Department of State)	10	55	22	-	-	-	-	-	Some mention should be made of the fact that the biomass in these biomass supply curves could be used for other energy purposes, e.g. the production of ethanol.	not sure if this is relevant here.
Gunnar Luderer (Potsdam Institute for Climate Impact Research)	10	56	9	-	-	-	-	-	"Solar PV is extremely sensitive to competition for land" - this statement should be checked with technology experts from the solar chapter. My understanding is that most of the solar deployment is projected to occur on rooftops or marginal lands (such as deserts) where competition for land is not an issue.	good point; I added clause that this is in this particular model (if that is what the authors claim, we should not override their arguments)
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	10	59	11	59	15	-	-	-	Onshore wind energy, too, is a mature technology well on its way of becoming cost-competitive with conventional energy sources in power generation.	there is no contradiction to the text
United States (U.S. Department of State)	10	59	18	-	-	-	-	-	These are general statements without actual substantive support. It appears as though this subchapter focused on cost declines in the past and not on cost declines in the future. There was no modeling of cost declines in the future with the exception of Figure 10.5.6.	10.5.3. focuses on the future, there is no numerical modelling of future costs, because this is done implicitely by the models discussed in 10.2.
Canada (Environment Canada)	10	59	23	59	29	-	-	-	Do these costs include the necessary investments in infrastructure, storage and systems integration required to "firm" the energy output to meet demand requirements? Where the sources are intermittent, the only ways that they can meet continuing needs for energy services are either by energy storage or by using other energy sources as supplements, either of which tends to increase costs and reduce net benefits.	10.5. focuses on technology costs, integration costs are discussed in Chapter 8. The text will emphasize this.

Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table Info	Comments	Consideration by writing team
Mark Fulton (Deutsche Asset Management, Deutsche Bank)	10	59	28	59	43	10.5.1	-	10.5.1	In LCOE section, there is little discussion of fossil fuel costs, so it would be helpful to have those numbers for comparison it the table (Table 10.5.1)	Accepted
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	10	59	31	59	33	-	-	-	Emerging economies of scale within the RE sector will foster growing competitiveness of RES (e.g. in the onshore wind sector where there is currrently a development from a seller´s towards a buyer´s market).	text will be expanded accordingly
Greece (National Observatory of Athens)	10	59	-	61	-	10.5.1	-	-	Climate change itself may influence the expected output of some RES technologies (mainly hydro, but also wind, solar, etc.) in a specific region, thus affecting the future levelized costs presented in this Section. It would be usefull to reflect this dimension into the text, providing also, if possible, some quantitative results.	the influence of climate change on renewable energies is discussed in the technology chapters
Greece (National Observatory of Athens)	10	59	-	61	-	10.5.1	-	-	Levelized costs of some RES technologies with a stochastic nature may also be affected by the level of RES penetration into the electricity grid. This is particularly true in relatively isolated power systems (e.g. in the islands), where the higher the penetration of some RES technologies, the higher the necessary investments for back-up technologies, and the lower the share of generated RES that is absorbed by the grid. This issue also affects the estimated levelized costs and should be taken into account, particularly in cases that a high penetration of RES is expected.	integration aspects are dealt with in Chapter 8. Chapter 10.5. contains a reference to Chapter 8.
¿vind Christophersen (Climate and Pollution Agency)	10	59	-	-	-	10.5	-	-	Suggest that the title of section 10.5 is changed to "Future costs for reduction of GHG emissions through increased use of RE"	at that level, titles cannot be changed anymore
United States (U.S. Department of State)	10	60	1	-	-	-	-	-	Change reference from Table 1 to Table 10.5.1	text will be revised
Emmanuel Branche (Electricité de France)	10	60	-	-	-	-	-	10.5.1	For large hydropower, cost could be lower than 800 USD/kW as hydropower is site specific (overnight cost = 757 USD2008/kW for a 6,277MW project in China, reference table 3.1b of IEA, "Projected costs of gernerating electricity" 2010 Edition)	value will be checked together with technology chapter
Peter de Haan (Ernst Basler + Partner AG)	10	60	-	-	-	-	-	10.5.1	This table provides too much detail for the SSREN report. Consider to refer to underlying studies but to report less of the results here in this table.	the SRREN has to provide detailed information. Table will be moved to appendix
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	10	61	3	61	4	-	-	-	Under favorable conditions onshore wind as well is well on ist way of becoming cost-competitive as confirmed by Figure 10.5.1.	comment contradicts figure 10.5.1.

Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table Info	Comments	Consideration by writing team
Steffen Schlömer (IPCC WGIII)	10	61	10	-	13	10.5.1	-	-	I suggested to include in chapter 1 a discussion of the rationale behind applying different interest rates. My comment to chapter 1 is included below. Please clarify with chapter 1 authors where this discussion should best be included. Cross-references between your sections are strongly recommended to enhance the readers' overview of the whole report and other relevant sections. "There is some overlap with chapter 10, hence, a cross-references should be inserted in both chapters. Chapter 10 only shows data for a 10% interest rate, but includes a comparison with typical household and wholesale electricity prices. Since table 1.4 already emphasizes the impact of different discount rates, this topic should be dealt with in more detail here. Below a draft text that should be added below the table: "Obviously, applying a higher discount rate drives LCOEs of all RE technologies up. The extent of the increase differs across technologies and generally depends on the specific timing of cash flows occuring during the lifetime of the respective investment. The effect of applying higher interest rates is particularly strong for technologies with high upfront cost of installation. Using the same discount rate for all technologies is a transparent, but simplified approach to standardize costs for cross-comparison. Interest rates charged for borrowing capital on private capital markets to finance high upfront expenditures will be different across technologies and projects i.a. to account for the specific risks involved in the respective investment. These technology-specific risks and, hence, risk-premiums will certainly be different. A project developer who wants to construct an onshore wind park, for instance, faces risks that are different from those faced by someone who wants to build a similarly sized project offshore. A valid comparison of the unit cost of energy or LCOE has to take into account the differences in the average cost of financing across technologies. It is, however, difficult to decide what the appropriate average interest rate is for each technology." ETHICAL CONSIDERATIONS ..., pure time discount rates, ... (1 - footnote) Differing risk premiums can also result from investor-specific or debtor-specific risks that depend on the overall financial situation of the borrower."	the text will be revised to take the arguments into account.
Garcia Javier (Garcia Monge Consultant)	10	61	10	-	-	-	10.5.2	-	In the paragraph there is an affirmation about discount rates, but in the figure it is the interest rate. Is that ok or there is a mistake?	discount rate will be used consistently
Australia (0)	10	61	11	-	13	10.5	-	-	The sentence suggests that private investors might be more willing to invest at a lower internal rate of return than (government owner?) utilities. This is counter intuitive and needs to be justified.	the arguments will be justified
Japan (the Japanese Ministry of Foreign Affairs)	10	61	-	-	-	-	10.5.1	-	A more detailed explanation should be given for the figure - especially as to why the LCOE range for solar PV is so significantly wide compared with other energy sources.	solar data will be updated
Emmanuel Branche (Electricité de France)	10	61	-	-	-	-	10.5.1	-	Highest cost for LCOE of conventional technologies at 14 cUSD/kWh is very expensive (even with the pass-through of CO2 price). It could be interesting that this higher value be presented in more details.	an extended discussion will be added

Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table Info	Comments	Consideration by writing team
Taishi Sugiyama (Central Research Institute of Electric Power Industry (CRIEPI))	10	61	-	-	-	-	10.5.1	-	Include (SRREN_Draft2_Review_Sugiyama_Taishi_Material_12) as a data source.	specific data is collected by technology chapters
Taishi Sugiyama (Central Research Institute of Electric Power Industry (CRIEPI))	10	61	-	-	-	-	10.5.1	-	This graph is good, but more revision requred. LCOE range of conventional tech is too large - keep baseloads alone, then the range will shift downward. Devide hydro into large ones and small ones.	the shaded area will be removed.
Australia (0)	10	61	-	-	-	10.5	10.5.2	-	These side-by-side graphs could be put on the same scale so that they can be easily compared. Also the choice of dicsount 3% and 10% rates needs to be explained.	the diagrams will be rescaled
Osamu Kimura (Central Research Institute of Electric Power Industry)	10	62	2	65	3	-	10.5.2	-	Prospects of balance of system (BOS) costs, including installation cost and miscellaneous cost, should be treated separately from the total cost prospects. As BOS costs are higher than module cost in many PV applications, it is important to analyse the potential of reducing BOS costs(Chapter 4 of the Solar Vision Study by US DOE, available at http://www1.eere.energy.gov/solar/vision_study.html). Yang (2010) raises an important point, saying "a great deal of the installation and miscellaneous cost is labor cost. As installers gain experience, they may be able to work more efficiently, but a labor cost reduction of over 80 percent in the near-term is likely optimistic." See: Chi-Jen Yang, 2010, Reconsidering solar grid parity, Energy Policy, 38, 3270-3273.	text will be revised in order to make this point clear.
Osamu Kimura (Central Research Institute of Electric Power Industry)	10	62	2	65	3	-	10.5.2	-	The section mainly reviews literature on experience curve, but other approaches should also be reviewed. Especially, expert judgements on cost prospects need to be reviewed here. For example, Curtright et al. (2008) show subjective probabilistic judgements about future PV module costs from dozends of experts. This kind of subjective expert judgements should be compared with the result of learning rate estimations. See: Aimee E. Curtright, M. Granger Morgan, David W. Keith, 2008, Expert Assessments of Future Photovoltaic Technologies, Environ. Sci. Technol., 42 (24), pp 9031--9038, DOI: 10.1021/es8014088.	if space limitations allow, other approaches will be presented as well
United States (U.S. Department of State)	10	62	17	62	19	-	-	-	Is this the correct terminology definition? I understand economies of scale as size-related (rather than the upsizing category). Does it make sense to distinguish between "learning by doing" and "learning by using"?	the original source will be checked to use a consistent language
Osamu Kimura (Central Research Institute of Electric Power Industry)	10	62	27	62	45	-	10.5.2	-	Uncertainty of experience curves should be more emphasised. One bias of experience curve literature is that it only analyses technologies that survived the history, and pay no attention to technologies that have perished at an early stage of development. This point is discussed by Ambuj D. Sagar, Bob van der Zwaan, 2006, Technological innovation in the energy sector: R&D, deployment, and learning-by-doing, Energy Policy, 34, 2601-2608.	text will be revised
United States (U.S. Department of State)	10	62	31	-	-	-	-	-	Change Table 2 to Table 5.10.2. This is also a problem with references to figure 3 on line 23 and 39.	text will be revised
United States (U.S. Department of State)	10	63	6	63	10	-	-	-	These lines are speculative and recommend deleting. The recommended deletion also applies to the paragraph that starts with "As these extra profits can be....."	the paragraphs are important. Additional, references will be added to support the argumentation

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)	10	63	9	-	-	-	-	-	For the discussion in the 2nd paragraph after line 9, please bring in more recent data, which confirms the author's point clearly, showing the dramatic plunge in PV prices over the last 2 years.	new numbers will be considered for inclusion
United States (U.S. Department of State)	10	63	16	64	3	-	-	-	This language is confusing, recommend deleting.	text will either be deleted or revised to enhance clarity
Taishi Sugiyama (Central Research Institute of Electric Power Industry (CRIEPI))	10	63	-	-	-	-	10.5.3	-	The "guide to the eye" line reminds me of notorious hockey stick diagram of so-called IPCC scandal. To me, the costs look saturating after 2000. I recommend you put two lines in the diagram to accommodate two different views - one line as it stands, and the other line which bends in 2000 and remains flat afterward up to 2008.	the diagram is taken from the original source and therefore will not be modified. However, the saturation will be discussed in the text
Finland (Finniah Meteorological Institute)	10	64	-	-	-	-	-	10.5.2.	The source mentioned in the table (Junginger, et al., 2005b), is not listed in the bibliography.	will be included
Juan Llanes (Centre for Environmental Studies)	10	65	-	-	-	10.5.3	-	-	figure 10.5.4 Consider the effects of increasing fuel prices overtime that reduces incremental costs.	diagram will be modified
United States (U.S. Department of State)	10	66	1	66	7	-	-	-	Rephrase lines 1-7 to reflect the following: investment in the early years of a technology with strong learning capacity may well be justified in present-value terms by the expected cost savings after the break-even point. However, this approach ignores the opportunity costs of making those investments, relative to other technologies or other carbon mitigation strategies that may ultimately over take the favored technology.	the integrated assessment models applied take this competition into account.
United States (U.S. Department of State)	10	66	9	66	11	-	-	-	Need to reword. Low incentives are not necessarily only a result of "imperfect performance of liberalized markets"	text will be revised
Mark Fulton (Deutsche Asset Management, Deutsche Bank)	10	66	-	67	-	10.5.4	10.5.5	-	Estimates of needed capital are all sourced from International Energy Agency and Bloomberg New Energy Finance. Are there other sources of such estimates that could be referenced?	the author is not aware of others sources on a global scale
United States (U.S. Department of State)	10	68	1	-	-	-	-	-	Recommend adding something to the effect of the following comment: An additional effect lessens the mitigation burden. If oil costs $100 / barrel, most of that price reflects a royalty to the resource holders. If instead a wind turbine charges an electrical vehicle, and the levelized cost per energy equivalent of a barrel of oil is also $100, most of that price reflects labor, equipment, and other economic activities that have pronounced multiplier effects. The economic impact of the two $100 prices are not at all the same ¿ high-tech manufacturing is a lot more valuable to an economy than resource extraction.	if space limitations allow, a respective paragraph will be added
Pekka Pirila (Aalto University)	10	68	5	68	10	-	-	-	The paragraph can easily be misinterpreted. Most or all scenario analyses consider avoided costs and take them into account. Most of them also attribute these changes to various technologies. Such results have, however, been seldomly published. The reason may have been that the models are not reliable enough at this level of detail to justify publishing the results or the authors have not judged these results to be of sufficient general interest. In all cases such results are sensitive to scenario assumptions.	text will be revised
¿vind Christophersen (Climate and Pollution Agency)	10	68	-	-	-	10.5.5	-	-	We propose that this section is deleted	the rewiever does not give arguments

Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table Info	Comments	Consideration by writing team
Finland (Finniah Meteorological Institute)	10	69	8	69	9	-	-	-	"Whereas RD&D funding is appropriate for infant technologies, market entry support and market push programs..." -> Should here be "market pull programs" instead of "market push programs"? push programs	text will be revised
Gunnar Luderer (Potsdam Institute for Climate Impact Research)	10	69	8	-	9	-	-	-	This should read "market pull programs" rather than "market push programs", shouldn't it?	text will be revised
United States (U.S. Department of State)	10	69	10	-	-	-	-	-	Suggest changing "appropriate" to "can be used in the deployment and commercialization phase¿". Additionally, it is important to ensure the terms "market entry support" and "market push programs" are consistent with the discussion in Chapter 11.	text will be revised
China (China Meteorological Administration)	10	70	6	70	7	10.6	-	-	In Chapter 10 - Mitigation Potential and Costs, the content here seems not so pertinent to the subject.	see next comment
Pekka Pirila (Aalto University)	10	70	6	73	2	-	-	-	Chapters 10.6.1 and 10.6.2 cover very similar matters. There is also direct repetition.	modify text
Frank Krysiak (University of Basel)	10	70	18	70	20	-	-	-	There might be some external benefits of energy production/consumption but these have to be considered in addition to private benefits only if they are not internalized. Most of these effects (such as job creation) are pecuniary and are thus internalized via price changes, if markets function well.	revise text
Mark Fulton (Deutsche Asset Management, Deutsche Bank)	10	70	-	80	-	10.6	-	-	The Social, Environmental costs and benefits section (Section 10.6) is somewhat gratuitous, remains very general and lacks any specificity to be useful. It does provide context, but does not add anything that numerous reports have already described in much greater detail elsewhere. As per instructions, this section could be removed entirely from the chapter (maybe place a summary of this section in the introductory sections of where rationale of entire report is described.)	Transfer? and revise
¿vind Christophersen (Climate and Pollution Agency)	10	70	-	-	-	10.6	-	-	Suggest that the title of section 10.6 is changed to "External costs for and benefits of reduction of GHG emissions through increased use of RE"	The present title is good for technology specific consideration, it was argeed in very beginning
Taishi Sugiyama (Central Research Institute of Electric Power Industry (CRIEPI))	10	70	-	-	-	-	10.6.1	-	Delete this diagram. This diagram is not more than a 'hope'. You must quantify with data if you put this here.	Accepted
Garcia Javier (Garcia Monge Consultant)	10	71	3	71	4	10.6.1.	-	-	May I suggest to add: ""Typical factors (¿) of fossil fuels energy production, and the pollution in the whole chain of fossil fuels: extraction, transport, refining and use.""	The text will be improved

Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table Info	Comments	Consideration by writing team
Juan Llanes (Centre for Environmental Studies)	10	71	18	-	25	-	-	-	I suggest that a separate point is needed to deal with cost benefit analysis. One issue is the economic valuation of changes on environmental quality and another issue the use of cost benefits analysis for such cases where external costs are high. The perspective used rises concern for the validation of CBA as the whole problem of mitigation is permeated by external and social costs. Instead of CBA what analytical or decision tool is recommended by the authors? The same issue is repeated in page 72 rows 42/46 a possibility to save space. There is an important literature on alternative decision tools in ecological economics published in recent years.	revise text
Christoph von Stechow (IPCC WGIII TSU)	10	71	30	71	42	-	-	-	Please add a cross-reference to the relevant sections in chapter 2 (e.g. 2.5.3).	Accepted
Garcia Javier (Garcia Monge Consultant)	10	72	6	72	7	-	-	-	for the hydro potential is important to add the situation of glaciers and snow for rivers that are fed on ice and snow covers in the mountains.	revision of text
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	10	72	8	72	11	-	-	-	RE can contribute to meeting the challenges of sufficient energy supply at fair price, reduction of environmental and social costs, mitigation of climate change. Nevertheless, as these are partly competitive targets there will the the need for compromise and a balanced energy mix including modern fossil-fuelled power plants with CCS technology and nuclear energy plants as bridge technologies.	emphasized in text
China (China Meteorological Administration)	10	72	22	-	-	10.6.2	-	-	Not much substantial contents, and the breakdown can be improved.	revision of text
Taishi Sugiyama (Central Research Institute of Electric Power Industry (CRIEPI))	10	72	42	-	43	-	-	-	That the assessment of external costs is very difficult is very important message. This message should appear in SPM with more attention.	comment transferred to SPM
Peter de Haan (Ernst Basler + Partner AG)	10	72	-	-	-	-	10.6.2	-	This section should link to, and refer to, chapter 2's environmental analysis	there is not enough information available
¿vind Christophersen (Climate and Pollution Agency)	10	73	5	73	6	-	-	-	Should give reference to IPCC AR4 here.	Accepted
Frank Krysiak (University of Basel)	10	73	12	73	33	-	-	-	The fundamental difference between the approaches of "prizing carbon" described here does not become clear to the reader. The Stern approach puts a price label on carbon emissions according to the present and future damages caused by them. These are marginal social costs of carbon emissions. The price of carbon observed on a market for emission permits represents the marginal costs of abating emissions at the level prescribed by the supply of emission permits. It is thus a measure of the costs of avoiding additional emissions and depends strongly on the amount of allowed emissions. Both price tags are only equal if the emission target is optimally chosen (and if all emission sources participate in permit trading); this seems to be rather unlikely.	Improve text

Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table Info	Comments	Consideration by writing team
Garcia Javier (Garcia Monge Consultant)	10	73	21	73	26	10.6.2.1	-	-	It is quoted the minimum, maximum and best guest but only number for minimum and maximum are provided.	all numbers are inthe text
Emmanuel Branche (Electricité de France)	10	73	41	73	44	-	-	-	Avoid new references and refer to section 5.6. Proposition: "Hydropower has a great CO2-reducing potential for a large part. However CH4 and CO2 may be emitted from some reservoirs under certain conditions, site and climate zone (mainly tropical area), after the first years after impoundment (see section 5.6)"	modify text
Peter de Haan (Ernst Basler + Partner AG)	10	73	-	-	-	-	10.6.2.1	-	in this context GHG should not be limited to CO2, because (i) N2O plays an important role for RE (denitrication in soil of fertilizer), (ii) land-use changes play an important role. Please link this section to chapter 2's more detailed discussion on these topics.	text revised
Garcia Javier (Garcia Monge Consultant)	10	74	37	74	37	10.6.2.3	-	-	May I suggest the following phrasing: ""Thermal condensing power plants and nuclear plants usually need water, e.g. from a river.""	nuclear plants are also thermal condensing plants
Emmanuel Branche (Electricité de France)	10	74	43	73	46	-	-	-	Avoid new references and refer to section 5.6. Proposition: "Dams are creating obstacles for the movement of migratory fish species and for river navigation. However those impacts may be lowered and mitigated by compensating measures such as fish passes and plantations (see section 5.6)"	Accepted
Pekka Pirila (Aalto University)	10	74	43	75	16	-	-	-	Much better coverage is given in section 5.6. A reference to that coverage is sufficient as very little specifically related to costs is added in the present text.	Accepted
Emmanuel Branche (Electricité de France)	10	75	2	75	5	-	-	-	Avoid new references and refer to section 5.6. Proposition: "Environmental Impact Assessment ¿of a planned hydropower plant (see section 5.6). The International Hydropower Association ¿at the international level."	references relevant in this context
Garcia Javier (Garcia Monge Consultant)	10	75	17	75	18	10.6.2.4	-	-	May I suggest to add: The use of bioenergy (¿) as well as by energy plantations and the use of landfills to generate biogas or power.""	clear without examples
Christoph von Stechow (IPCC WGIII TSU)	10	75	17	75	25	-	-	-	Please provide a cross-reference to the relevant sections in Chapter 2 (e.g. 2.5.3).	Accepted
Garcia Javier (Garcia Monge Consultant)	10	75	28	75	28	10.6.2.4	-	-	It is stated: (which may result from the use of some RE options). It should be better to state: (which may result from biomass and geothermal generation).	text modification done
¿vind Christophersen (Climate and Pollution Agency)	10	75	32	75	44	-	-	-	We propose that this section is deleted	modification and transfer of text considered
Greece (National Observatory of Athens)	10	75	-	76	-	10.6.2.5	-	-	On the one hand the exploitation of RES technologies contribute to the enhancement of security of energy supply in a country / region, reducing the share of imported energy sources, on the other hand, some of the RES technologies, due to their stochastic nature, may associated with energy supply difficulties. It is a complex issue that needs further investigation for providing quantitative results.	should be mentioned but mainly discussed in chapter 8

Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table Info	Comments	Consideration by writing team
Pekka Pirila (Aalto University)	10	76	7	76	20	-	-	-	Increasing employment is not always a positive effect. Largest increases in employment are created by lowest productivity, and increasing low-productivity work through strong economic support has a negative overall effect. There may also be shortage of high level experts. These concerns apply to several common claims on employment benefits of RE. The real goal is to improve the health of the economy and RE policies may affect the economy in either direction.	discussion of possible negative effects for employement to be added
Supachai Panitchpakdi (United Nations Conference on Trade and Development)	10	76	7	76	20	-	-	-	Line 7 to 20 of page 76 seem too unbalanced and short. The dynamic effect on structural economic change cannot be underestimated, as has been made clear in UNCTAD (2009). For most countries, climate mitigation is economically more an opportunity than a threat. A more balanced and in depth discussion here would be good. See: UNCTAD (2009). Trade and Development Report 2009: Responding to the Global Crisis - Climate Change Mitigation and Development. United Nations: New York and Geneva.	text changes possible but the proposed literatury is grey
Rainer Walz (Fraunhofer Systems and Innovation Research)	10	76	20	-	-	-	-	-	The positive net employment effects of renewable energy have also been confirmed for the EU 27: see Ragwitz, M. et al. (2009): EmployRES. The Impact of Renewable Energy Policy on Economic Growth and Employment in the European Union, Final Report. DG TREN, Brussels	Add refrence
¿vind Christophersen (Climate and Pollution Agency)	10	76	-	-	-	10.6.3	-	-	Suggest that the title of section 10.6.3 is changed to "External costs and benefits - regional differences"	present title reflects better content of section
Taishi Sugiyama (Central Research Institute of Electric Power Industry (CRIEPI))	10	77	-	78	-	-	-	-	The external costs estimates tables (10.6.1 through 10.6.3) conveys important information and should appear in SPM. Add benefit quantifications as well.	text is enough
Peter de Haan (Ernst Basler + Partner AG)	10	77	-	-	-	-	-	10.6.1	This table presents external costs that are, as all external costs, highly specific for the region in question, especially since climate change and human health are the main cost categories. Please specify for which region and year this applies OR consider to delete this table.	revise text
Garcia Javier (Garcia Monge Consultant)	10	77	-	-	-	-	-	10.6.1 last row	There is no title for the last row so it is impossible to know the meaning of the numbers.	add text
Peter de Haan (Ernst Basler + Partner AG)	10	78	-	-	-	-	10.6.3	-	It is very controversial to list external costs for nuclear power generation. This should be either done in more detail (citing more studies from literature), or not. Consider to delete nuclear power from this figure and to explain, in the text body, for which reason.	will be revised
Antoine BONDUELLE (E&E Consultant)	10	78	-	-	-	-	10.6.3	-	The figure 10.6.3 p. 78 (comparing external costs) is too controversial for this survey. This contradicts for example other published comparisons such as : Sovacool 2008 ""Valuing the greenhouse gas emissions from nuclear power: A critical survey"" Energy Policy 36 (2008) 2950¿ 2963 where nuclear power is studied more in-depth. Examples given in figure 10.6.3 are also too specific (no wind onshore, only retrofit for PV..), and in addition, framing information such as energy mix is not given. Thus this graph should not be included.	nuclear energy will be excluded from the figure

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)	10	79	15	79	19	-	-	-	Please provide a cross-reference to the relevant sections in Chapter 9.	Accepted
Peter de Haan (Ernst Basler + Partner AG)	10	79	-	-	-	10.6.4	-	-	It is mentioned (lines 23 to 24) that combined strategies should be applied, but this section is too short to do this.	text will be revised, more details from Bollen study
¿vind Christophersen (Climate and Pollution Agency)	10	79	-	-	-	10.6.4	-	-	Section 10.6.4 presents an important idea, but the text is very hard to understand and needs to be rewritten. The title could be changed to "Positive synergies from combined strategies"	revision of text made
Peter de Haan (Ernst Basler + Partner AG)	10	79	-	-	-	-	10.6.4	-	The cost/welfare/benefit changes depicted here are for three scenarios, with death toll due to PM emissions - what does this figure tell us in this section, for what reason is PM choosen as leading substance?	PM seems to be very important (Krewitt and Schlomann 2006)
Steve Sawyer (Global Wind Energy Council)	10	88	24	88	24	-	-	-	the name is 'Sawyer', not Swayer	Accepted
China (China Meteorological Administration)	10	89	28	89	38	-	-	-	Take more references from China, India and other developing countries, for example, the scenario analysis from "Qimin Chai, Xiliang Zhang. Technologies and Policies for the Transition to A Sustainable Energy System in China. Energy, In Press, Available online 13 July 2010".	is not possible due to page constraints
Timm Zwickel (IPCC WG III)	10	91	3	91	9	-	-	-	Concerning the extension to 2050: Please discuss within the author team, whether it is sufficient for the DLR2010 paper to be accepted or whether it would be good that in addition you get a confirmation by the IEA that the extension done is plausible in their view. Throughout the report when referring to the extension reference it as ¿DLR/IEA2050¿ or something similar in order to avoid that the 2050 data is understood to be direct IEA data!	was discussed in the author team and extension accepted by the IEA
Timm Zwickel (IPCC WG III)	10	91	11	-	-	-	-	-	¿ReMind-Recipe¿ is not a scenario! Recipe is a model comparison and ReMind a model. So call it something like ¿ReMind-450¿ and the give the Recipe publication as reference.	accepted
¿vind Christophersen (Climate and Pollution Agency)	10	91	21	-	-	-	-	-	In Box 10.3: What does RET mean?	will be clarified
Timm Zwickel (IPCC WG III)	10	91	25	-	-	-	-	-	EMF22 is a model comparision, so call the SCENARIO something like ¿MiniCAM-450os¿	accepted
Timm Zwickel (IPCC WG III)	10	91	40	-	-	-	-	-	Concerning ER. As there has been the Krewitt 2009 publication about ER and as the Spanda Journal is not an ISI listed journal, it is probably best to quote the higher level Krewitt publication.	will be quote both
Gunnar Luderer (Potsdam Institute for Climate Impact Research)	10	91	-	-	-	10.3	-	-	Given that the IEA WEO data originally only extends until 2030, I wonder if it is appropriate to provide numbers for 2050 based on extrapolation. This is not an approved methodology, and might be problematic in view of the highly non-linear dynamics that characterize the energy-economic system.	Accepted
Timm Zwickel (IPCC WG III)	10	91	-	-	-	-	-	-	As the motivation of 10.3 is a deep dive into the models, this box should not only describe each scenario's storylines but the models themselves, as is done to some degree. I suggest to change the heading to ¿Characteristics of the four models and their resp. illustrative scenario¿	will be discussed more in detail

Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table Info	Comments	Consideration by writing team
Timm Zwickel (IPCC WG III)	10	91	-	-	-	-	-	-	Box 10.3 descriptions vary, make them more comparable. Mention what economic model is the basis (optimization, etc.) as this is important for the recipient for the classification.	accep
Gunnar Luderer (Potsdam Institute for Climate Impact Research)	10	91	-	-	-	-	-	-	I appreciate this box on storylines of the illustrative scenarios. For the Energy Revolution scenario, I still do not understand to what extent renewable deployment levels are an assumption or an endogenous result of the model. This should be clarified.	will be clarified
Australia (0)	10	96	22	-	-	-	-	-	The text refers to how collaboration can support radical innovation. We can further support this by referencing the 2006 DITR report that shows collaboration is more likely to result in innovation with a higher degree of novelty. Collaboration is associated with a 62-73% higher probability of a firm having the highest degree of innovation novelty (new to the world) and a 23-27% lower probability of a firm having the lowest degree of novelty (new to the firm). (Department of Industry, Tourism and Research, 2006, Collaboration and other factors influencing innovation novelty in Australian businesses, Commonwealth of Australia, Canberra, Australia).	Text could not be found. Page 96 does not exist
United Kingdom (Department of Energy and Climate Change)	10	-	39	-	44	10.6.2.3	-	-	suggest there are positive energy security benefits to renewable energy, but there is little discussion on the potential negative consequences of having high concentrations of intermittent renewable energy sources such as wind, wave and tidal, which create a big challenge in matching electricity demand to (intermittent or unreliable) electricity supply.	could be mentioned but belongs to chapter 8
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	10	-	-	-	-	10.1	-	-	Second part of introduction with description of content of successive sections could be shortened.	Text will be revised
Gunnar Luderer (Potsdam Institute for Climate Impact Research)	10	-	-	-	-	10.2	10.2.2	-	The authors indicate that RE deployment depends critically on the scale of the energy system. To correct for this effect, it would be worthwhile to perform an analysis of RE deployment in relative terms, i.e. as % of the TPES, as a function of CO2 emission level.	We agree that a dual approach of presenting both absolut numbers and shares can be insightful, but given the space limitations, we prefer to stick with absolute numbers only rather than shares only, since the absolute amount matters for the upscaling of a technology and the prospects for market sizes etc. Note that Figure 10.2.6 uses shares, but to avoid misinterpretation additional interpretation of results is required (an increasing share could correspond to a reduction in absolute deployment, if the total system size decreses more.
United States (U.S. Department of State)	10	-	-	-	-	10.2	-	-	A lot of text and graphics in sub-sections 10.2.2.2 to 10.2.2.5 that create basis for the whole discussion of the chapter refer to only one source or at the best a couple of sources by the same author. Even though the reviewers understand that the reference provides a comparison of various models, the fundamental premise of IPCC Reports comparing various studies and viewpoints available in multiple literature sources gets lost, in contrast later sub-sections in 10.3 seem to more effectively compare results from various sources.	The aforementioned reference (Krey and Clarke, 2010) is a spin-off publication of the synthesis done for the SRREN and because of less severe space limitations goes beyond the coverage in the SRREN. Will clarify that figures are based on all models in table.
Marc Darras (GDF SUEZ)	10	-	-	-	-	10.2	-	-	Because the energy demand is connected to various elements outside the energy world and climate constraints the corresponding parameters should be mentioned for the range of the 165 scenarios: range of GDP growth, population, energy consumption in term of J/hab or J/US$ GDP (ppp?), fossil energy price. This can be a constraint of the model or a product of it (exogeneous or endogeneous). Furthermore, this could be indicated in table 10.2.1.	Within space limitations we will try to add this information. Note, however, that the range of GWP is covered in Figure 10.2.11 and population is very similar across all scenarios in the comparison. The scenario data used for the analysis will be made available in web-database by the time of publication of the SRREN.
United States (U.S. Department of State)	10	-	-	-	-	10.2	-	-	In general, it may be helpful for the scenario-review section of the chapter to focus more on the assumptions that all the scenarios share, but could be wrong.	This was considered, but turned out to be too difficult a task for the large set of more than 160 scenarios, because not only parameters, but also representation of policies and technologies differ strongly across the models.

Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table Info	Comments	Consideration by writing team
Gunnar Luderer (Potsdam Institute for Climate Impact Research)	10	-	-	-	-	10.2	-	-	In my view, Section 10.2. is one of the most valuable parts and a major strength of the SREN.	Acknowledged.
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	10	-	-	-	-	10.3	10.3.5	-	it should be stated that REMIND uses grades to that wind and PV pop up several times in that graph	The text explains this (or rather the lack of gradation in the other two scenarios, which is a major shortcoming) in lines 12 - 17 on page 39. If I had more space, I could add some more text on this issue, but I am constantly under strong pressure to reduce the length even further - this compromises clarity to some extent, unfortunately.
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	10	-	-	-	-	10.3	10.3.6	-	it should be stated that REMIND uses grades to that wind and PV pop up several times in that graph	The text explains this (or rather the lack of gradation in the other two scenarios, which is a major shortcoming) in lines 12 - 17 on page 39. If I had more space, I could add some more text on this issue, but I am constantly under strong pressure to reduce the length even further - this compromises clarity to some extent, unfortunately.
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	10	-	-	-	-	10.3	10.3.9	-	What do the vertical bars indicate? Stdv? Error of what?	will be explained
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	10	-	-	-	-	10.3	10.3.10	-	What do the vertical bars indicate? Stdv? Error of what?	will, be explained
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	10	-	-	-	-	10.3	10.3.11	-	What do the vertical bars indicate? Stdv? Error of what?	Accepted
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	10	-	-	-	-	10.3	-	10.3.3	General comment: I find it very critical that many conclusions in this section are based on just one scenario (ER 2010), e.g. Table 10.3.5 and Table 10.3.6. Better use less regions but more models, e.g. you could concentrate e.g. only on USA, EU, CHN, IND, but then analyse it for all four models. In fact it is well known that regional results vary substantially from model to model, so statements as given on page 38, line 28-32 are not very serious. I strongly recommend to give also numbers for the other three models.	will add map and move ta bles to the appendix
Gunnar Luderer (Potsdam Institute for Climate Impact Research)	10	-	-	-	-	10.3	-	-	Compared to the other Sections of Chapter 10 (which are well written and concise), this subchapter is of lesser quality. Some statements lack proper scientific underpinning. A number of language errors and typos remain The section would benefit from English language editing.	Accepted
Timm Zwickel (IPCC WG III)	10	-	-	-	-	10.3	-	-	Concerning the extension to 2050: Throughout the report when referring to the extension reference it as ¿DLR/IEA2050¿ or something similar in order to avoid that the 2050 data is understood to be direct IEA data!	Accepted
United States (U.S. Department of State)	10	-	-	-	-	10.3	-	-	Needs substantial editorial work. Section is difficult to read at times.	Accepted
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	10	-	-	-	-	10.3	-	-	the MiniCam Scenario should be named "MiniCam" and not EMF22 (e.g. on page 32, line 34 or in Fig. 10.3.8/9/10/11 and everywhere else in this chapter. This is completely misleading. EMF22 is a complete model comparison with 10 models.	Accepted

Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table Info	Comments	Consideration by writing team
Timm Zwickel (IPCC WG III)	10	-	-	-	-	10.3	-	-	The scenarios evaluated are named wrongly. It is not ¿ReMind Recipe¿ but it is ¿Recipe 450¿ or so. EMF22 is a model comparison exercise and not a scenario, it should be named ¿MiniCAM 450 P&D¿ or something along those lines. Please adjust this throughout including Box 10.3	Accepted
Timm Zwickel (IPCC WG III)	10	-	-	-	-	10.3	-	-	This section needs to be thoroughly overworked language wise. I have tried to make numerous constructive suggestions.	Accepted
Brigitte Knopf (Potsdam Institute for Climate Impact Research)	10	-	-	-	-	10.3	-	10.3.3.	the left column should always start with capital letters	Accepted
Supachai Panitchpakdi (United Nations Conference on Trade and Development)	10	-	-	-	-	10.4	-	-	The cost curves used in 10.4, are again criticized heavily by the authors and it is not clear why they are then subsequently used. In fact, it seems the text gives more questions than answers. Especially the curves seem to be static equations, where the cost curves are not endogenously fed by technological advances etc. It should be possible, to come up with more dynamic models, which can be used from a huge existing literature on structural economic change, new technology introductions etc. The authors seem to have relied on the narrowly defined cost curves of the existing climate change literature without going into the broader economics literature to find more plausible models. The wider literature should at least provide guidance on how one could move ahead. Related is page 47, line 36-37, where some author is quoted in order to make the unsatisfying concepts look more appropriate.	The cost curves we produce in the SRREN are based on dynamic models (see 10.3). These tables simply review the existing literature on cost curves. If the reviewer can send us any literature that he suggests should also be included, I will be happy to do so. The reason why these curves are covered are several-fold: first, the IPCC's plenary gave SRREN a mandate to cover them; second, because the concept is very popular and very highly used by decision-makers, so it is important to relate to them, and emphasise why they should be used with more caution than they are presently done.
United States (U.S. Department of State)	10	-	-	-	-	10.5	-	-	In this section, LCOE is presented in various units ($/MWh, cents/kWh, and even $/kWh). It is suggested to convert all numbers/graphs to ONE unit. This would make comparisons easier.	a common unit will be used
Pekka Pirila (Aalto University)	10	-	-	-	-	10.5	-	-	The complexity of the issue of estimating cost development and the resulting cost of early implementation is indicated in the first part of the chapter and at the end in 10.5.6. Most of the chapter is, however, written as if these issues were not crucial. It is known that volume of production is only one of many factors contributing to cost development and often less important than other factors. It is impossible or extremely difficult to estimate the influence of one factor with other kept constant. The text contains also on page 63 wage arguments claiming errors in the opposite direction. These arguments are not convincing and give the impression of an attempt to push results to the direction favoured by the authors. The chapter 10.5.3 presents a comparison that is often made extremely unreliable by the difficulty in estimating future costs of both the technology being considered and all its potentially competitive alternatives. It should be emphasized that the results are even remotely reliable only when the break-even of ultimate total discounted costs is reached within a few decades and without dramatic cost reductions. The chapter contains again wage arguments in one direction but neglects potentially stronger opposite arguments.	text will be rewritten to reflect the uncertainty.

Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table Info	Comments	Consideration by writing team
Timm Zwickel (IPCC WG III)	10	-	-	-	-	10.6	-	-	Please check whether the literature used in this section is consistent with the literature used in Chapters 2 through 9. Though in those chapters the focus is on qualitative data, there might be literature either considered here or in those chapters that contains qualitative and quantitative information. For consistency throughout the report it would be important if such sources would not only be considered in one of the two places.	reviosion and comparision wth other Chapters
Juan Llanes (Centre for Environmental Studies)	10	-	-	-	-	10.6	-	-	The approach to social costs of carbon is broader than the ¿cost of energy production¿. Suggest to review the section. The most pervasive component of the social costs of carbon is sea level rise, a potential impact that may destroy economies of small island states causing migration tensions in many countries.	Social costs of carbon SCC contains all damage types, also sea level rise.
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	10	-	-	-	-	10.6	-	-	The assessment of social and environmental costs and benefits of RE is highly complicated and contentious, especially when it comes to quantification of such impacts. Results can - at best - give an orientation the effects to bear in mind for individual RE technologies and their sum as a part of the whole energy system.	revision and completion of text
Pekka Pirila (Aalto University)	10	-	-	-	-	10.6	-	-	The knowledge gaps and uncertainties are discussed in many places and often in similar terms. One more comprehensive section would be better. This section could be referenced elsewhere, when judged necessary. Discussion appears at least on page 71, rows 18-25, page 72/41-73/3, 73/12-20	Considered in previous comment
Pekka Pirila (Aalto University)	10	-	-	-	-	10.6	-	-	The section contains significant amounts of description of environmental effects of specific forms of RE without direct link to economic analysis. Such text is out of place here as the same issues have been discussed more comprehensively in technology specific chapters. The knowledge gaps and uncertainties are discussed in many places and often in similar terms. One more comprehensive section would be better. This section could be referenced elsewhere, when judged necessary. Discussion appears at least on page 71, rows 18-25, page 72/41-73/3, 73/12-20	The text will be revised and possibly transferred
Gunnar Luderer (Potsdam Institute for Climate Impact Research)	10	-	-	-	-	10.6	-	-	This section on external costs is a valuable contribution to the report. Since for the most part the scenarios do not account for social costs other than those of GHG emissions, they may be biased against energy technologies and sources with low external costs. Authors should consider to either strengthen the link to the scenario analysis in Sections 10.2. and 10.3. or to move this section to Chapter 9, which deals with sustainability in the broader context.	strenghten ties with the other parts of the chapter
Pekka Pirila (Aalto University)	10	-	-	-	-	10.6.1	10.6.1	-	This chapter is prone to double counting. The environmental costs of conventional energy should not at the same time be considered as external bebefits of RE. In most cases the external costs are larger than external benefits for RE as well. The Figure 10.6.1 is one-sided and the most obvious case of double counting.	explain in the text, delete yhe figure

Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table Info	Comments	Consideration by writing team
Marc Darras (GDF SUEZ)	10	-	-	-	-	10.6.1	-	-	This chapter is presenting very few modification from the FOD. To clarify "externatilities" one should clarify the various elements: economic externalities (avoided cost of transmission system; loss of production day for ozone pollution; loss of agricultural production for acidification...) economically evaluated externalities (such as evolution of price of housing under different environmental conditions...) and evaluated social externalities (evaluated through WTP or WTA methods). Then the question of inter-economies evaluation (the cost of life in US versus the cost of life in india for example) and then the question of intergeneration evaluation . With such a background the various evaluation should be discuss and their limitation underscored. Furthermore, as it is indicated in some paragraph, in many examples the cost of mitigation to a given level of emission is a substitute to the external cost of CC. (this elements have been discussed since at least the SAR in the context of IPCC and many other places (see for instance NEA. Externalities and energy policies:The life cycle Analysis Approach. 2002.	improvements in the text
Timm Zwickel (IPCC WG III)	10	-	-	-	-	10.4.2	-	-	As the points raised in this section are very important whenever the cost curves are discussed, it would be very valuable to produce a figure summing up this section, so that not only the curves are available in such a format.	a figure or box summarizing the advantages and disadvantages of cost curves can only be provided if space constrains allow
¿vind Christophersen (Climate and Pollution Agency)	10	-	-	-	-	10.5.2	-	-	Fix figure references in text (lack section numbers).	text will be revised
United States (U.S. Department of State)	10	-	-	-	-	10.5.2	-	-	There needs to be better definition around 'production cost' relative to 'purchase or installation cost.' The terms "purchase and installation cost" are not used when talking about competitive markets.	text will be revised
massimo tavoni (FEEM and CMCC)	10	-	-	-	-	10.6.2	-	-	Most of the co-benefits summarized arise when fossil fuels are replaced with non-emitting sources. Thus, they are not exclusive to RE	The text will be improved
Emmanuel Branche (Electricité de France)	10	-	-	-	-	10.6.2	-	-	Refer to environmental and social section of the different technology chapters, rather than simplifying and writing wrong/biased elements. Most of the time for each impact there is a mitigation measure that will reduce this impact, and that may in some cases result in positive impacts. But all the mitigation and positive impacts are not written in this section	Accepted
Gunnar Luderer (Potsdam Institute for Climate Impact Research)	10	-	-	-	-	10.5.3	-	-	This is a very nice and informative overview of learning investments. The author makes the case that optimal policy strategies need to address both the market failures from pollution and the market failures associated with innovation. It is important to note that the market failure with respect to innovation hinges critically on the appropriability of innovation benefits by the innovating firm. If spillovers to other firms exists, this gives rise to a market failure and makes the case for technology policy. It is my impression that it is notoriously difficult to measure the appropriability, and I am not aware of any studies that looked at this. It would be worthwhile mentioning this in the knowledge gaps section.	the knowledge gap paragraph will be extended accordingly

Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table Info	Comments	Consideration by writing team
Greece (National Observatory of Athens)	10	-	-	-	-	10.6.3	-	10.6.1	I think that some modifications / completions are necessary for this Table. Specifically: - The table does not provide any information for large hydro and nuclear power plants. - To my understanding some of the externalities attributed to the RES technologies are based on a Life Cycle Assessment Approach. It should be clarified if the same approach has been followed in the fossil-fired technologies included, taking also into account all the stages of the corresponding fuel cycle (i.e. fuel extraction, fuel transportation, etc.). - According to the table, the health damages attributed to PV are more or less at the same level with the health damages associated with fossil-fueled power technologies. The results of some recent studies (e.g. the CASES project) identify that health damages associated with PV construction are very important, however significant lower (almost the half) compared with those associated with existing fossil-fueled power technologies and especially oil, coal and lignite.	Table is being deleted
Timm Zwickel (IPCC WG III)	10	-	-	-	-	10.3.4	-	-	As this section computes and presents abatement potential and as there is in the context of the abatement curves extensive critique on this (see discussion in 10.4) it might be good to discuss those aspects that apply to the method applied here here (e.g. uncertainty about future fossil fuel use).	text will be revised
Supachai Panitchpakdi (United Nations Conference on Trade and Development)	10	-	-	-	-	10.4.4	-	-	Section 10.4.4 can be deleted or reduced to one paragraph. While the section has an important objective, it does not identify any hard facts which could be useful for policy makers. This is even mentioned by the authors on p. 58/89, lines 18-21, where they say that a comparison of the cost curves has severe limitations due to methodological restrictions. If they should not be used for comparison, as suggested by the authors, they should not be dealt with in exactly this manner and it is better to reduce section 10.4.4 just to the last paragraph (line 17-24).	The main report is prepared for a broader audience than just policy makers, also for specialists. Furthermore, the discussion of technology specific cost curves links chapter 10.4 aspects with the technology chapters. an assessment needs to discuss pro and cons of methods as well as results. It is very policy relevant to clearly point out limitations of certain methodologies, since they may be used for policy advise.
Jussi Uusivuori (Finnish Forest Research Institute Metla)	10	-	-	-	-	10.5.5	-	-	In the following text (pages 68-69): "Whereas RD&D funding is appropriate for infant technologies, market entry support and market push programs (e.g., via norms,feed-in tariff, renewable quota schemes, tax credits, bonus and malus systems) are the appropriate tools in the deployment and commercialization phase (Foxon, 2005; González, 2008). A detailed description of these programs can be found in Chapter 11." Is it the purpose that the term 'market push programs' should read: 'market pull programs'?	correct, "market pull" will be used
Timm Zwickel (IPCC WG III)	10	-	-	-	-	10.3.6	-	-	Add the lack of in-depth model comparison analysis (by region, by technology) that would have been of great benefit for this section and now had (actually still: has) to be done by the IPCC	Accepted
Gerrit Hansen (TSU)	10	-	-	-	-	10.3.6	-	-	Chapter 3 (in the introductory part of 3.9) discusses unsatisfying representation of stand alone solar electricity and low temperature solar thermal generation. please consider to include the difficulty of includign distributed generation in general into the knowledge gaps section.	comment does not belong to chapter 10
Gunnar Luderer (Potsdam Institute for Climate Impact Research)	10	-	-	-	-	10.5.6	-	-	Another crucial issue that should be mentioned in the knowledge gaps section is that of optimal timing of RD&D vs. market programs. Should they be fully sequential (first RD&D, then market pull), or is it necessary to have a phase of market deployment paralleled by further RD&D efforts?	the knowledge gap paragraph will be extended accordingly

Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table Info	Comments	Consideration by writing team
Frank Krysiak (University of Basel)	10	-	-	-	-	-	6.1	-	This figure depicts only one possible case and is a bit suggestive. Either more cases (with contrasting conclusions) should be depitcted or the figure should be based on actual data. Furthermore, as argued above it seems a bit implausible that external benefits are that large compared to private benefits.	fig deleted
Timm Zwickel (IPCC WG III)	10	-	-	-	-	-	10.1.1	-	¿Average supply costs¿ should refer to 10.4 instead of 10.3	Figure is correct. But it will be deleted
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	10	-	-	-	-	-	10.1.1	-	Layout of figure needs refinement.	Figure will be deleted
United States (U.S. Department of State)	10	-	-	-	-	-	10.1.1	-	Recommend deleting chart, it is explained adequately in the text.	Figure will be deleted
Timm Zwickel (IPCC WG III)	10	-	-	-	-	-	10.1.1	-	The general idea of this figure is very good. The meaning of the arrows is unclear, though, esp. of the second one. Maybe have an arrow indicating sequence running through at the very left, then on top of each other the two blue boxes and left of the boxes what is resp. currently beneath them; instead of dashed for the issues covered in the resp. sections use the section number in the beginning	Figure will be deleted
Timm Zwickel (IPCC WG III)	10	-	-	-	-	-	10.2.1	-	the past should not be in the color as one of the categories, so maybe use blue instead of black	We will change the color of historic data or introduce a dotted/dashed line.
Timm Zwickel (IPCC WG III)	10	-	-	-	-	-	10.3.1	-	for PV 2050 add the Twh/y value to the bar as it is cut off	Accepted
Gunnar Luderer (Potsdam Institute for Climate Impact Research)	10	-	-	-	-	-	10.3.1	-	Numbers for ReMIND-RECIPE are 0 for biomass, but shouldn't be.	Accepted
Timm Zwickel (IPCC WG III)	10	-	-	-	-	-	10.4.1	-	As the figure is of very poor quality and will need to be redrawn completely, please contact the creators and either provide the data or a vector graphic version of the figure to the TSU.	OK, if the figure stays, I will, but if it stays in the bioenergy chapter, it will be deleted in ours.
Gerrit Hansen (TSU)	10	-	-	-	-	-	10.4.1	-	figure is also included in the bioenergy chapter (figure 2.2.5), please reconcile which chapter uses the figure and which includes a reference.	Thanks for the great point! We delete the figure and just cross-reference it if it stays in the bioenergy chapter.
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	10	-	-	-	-	-	10.4.1	-	Layout of figure needs refienement. Additional information in legend would be highly recommendable.	Such as what additional info? This is all the info also in the original article.
Gunnar Luderer (Potsdam Institute for Climate Impact Research)	10	-	-	-	-	-	10.5.1	-	A range of 4-14ct per kWh is given for LCOEs of conventional power technologies. Doesn't the high end correspond to dispatchable peak load technologies such as gas turbines. I wonder if it is appropriate to compare LCOEs for mostly non-dispatchable, fluctuating RE supply technologies with such peak load technologies.	the shaded area will be removed.
United States (U.S. Department of State)	10	-	-	-	-	-	10.5.1	-	All the options are RE but the caption refers to conventional technologies (including nuclear, gas, coal). But coal, gas, and nuclear were not found in this chart.	as the shaded area will be removed, the comment is obsolete
Osamu Kimura (Central Research Institute of Electric Power Industry)	10	-	-	-	-	-	10.5.1	-	Cost estimates should not assume any future carbon price. Carbon prices should be treated separately.	the shaded area will be removed.

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)	10	-	-	-	-	-	10.5.1	-	It is unclear why there is an assumed carbon price included for OECD countries. There data should be presented without a carbon cost. If a carbon cost is included, that specific cost should be broken out and distinguished to the reader in order to be able to compare costs independent of policy.	the shaded area will be removed.
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	10	-	-	-	-	-	10.5.1	-	Use different colours for "LCOE of conventional technologies (nuclear, gas, and coal)" and the different RES, add unit (US Cent/kWh) of x-axis.	the shaded area will be removed.
United States (U.S. Department of State)	10	-	-	-	-	-	10.6.1	-	Levelized cost of electricity should be added as the first row. Also, the table should reflect values from the recent US Government assessment of SCC.	figure deleted
Marc Darras (GDF SUEZ)	10	-	-	-	-	-	10.6.1	-	This presentation of an a priori vision of RE is not beneficial to the demonstration and is not needed at this stage. It could be done on the basis of 10.6.3 for example and the cost of the various energy source. Furthermore the question of private benefits and costs are complicated by the impact of policies both for conventional and renewable energy forms. This graph could be used with energy at large and giving the different class of externalities depending if they are in the economic or social or environmental at large sphere.	see previous comments
Timm Zwickel (IPCC WG III)	10	-	-	-	-	-	10.2.2	-	In caption it says also ¿2100¿ which, though I recommended it to be included in an above comment, is currently not shown and hence should be removed from the caption, too	Will be removed.
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	10	-	-	-	-	-	10.2.2	-	Poor readability of figure. In the legend the years 2030, 2050 and 2100 are mentioned. Correct? Either figure for 2100 is lacking or the year "2100" should be left out as in following tables.	2100 will be removed from the caption. We will try to improve readability of the figures. Note, however, that space limitations impose restriction on figure sizes as well.
United States (U.S. Department of State)	10	-	-	-	-	-	10.2.2	-	The caption refers to a vertical black line, but the line is actually horizontal	Will be changed.
United Kingdom (Department of Energy and Climate Change)	10	-	-	-	-	-	10.4.2	-	There is rather more up to date literature on the abatement potential in the UK than the sources shown in the table. For example, a useful source is the Committee on Climate Change first report from December 2008, at the following link: http://www.theccc.org.uk/reports/building-a-low-carbon-economy .	Thanks, the figures will be used! (although this refers to the table 10.4.2 I think)
Timm Zwickel (IPCC WG III)	10	-	-	-	-	-	10.4.2	-	As the figure is of very poor quality and will need to be redrawn completely, please contact the creators and either provide the data or a vector graphic version of the figure to the TSU.	OK, if the figure stays, I will.
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	10	-	-	-	-	-	10.4.2	-	Figure should be in colour for clarity reasons.	Unfortunately this is how it is in the original source. The writing team hopes that the final figure will look better provided new formatting by the publisher together with the TSU
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	10	-	-	-	-	-	10.5.2	-	Amplify panels for clarity reasons. Add unit (USD2005/kWh) of y-axis.	diagrams will be amplified
United States (U.S. Department of State)	10	-	-	-	-	-	10.5.2	-	Caption refers to discount rate, while title refers to interest rate	discount rate will be used consistently
United States (U.S. Department of State)	10	-	-	-	-	-	10.5.2	-	Please redo the charts so both have the same y-axis scale (and delete reference to different scales in caption). Easier to compare. Also, please convert to a single common unit for LCOE. This chart uses $/kWh. Figure 10.5.1 uses cents/kWh, table 10.5.1 uses $/MWh. This will confuse the reader.	a common unit will be used

Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table Info	Comments	Consideration by writing team
Timm Zwickel (IPCC WG III)	10	-	-	-	-	-	10.2.3	-	past in blue (see comment above)	We will change the color of historic data or introduce a dotted/dashed line.
Timm Zwickel (IPCC WG III)	10	-	-	-	-	-	10.3.3	-	the caption is not clear, which bars are showing ¿RE development projections¿ and which ones ¿renewable primary energy shares¿? I would expect the latter to be in percent, but there is nothing in percent	Accepted
Timm Zwickel (IPCC WG III)	10	-	-	-	-	-	10.4.3	-	As the figure is of very poor quality and will need to be redrawn completely, please contact the creators and either provide the data or a vector graphic version of the figure to the TSU.	OK, if the figure stays, I will.
Timm Zwickel (IPCC WG III)	10	-	-	-	-	-	10.3.4	-	as color code please use similar colors for the same model	Good idea!
Emmanuel Branche (Electricité de France)	10	-	-	-	-	-	10.3.4	-	Figures 10.3.4, 10.3.5 and 10.3.6 are very interesting, however they are not easy to read. Maybe they can be splitted by reference year (and 2030 removed from those figures as the title only refers to year 2050)	Unfortunately there is no space for splitting them. Also, not sure what is meant by "reference year".
United States (U.S. Department of State)	10	-	-	-	-	-	10.3.4	-	It is recommended that the same y-axis scale for all three Figures (10.3.4, 10.3.5, and 10.3.6) be used. This would help the comparison across regions.	While it is a nice idea, due to space constraints that would make the curves with lower costs much more un-navigable. Comparisons can still be made, since the numbers are marked.
Timm Zwickel (IPCC WG III)	10	-	-	-	-	-	10.3.4	-	the curves are hard to read; readability will be greatly improved by removing the line markers (square, triangle, circle)	well, these markers distinguish the lines on black-and-white copies, so I would prefer to keep them. I also doubt that that would help readibility.
Timm Zwickel (IPCC WG III)	10	-	-	-	-	-	10.4.4	-	As the figure is of very poor quality and will need to be redrawn completely, please contact the creators and either provide the data or a vector graphic version of the figure to the TSU.	OK, if the figure stays, I will.
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	10	-	-	-	-	-	10.4.4	-	Ibid.	layout will be revised
United States (U.S. Department of State)	10	-	-	-	-	-	10.4.4	-	The lines are difficult to distinguish	OK, I will try to add connecting lines between the legend and the lines
Timm Zwickel (IPCC WG III)	10	-	-	-	-	-	10.4.5	-	As the figure is of very poor quality and will need to be redrawn completely, please contact the creators and either provide the data or a vector graphic version of the figure to the TSU.	OK, if the figure stays, I will.
United States (U.S. Department of State)	10	-	-	-	-	-	10.4.5	-	Unless the takeaway is made clearer in the text and this figure, it should be deleted. One of the reasons this figure is unclear is that these costs seem questionable and low. In addition, this is the only chart that uses Euro per kilowatt hour. All other charts use $ per kilowatt hour.	we do not ignore or delete figures because some readers find the costs "too low"; if it is from robust literature. We review curves for all RES technologies that exist; and refer to the source.
Gunnar Luderer (Potsdam Institute for Climate Impact Research)	10	-	-	-	-	-	10.4.5	-	Why are costs in shallow offshore wind sights higher than for higher depths? My understanding a lot of the costs for offshore wind comes from the problems of dealing with the grounding of turbines in deep water.	there is no space to provide such explanations; it should be the wind chapter to do so.
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	10	-	-	-	-	-	10.5.5	-	Figure needs refinement. Panel a): Give numbers for share of "S/RP, corp. RD&D, gov. R&D" and "financial investment".	comment is too specific
Timm Zwickel (IPCC WG III)	10	-	-	-	-	-	10.2.6	-	caption: move the word ¿scenarios¿: ¿... by 2050 in scenarios constrained in the technology compared to ...¿	Will be adjusted.
United States (U.S. Department of State)	10	-	-	-	-	-	10.2.6	-	Clarify the term "standard"	We will link the term in a clearer way to Table 10.2.1. Standard refers to the technology assumptions made in the respective 1st-best climate mitigation case.
Timm Zwickel (IPCC WG III)	10	-	-	-	-	-	10.2.6	-	each technology should have a differently colored bar, so that the same tech can be compared quicker across scenarios	Will be changed.
Timm Zwickel (IPCC WG III)	10	-	-	-	-	-	10.2.6	-	for better readability swap CSS and nuclear everywhere, as with one exception the latter is smaller	We will consider changing the order of the technology restrictions.

Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table Info	Comments	Consideration by writing team
Timm Zwickel (IPCC WG III)	10	-	-	-	-	-	10.2.6	-	insert ¿x¿ where the scenario was not done to make it distinguishable from 0%	There are no 0% increases in this set of scenarios, however, we will add marks that allow to distinguish "scenario was attempted, but turned out to be infeasible" and "scenario was not attempted".
massimo tavoni (FEEM and CMCC)	10	-	-	-	-	-	10.2.6	-	Results from the RECIPE model intercomparison exercise are shown for both RE-MIND and IMACLIM-R, but not for WITCH, which also participated in the same analysis. Too much emphasis is given to one model (RE-MIND), which is featured twice. Similarly, why is only MESSAGE reported from the EMF22. By showing only a small subset of models, the analysis is not robust. do the other EMF22/RECIPE/ADAM etc. models find similar results?	The models reported in Figure 10.2.6 represent the set of scenarios that was available at the time of the FOD (December 2009). Unfortunately, we forgot to add additional model runs that were made available thereafter, but do so for the final revision of the SRREN. EMF22 did not include any co-ordinated set of restricited technology scenarios and therefore a broader coverage of models from EMF22 as for ADAM or RECIPE was not possible.
Timm Zwickel (IPCC WG III)	10	-	-	-	-	-	10.2.6	-	What is the difference between ReMind in Recipe and Adam that the 450ppm from Recipe does not have values somewhere between Adam 400 and 550? This should probably be mentioned somewhere, as I will not be the only one who stumbles across it.	We will add a note, either here or in the vicinity of Figures 10.2.12/13 which show results from ADAM and RECIPE and cross-reference to that.
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	10	-	-	-	-	-	10.5.6	-	Figure layout needs refinement.	layout will be revised
United States (U.S. Department of State)	10	-	-	-	-	-	10.5.6	-	Labels are not legible. Everything is too small.	layout will be revised
Gunnar Luderer (Potsdam Institute for Climate Impact Research)	10	-	-	-	-	-	10.5.6	-	The ReMIND-RECIPE scenario used is one that does allow for CCS and nuclear. The caption needs to be adjusted.	capation will be revised
Timm Zwickel (IPCC WG III)	10	-	-	-	-	-	10.2.7	-	change the y-axis to REN/LCE (%) - this has the great advantage that the upper left half of the figure will not be wasted and the information that is of most interest can be grasped much easier	Such a version of the figure was considered, but shares have the disadvantage of hiding the absolute dimension of the RES deployment. A dual approach of showing both versions of the figure would be preferable, but is not feasible given space constraints.
Timm Zwickel (IPCC WG III)	10	-	-	-	-	-	10.2.7	-	use other color than purple so that it can be distinguished better	Colors will be adjusted.
Timm Zwickel (IPCC WG III)	10	-	-	-	-	-	10.3.7	-	as the amount of total RE is a subset of primary energy demand, the RE bars should be in the PE bars ¿ this will improve reading and allow more space; the legend explaining the red line is missing in the very same figure in the technical summary (TS.10.5); please remove gradient from yellow/green bars, as this renders no information and might be interpreted as being suggestive	Figure will be edited
Timm Zwickel (IPCC WG III)	10	-	-	-	-	-	10.3.7	-	the caption misses information about IEA WEO 2008	Accepted
United States (U.S. Department of State)	10	-	-	-	-	-	10.3.7	-	Use of commas and periods incorrect	will be edited by TSU
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	10	-	-	-	-	-	10.5.7	-	Ibid.	I do not understand this comment.
United States (U.S. Department of State)	10	-	-	-	-	-	10.2.8	-	Both charts need legible y-axis	The error appeared in the collation of the SOD version for review and will be fixed in the final revision.
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	10	-	-	-	-	-	10.2.8	-	Figure layout needs refinement (e.g. right side of 2030 scenario).	The error appeared in the collation of the SOD version for review and will be fixed in the final revision.
United States (U.S. Department of State)	10	-	-	-	-	-	10.2.8	-	Figures need labels on the axes.	The error appeared in the collation of the SOD version for review and will be fixed in the final revision.

Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table Info	Comments	Consideration by writing team
Gerrit Hansen (TSU)	10	-	-	-	-	-	10.2.8	-	scale missing	The error appeared in the collation of the SOD version for review and will be fixed in the final revision.
Timm Zwickel (IPCC WG III)	10	-	-	-	-	-	10.2.8	-	There is some easy way to improve the readability of this type of otherwise very good graph. Instead of color coding the ranges by technology, the technologies should each be written at the top of the ¿columns¿ with the two bars for each technology. The area where the two bars are located could be given an individual background color. This would enable us to color the bars themselves in two colors (Annex I, Non-Annex I), thus making the x-axis superfluous. With the graphic designer there should eventually be a discussion about how to improve the design of the boxes and whiskers.	Adding RES names at the bottom (or top) is an option that can be discussed with the graphics designers.
United States (U.S. Department of State)	10	-	-	-	-	-	10.2.8	-	Vertical axis is missing units and label. Why are there two bars in each figure for each technology?	The error appeared in the collation of the SOD version for review and will be fixed in the final revision.
Timm Zwickel (IPCC WG III)	10	-	-	-	-	-	10.3.8	-	do not use color gradients for clarity	Accepted
Timm Zwickel (IPCC WG III)	10	-	-	-	-	-	10.3.8	-	Please add an ¿x¿ at each technology which a scenario did not take into account.	new graph will be done
United States (U.S. Department of State)	10	-	-	-	-	-	10.3.8	-	Please correct the use of commas and periods	will be edited by TSU
Timm Zwickel (IPCC WG III)	10	-	-	-	-	-	10.3.8	-	use Gt and not million on y-axis for better readability, same for 10.3.9, 10.3.10	Accepted
Timm Zwickel (IPCC WG III)	10	-	-	-	-	-	10.2.9	-	A redesign along the lines suggested for 10.2.8 would be good: Remove x-axis, shade three areas differently for years 2020, 2030, 2040, with these as labels at top. Give each graph a label at top (e.g. ¿wind¿), so that it can be easier seen what each graph is about and the small y-axis label has not to be read. Consider offsetting the electricity supply graph by giving it a different background altogether, so that it is not mistaken to show the same as the other graphs.	We could introduce a separating line between the 2020, 2030 and 2050 boxes in the individual panels of 10.2.9. As figures have already been supplied to the graphics designers, this will need to be discussed with them.
United States (U.S. Department of State)	10	-	-	-	-	-	10.2.9	-	All charts need legible y-axis	The error appeared in the collation of the SOD version for review and will be fixed in the final revision.
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	10	-	-	-	-	-	10.2.9	-	Figure layout needs refinement (e.g. "Global Wind Primary Energy Supply [EJ/y] axis description is left out. Alignement of tables.)	The error appeared in the collation of the SOD version for review and will be fixed in the final revision.
United States (U.S. Department of State)	10	-	-	-	-	-	10.2.9	-	Figure need labels for the axes.	The error appeared in the collation of the SOD version for review and will be fixed in the final revision.
United States (U.S. Department of State)	10	-	-	-	-	-	10.2.9	-	No vertical axis or labels. No designation of which graph is for which technology. Why are there three sets of bars in each graph?	The y-axis disappeared in the final processing of the SOD version for review and will be fixed in the final addition. Generally, y-axis labels are pretty explicit where shown, but in addition, a numbering of panels will be introduced to better match panels with captions. The three sets of bars refer to different years as plotted on the x-axis and for each year distinguish Baseline and two levels of stabilization scenarios. This will be improved in the final version of the figure.
Gerrit Hansen (TSU)	10	-	-	-	-	-	10.2.9	-	scale missing	The error appeared in the collation of the SOD version for review and will be fixed in the final revision.
Timm Zwickel (IPCC WG III)	10	-	-	-	-	-	10.3.9	-	do not use color gradients for clarity	Accepted
Timm Zwickel (IPCC WG III)	10	-	-	-	-	-	10.3.9	-	Please add an ¿x¿ at each technology which a scenario did not take into account.	Accepted

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)	10	-	-	-	-	-	10.3.9	-	Please correct the use of commas and periods	will be edited by TSU
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	10	-	-	-	-	-	10.2.10	-	Amplify figure for better readability. Add year (2020 / 2040) in legend of axis.	We will remove the figure
United States (U.S. Department of State)	10	-	-	-	-	-	10.2.10	-	Caption: ....(N.T.E) in the before 2100. The end of the caption is unclear. What does "in the before 2100" refer to? Incomplete sentence perhaps?	We will remove the figure
Timm Zwickel (IPCC WG III)	10	-	-	-	-	-	10.2.10	-	Label each graph with ¿2020¿ and ¿2040¿ respectively and delete the description from the caption. Circles in this graph overlap though they do not need to as within a column there is plenty of space to move sideways. As for what is discussed about this graph the difference between NTE and OS is irrelevant, this should be considered to be lumped together. Remove ¿in the¿ in last line of caption. Explain in caption what the y-axis change is relative to.	We will remove the figure
United States (U.S. Department of State)	10	-	-	-	-	-	10.2.10	-	Need more definition of ¿not-to-exceed¿ and ¿overshoot¿. Why are these China results relevant?	We will remove the figure
Timm Zwickel (IPCC WG III)	10	-	-	-	-	-	10.3.10	-	display the full error bars	new graphs will be added
Timm Zwickel (IPCC WG III)	10	-	-	-	-	-	10.3.10	-	do not use color gradients for clarity	Accepted
United States (U.S. Department of State)	10	-	-	-	-	-	10.3.10	-	Please correct the use of commas and periods	Accepted
Marc Darras (GDF SUEZ)	10	-	-	-	-	-	10.3.10	-	The title should read: Annual global CO2 savings from RE"in the electricity production sector" for ...	see above - new calculation
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	10	-	-	-	-	-	10.2.11	-	Figure layout needs refinement. Add "2010" above figure about Gross World Product. Both figures not reader-friendly, especially the one about carbon price. Amplify or redesign for clarity reasons.	We aim at improving readability of the figure. Note that all figures will be layouted by graphics designer for the final report. Adding 2010 above the GWP figure seems inappropriate given that it shows a time series and not a snapshot for a given period.
United States (U.S. Department of State)	10	-	-	-	-	-	10.2.11	-	Has world GDP chart with no explanation/description	The caption includes information on the GWP and it corresponds to the same scenario set which is analyzed in Seciton 10.2. The figure will, however, be redesigned for better readibility. In case not significant improvement is made, the figure will eventually be deleted.
Timm Zwickel (IPCC WG III)	10	-	-	-	-	-	10.2.11	-	This spaghetti is so indistinguishable, that it should be removed. In the text it should instead be stated that they all have an above linear growth in common and the source where this graph can be looked up should be referenced.	We will look into possibilities to better present the data underlying Figure 10.2.11 and eventually remove the figure in case no significant improvement can be made
Timm Zwickel (IPCC WG III)	10	-	-	-	-	-	10.3.11	-	make transparent how you computed the annual mitigation potential, i.e. what pathways you assumed, maybe this can be provided by a function or table in a footnote; as the error bars in Fig.10.3.10 are so great I wonder whether they are not quite small here ¿ make transparent how you derived them	explaination will be added
United States (U.S. Department of State)	10	-	-	-	-	-	10.3.11	-	The uncertainty range for 2050 seems to be too small. Please verify.	explaination will be added
Timm Zwickel (IPCC WG III)	10	-	-	-	-	-	10.2.12	-	use different coloring, maybe explain what each bar means by referencing one set directly instead of doing it via a legend	The figure is directly copied from the ADAM overview paper (Edenhofer et al, 2010) and could be improved for the SRREN.
Timm Zwickel (IPCC WG III)	10	-	-	-	-	-	10.2.13	-	maybe explain what each bar means by referencing one set directly instead of doing it via a legend	We will look into possibilities to improve the figure with the help of the graphics designer of the SRREN.
United States (U.S. Department of State)	10	-	-	-	-	-	10.2.13	-	This figure does not appear to have a reference in the text body	The reference appears to have been lost in the final editing. We will fix this.

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)	10	-	-	-	-	-	-	10.3.1	In the column "Range of Estimates": are the ranges for the entire period (2020-2050) or is this the range in 2050 only? Also, the first footnote seems to be cut off at the end - please verify	Accepted
United States (U.S. Department of State)	10	-	-	-	-	-	-	10.3.1	Range of estimates does not specify the year of the estimates. If they are for all years there is an inconsistency in that the low end of the PV range is 1338 EJ/yr, while the 2020 estimate for Krewitt is 1126, i.e. less than the lower end of the range.	potential are discussed in chapter 1
Timm Zwickel (IPCC WG III)	10	-	-	-	-	-	-	10.3.1	This table can also be found in Chapter 1 (Table 1.3) and the TS (TS.1.1) and SPM (SPM.4.1). I suggest to remove this table from here and to only have it in Chapter 1. It should then be referenced and discussed here ¿ if needed. Before removing the table please provide all information collected here to Chapter 1, as though the tables seem to have the same origin, they have forked and developed differently. In the columns ¿Range of Estimates¿ this table should give the full range that is found in the report, not just Krewitt, 2009. It should be discussed why this figure gives the Technical Ressource Potential particularly for the Krewitt paper.	rejected - as you´ll loose the overview
United States (U.S. Department of State)	10	-	-	-	-	-	-	10.3.1	This table is a partial copy of the three Tables (SPM 4, TS 1.1 and 1.3). The first three tables are identical. All of the Tables, including Table 10.3.1, references ¿Krewitt et al. (2009),¿ However, there is no mention of this reference in the text of Chapter 10. The text of Section 10.3.1 does not include an explanation of why the data from Krewitt et al, (2009) is used in Table 10.3.1 rather than the other references that are included in the text. Such an explanation should be included. Also, Table 10.3.1 is a partially edited copy of the three Tables. An explanation should be provided as to why edits were made to Table 10.3.1 compared to the other three tables. Specifically the Range of Estimates data and Sources for Biomass Energy Crops and Biomass Residues. Also, it appears that the Wind On-shore data for 2020 and 2030 was transposed in Table 10.3.1 compared to the other three similar tables. Also, the Chapter 10 Reference section includes a Krewitt (2009) source that does pertain to the topic of Table 10.3.1.	Accepted
Timm Zwickel (IPCC WG III)	10	-	-	-	-	-	-	10.4.1	caption: define TPES either here or on glossary	TPES is important enough that it must be in our glossary
United States (U.S. Department of State)	10	-	-	-	-	-	-	10.4.1	In some categories, Total RES is ranked from high to low cost, in others from low to high (e.g., Global Wind goes from <100 to <40 while Global Former USSR goes from <70 to <100). Suggest to make the entire table consistent and always use the same ranking.	good point, will be changed.
Gunnar Luderer (Potsdam Institute for Climate Impact Research)	10	-	-	-	-	-	-	10.4.1	It should be indicated if potentials reflect proximity to demand centers, or if costs reflect transport costs to demand centers	while it is a good point (not only for this figure, but for all the figures and tables basically in the chapter….), unfortunately most studies do not document this properly so this is not possible.
United Kingdom (Department of Energy and Climate Change)	10	-	-	-	-	-	-	10.4.1	there is a fairly up to date study from Mott Macdonald on renewable (and other) electricity generation costs: http://www.decc.gov.uk/assets/decc/statistics/projections/71-uk-electricity-generation-costs-update-.pdf	The table is not about generation costs, but about potentials as a function of cost.

Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table Info	Comments	Consideration by writing team
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	10	-	-	-	-	-	-	10.5.1	Amplify table to make it more reader-friendly.	table size will be extended
Netherlands (KNMI (Royal Dutch Meteorological Institute))	10	-	-	-	-	-	-	10.5.1	Neglects some of the ocean technologies listed in Chapter 6 For example tidal rise and fall is quoted within the chapter as having a very large capacity under consideration but isn't listed here? Also I believe the numbers quoted for wave and tidal are not IPCC 2010 derived values, but just Carbon Trust numbers in Chapter 6 converted to US$. Please check this.	table will be extended if hydro chapter confirms this
Robert Pietzcker (PIK)	10	-	-	-	-	-	-	10.5.1	Use a default of 7% discount rate for LCOE calculations ¿ by now, direct private investment into renewables has become widespread among normal citizens. This decreases the cost of capital for such projects, leading to much lower average discount rates than the 10% discount rate normally used by individual large energy companies.	The table uses 10% in order to allow a comparison with IEA data. The effect of different discount rates is shown in figure 10.5.2
Gunnar Luderer (Potsdam Institute for Climate Impact Research)	10	-	-	-	-	-	-	10.5.1	Why is a default discount rate of 10% used? If the discount rate is 10% in real terms, it corresponds to a 12% or so nominal interest rates, which seems rather high and tends to make capital intensive technologies less attractive.	the rationale behind selecting 10% will be explained
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	10	-	-	-	-	-	-	10.2.2	Table layout needs refinement.	The final layout will be taken care of by specialists.
Timm Zwickel (IPCC WG III)	10	-	-	-	-	-	-	10.3.2	There is a contradiction in the table, as ER2010 has a RE share in 2050 of 80% which is outside of the range given for ¿all¿. This is due to ER2010 not being part of the assessment done in 10.2. As 10.3 is supposed to be a deep dive into what is more generally discussed in 10.2, it is not an option to assess a scenario here that has not been included in 10.2.	Accepted
United States (U.S. Department of State)	10	-	-	-	-	-	-	10.5.2	Please ask the authors of the solar chapter to provide more recent data than 2001 for CSP, it is a noticeable gap for a rapidly changing sector.	the data will be checked
Jussi Uusivuori (Finnish Forest Research Institute Metla)	10	-	-	-	-	-	-	10.5.2	The referred source: "Junginger, et al., 2005b" is not included in the literature list.	will be included
United States (U.S. Department of State)	10	-	-	-	-	-	-	10.5.2	Updated numbers from USA can be found from the USDOE Energy Information Administration's Annual Energy Outlook 2010 at: http://www.eia.doe.gov/oiaf/aeo/index.html and the world numbers from the International Energy Outlook 2010 at: http://www.eia.doe.gov/oiaf/ieo/index.html	new numbers will be considered for inclusion
Robert Pietzcker (PIK)	10	-	-	-	-	-	-	10.5.2	what discount rate is used here? Use 7% as default (see comment for figure 10.5.1 for the reasons)	learning rates are not dependent on discount rates
United States (U.S. Department of State)	10	-	-	-	-	-	-	10.3.3	- The table uses commas and periods in a way that is inconsistent with the text body. Text uses periods for decimals, table uses commas. - Check the numbers for Generation above the yellow line. - Use NA in all places. There are blank spots in the tab	TSU will edit
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	10	-	-	-	-	-	-	10.3.3	Amplify table to make it more reader-friendly.	r - doesn´t work - A4 remains A4
Timm Zwickel (IPCC WG III)	10	-	-	-	-	-	-	10.3.3	Shouldn't heading be ¿Annual Market Volume Increase¿ instead of ¿Annual Market Volume¿?	r - no the heading is correct

Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table Info	Comments	Consideration by writing team
Gunnar Luderer (Potsdam Institute for Climate Impact Research)	10	-	-	-	-	-	-	10.3.3	The bioenergy electricity generation for ReMIND-RECIPE should be attributed to heat&power. I would certainly be available for any further clarifications with respect to the ReMIND-RECIPE data, if necessary.	Accepted
Timm Zwickel (IPCC WG III)	10	-	-	-	-	-	-	10.3.3	The table provides an encompassing overview over the 4 scenarios but is very hard to access; maybe parts of it can be converted to a figure without needing much more space; by using color coding for the resp. scenarios, the table could be made more accessible, too	a table will not be easier to read - too man informations
United States (U.S. Department of State)	10	-	-	-	-	-	-	10.3.4	Change use of commas and periods to be consistent with the main text body. Also, the blank spots in the table - are they NA?	Accepted
Gunnar Luderer (Potsdam Institute for Climate Impact Research)	10	-	-	-	-	-	-	10.3.4	The bioenergy heating numbers for ReMIND-RECIPE do not agree with those submitted by us. Needs to be double-checked.	will be checked
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	10	-	-	-	-	-	-	10.3.5	Amplify table in order to make it more reader-friendly.	it is not clear to which table this comment refers
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	10	-	-	-	-	-	-	10.3.6	Presents an overview of the relation between the primary energy contribution of RE and the corresponding technical potential by region and technology. Would it not be better to compare the primary energy contribution and the market potential as this is a more realistic assessment?	will be rewritten
United States (U.S. Department of State)	10	-	-	-	-	-	-	10.3.6	Use of comma and periods inconsistent with text.	Accepted
Emmanuel Branche (Electricité de France)	10	-	-	-	-	-	-	-	Boxes 10.2 and 10.3 are referenced in the text, but are missing in this SOD version. To be checked	An error in the compilation of the SOD resulted in Boxes 10.2 and 10.3 being absent from the SOD revision 1 which was fixed in the SOD revision 2 made available on 16 July 2010. Box will return to text
Patrick Matschoss (TSU)	10	-	-	-	-	-	-	-	check definitions in glossary: p. 7, l.19-22; liaise with chapter 1 if not consistent	Will be done
Juan Llanes (Centre for Environmental Studies)	10	-	-	-	-	-	-	-	For the chapter: A difficult chapter. The chapter title suggest an analysis of the mitigation potentials and costs of the possible mitigation effort and not properly and analysis of scenarios. Suggest to change title to ¿trends on mitigation potentials, RE expansion and costs¿. Most of the space for the executive summary and the introduction to the chapter is devoted to scenarios and the rest to other main targets of the chapter: costs, costs curves, and co-benefits. The concept of potentials is missing in the executive summary and the introduction.	Title cannot be changed
Mark Fulton (Deutsche Asset Management, Deutsche Bank)	10	-	-	-	-	-	-	-	General comment: Overall concern of chapter is that the costs of commercialization and deployment are not cross-referenced with the mitigation scenarios. Given the detailed nature of the mitigation scenarios, there is little integration of the costs imbedded in the models. Therefore it is difficult to ascertain how much each given scenario would cost and what will be the barriers to overcome.	discussion will be improved
Mark Fulton (Deutsche Asset Management, Deutsche Bank)	10	-	-	-	-	-	-	-	General comment: There is little discussion of the cost benefit analysis of choosing one scenario over another. While scenario building is important, the chapter does not describe optionality of pathways.	we will clarify that there is broad variety of possible future paths

Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table Info	Comments	Consideration by writing team
Supachai Panitchpakdi (United Nations Conference on Trade and Development)	10	-	-	-	-	-	-	-	General Comment: This chapter is not very convincing in terms of conveying a message. A huge number of model simulations is used without identifying why and how they were selected. On that basis, cost curves, which are criticized heavily by the authors themselves, are used and quantitative results are achieved. Quantitative reasoning should be based on a credible model. The general conclusion from the chapter might therefore be the need for such a model.	qualitative and clear storyline why we have chosen thosen these scenarios, will be addressed
Kristie Ebi (Department of Global Ecology)	10	-	-	-	-	-	-	-	Section 10.6.2.2, lines 32-35. This section should refer to the special issue of the Lancet on health co-benefits that was published in November 2009.	Refrence Lancet will be checked
Kristie Ebi (Department of Global Ecology)	10	-	-	-	-	-	-	-	Section 10.6.3, lines 32-43. These paragraphs have no information; the results need to be synthesized and key findings presented.	text will be modified
Antoine BONDUELLE (E&E Consultant)	10	-	-	-	-	-	-	-	The chapter is well designed and gives a broad view of possible policies.	Accepted
Marc Darras (GDF SUEZ)	10	-	-	-	-	-	-	-	This chapter is not easy reading. I reviewed in details FOD and I will below take back some of the comments when pertinent. One way to ease the reading might be to more clearly state the background of the 4 main parts: scenarios, detailed scenarios, cost and barriers, externalities. This will be mentioned in the pertinent section. And should be reflected in the Exec Summary.	This background will be given in 10.3, accepted.
massimo tavoni (FEEM and CMCC)	10	-	-	-	-	-	10.2.2.6	-	Although the authors are right that a rigourous analsys of the role of RE in determining costs is difficult to establish, it is nonetheless possible in specific cases. For example, applying statistical analysis to the EMF22 data base, Tavoni, M., and R. Tol (2010) [¿Counting only the hits: the risk of underestimating the costs of stringent climate policies¿ , Climatic Change 100-769] have quantified the importante of biomass and CCS on the mitigation costs.	will try to use some given sources to discuss this topic in section 10.2
Gunnar Luderer (Potsdam Institute for Climate Impact Research)	10	-	-	-	-	-	10.3.3.	-	Again, the numbers for ReMIND-RECIPE do not agree with the ones submitted by us. Needs to be double-checked.	Accepted
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	10	-	-	-	-	-	10.3.4 - 10.3.6	-	Design of figure very complicated, add "2030" in legends according to title of figures. Wrong numeration of last figure: should be "Figure 10.3.6" instead of "Figure 10.2.6".	done.
Gunnar Luderer (Potsdam Institute for Climate Impact Research)	10	-	-	-	-	-	10.3.8 - 10.3.10	-	Each data point in these graphs has big error bars. What do they refer to? The error bars are not consistent with the range of CO2 emission factors in the text. Needs to be clarified.	calcu
Gunnar Luderer (Potsdam Institute for Climate Impact Research)	10	-	-	-	-	-	10.3.8 - 10.3.10	-	In the scenarios, some bioenergy technology may be deployed in combination with CCS (BECCS). This is a crucial aspect for their deployment in ambitious low-stabilization scenarios. For a consistent analysis, the negative emissions associated with BECCS need to be taken into account.	Will mention (if there is space)

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Supachai Panitchpakdi (United Nations Conference on Trade and Development)	10	-	-	-	-	10.1 and 10.2	-	-	Section 10.1. and 10.2 are talking about the "165 selected scenarios". Neither does it become clear why these 165 have been chosen (or whether this is the total number of scenarios available), on what grounds they were chosen and whether they all can be regarded equally in their scientific value. As a reader, it seems very ad hoc and questionable, using the 165 scenarios in that way. More clarification on the commonalities, differences, selection criteria, and especially the scientific quality of these scenarios would be appropriate. As the distribution of these 165 models is rather wide too, the following discussion on the scenarios is vague, as the 165 scenarios rationalize very diverse conclusions.	The scenario information for the analysis in Chapter 10.2 was collected in an open process via a request to numerous modeling teams to supply detailed renewable energy data for scenarios in the peer-reviewed literature. All scenario data that was submitted in this process was included in the analysis. We will add a note on this process to Section 10.2.2.
United States (U.S. Department of State)						10.2			A lot of text and graphics in sub-sections 10.2.2.2 to 10.2.2.5 that create basis for the whole discussion of the chapter refer to only one source or at the best a couple of sources by the same author. Even though the reviewers understand that the reference provides a comparison of various models, the fundamental premise of IPCC Reports comparing various studies and viewpoints available in multiple literature sources gets lost, in contrast later sub-sections in 10.3 seem to more effectively compare results from various sources.	The scenario information for the analysis in Chapter 10.2 was collected in an open process via a request to numerous modeling teams to supply detailed renewable energy data for scenarios in the peer-reviewed literature. All scenario data that was submitted in this process was included in the analysis. We will add a note on this process to Section 10.2.2.
United States (U.S. Department of State)						10.2			In general, it may be helpful for the scenario-review section of the chapter to focus more on the assumptions that all the scenarios share, but could be wrong.	In order to explore the full scenario space we decided not to focus
Supachai Panitchpakdi (United Nations Conference on Trade and Development)	10	-	-	-	-	10.2.1.2	-	-	As the authors ask for suggestions, how to cut the text, it is recommended to delete chapter 10.2.1.2 entirely, given the report is too long. This is a very general discussion, which does not add much value to the arguments. Overall, Section 10.2. is not very convincing, as the concepts used are questioned considerably at the same time. Using these models further to derive conclusions is then partially questionable. A new model that takes care of some of this criticism might be a more convincing way ahead for future research.	Addressing strength and weaknesses of the presented analysis is mandatory for section 10.2 as well as any other section in the SRREN. While there are naturally numerous unresolved issues in the representation of renewable energy in Integrated Assessment and Energy Economic models, there strength is the integration across different sectors, regions and time scales which more detailed approaches typically lack. However, we deem it necessary to inform the readers also about open issues which are ongoing research activities.
Marc Darras (GDF SUEZ)	10	-	-	-	-	10.2.2.3	-	-	In this section element of GDP growth and energy efficiency could be interesting.	It is agreed that GDP as a main driver for energy service demand and energy efficiency as a means to reduce the final demand for a given energy service demand are both important determinants of the "energy system scale". However, these broader issues cannot be addressed comprehensively within the space limitations of the SRREN, but it was attempted to at least touch upon the issues (e.g. Figure 10.2.11 for GDP).
United States (U.S. Department of State)						10.3			Needs substantial editorial work. Section is difficult to read at times.	Noted.
United States (U.S. Department of State)	10	-	-	-	-	10.3.2.1	-	-	It is hard to distinguish between use of the terms 'manufacturing/production capacity' and 'market penetration', and it is suspected that the term 'manufacturing capacity' is being used incorrectly in some instances.	a - additional sentence added to make it clearer
Timm Zwickel (IPCC WG III)	10	-	-	-	-	10.3.2.1	-	-	subsection ¿Annual market potential for renewable power¿: this section is basically just quoting numbers from the 4 scenarios without any analysis; it is good that these numbers are given in Table 10.3.3, but the text should go beyond, because otherwise the reader will just wonder why are there such different outcomes among the scenarios	add a line why the manufaction capacities are important and if the modells take it into account

Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table Info	Comments	Consideration by writing team
Timm Zwickel (IPCC WG III)	10	-	-	-	-	10.3.2.1	-	-	the subsection ¿factors for market development in the renewable power sector¿ does not contain what is in the title; in this section factors have to be named, then ¿ according to how these factors vary ¿ it has to be described how this effects the outcome; in this section descriptions should probably be qualitative; what the section instead does is to describe how certain assumptions vary ¿ this does not give any insight	add a line why the manufaction capacities are important and if the modells take it into account
United States (U.S. Department of State)	10	-	-	-	-	10.3.2.2	-	-	The discussion should definitely include combined heat and power (or combined heating, cooling, and power) as one aspect of the renewable heating and cooling potential. Geothermal is mentioned explicitly and then relegated to the power section; biomass and CSP opportunities are barely mentioned at all. Especially given the inadequate attention on this sector as it is, and the huge blind-spot that so many analyses have toward non-electric energy use, the report should aim for greater inclusiveness.	Accepted
Timm Zwickel (IPCC WG III)	10	-	-	-	-	10.3.2.3	-	-	as from the 4 scenarios nothing can be inferred about the transport sector, you might want to consider pointing out other parts of the SRREN dealing with transport or reference other studies on transport futures	beyond the scope - further data has not been delivered
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	10	-	-	-	-	10.3.2.3	-	-	Very scarce data about market potential for RES in the transport sectors. As this often the case future research in this field is needed in order to better indentify corresponding chances in this field.	Accepted
United States (U.S. Department of State)	10	-	-	-	-	10.3.2.4	-	-	Three issues merit greater discussion and possibly separate sections - RE in transport section and modeling issues (fuels), electricity sector, and thermal energy.	beyond the scope - further data has not been delivered
Gunnar Luderer (Potsdam Institute for Climate Impact Research)	10	-	-	-	-	10.4.4 and 10.4.5	-	-	Global data sets on deployment potential as a function of energy production costs or other metrics of quality (e.g. capacity factor for wind and solar) are a key requisite for integrated assessment modeling studies. The lack of such comprehensive data sets (with the laudable exception of Hoogwijk data) is striking, and should be clearly pointed out in the section on knowledge gaps.	point added to knowledge gaps section
United States (U.S. Department of State)						10.5			In this section, LCOE is presented in various units ($/MWh, cents/kWh, and even $/kWh). It is suggested to convert all numbers/graphs to ONE unit. This would make comparisons easier.	Accepted.
United Kingdom (Department of Energy and Climate Change)	10	-	-	-	-	10.6.2.2	-	-	Although acknowledged, this section doesn't set out clearly enough that concentrated biomass burning in urban areas could present a serious health hazard in terms of particulate pollution, so that care needs to be taken to ensure that there is not a very dense build-out of biomass heaters/boilers.	will be addressed
China (China Meteorological Administration)	10	-	-	-	-	all	-	-	The Chapter 10 is somehow lack of research prospectives from the developing countries, particularly from China and India. Extremely little publications and reports are referred in this Chapter from those emerging economies. The results of integrated assessment models developed by China and India, such as IAMC (Tsinghua University, China), IPAC (Energy Research Institute, China), MARKAL (Indian Institute of Management) are not quoted here.	The scenario information for the analysis in Chapter 10.2 was collected in an open process that included also the groups mentioned in the comment. Unfortunately, we did only get data from the IIM MARKAL model, but for space limitations, it was not possible to do an India- or China-specific analysis as originally planned. We will explain the selection procedure more explicitly in Section 10.2.2.
Timm Zwickel (IPCC WG III)	10	-	-	-	-	ES	-	-	The statements in the Executive Summary are very general, it would be good to have sharper messages ¿ if possible	Text will be revised

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Doug Arent (Joint Institute for Strategic Energy Analysis)	10	-	-	-	-	exec summ and overall	-	-	In Chpt 10,the figures are complex (too complex for policy makers), and there is too strong an emphasis on the scenario modeling as ¿indicative¿ of mitigation potentials vs constrained by fundamental scientific information such as resource knowledg and the fact that many of the models and scenarios do not account for national or subnational policies, but are limited to global climate stabilization ONLY, nor represent all RE technologies, particularly offshore wind, but aso some do not include CSP or direct solar. I would recommend the author team consider adding caveats up front in the SPM and in Chpt 10 on these points (they are currently buried about 50% into Chpt 10). Additionally, the chapter does not capture that the mitigation potential of RETs depends therefore on what individuals, corporations and governments choose to invest in, thru choices of R&D, programs, and policies. This msg is not clear enough. I would strongly suggest that the caveats of the analysis provided be moved toward the front of the chapter and perhaps put in a text box to highlight them. These fundamental issues related to resource data quality which are ¿behind¿ the economic competition in the IAMs is fundamental to the ¿mitigation potential¿ of RETS, and the emphasis on analysis of the output of many scenarios masked the fundamental state of the science.	(SPM is more in this line). Caveats will be added more clearly on relevant places in the chapter, including particularly to the knowledge gap sections
United States (U.S. Department of State)	10	-	-	-	-	Executive Summary	-	-	the wording "frame condition" is used repeatedly throughout the section. Meaning is unclear and term should be described better.	Text will be revised
Steffen Schlömer (IPCC WGIII)	10	-	-	-	-	Supply Cost Curves	-	-	Figure 5.24 and 5.25 relevant?	comment does not belong to chapter 10