INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE

Special Report on Renewable Energy Sources and Climate Change Mitigation

Government and Expert Review of the Second Order Draft
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Chapter 9

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

Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table Info	Comments	Consideration by the writing team
Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	0	-	-	-	-	-	-	Even though I am quite sympathetic to the idea of RE as a powerful tool for sustainable development and believe that RET¹s will form an integral and significant part of any SD pathway, the chapter does not well advance this case. In many parts it tends to read as an opinion piece, rather than as a rigorous assessment of the literature.	Chapter will be completely re-drafted to address these problems.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	0	-	-	-	-	-	-	In general, I found the chapter not very well written, often lacking references and with incorrect or inconsistent usage of terminology (for example energy services, energy resources and energy technologies are often conflated or used inconsistently). Sustainable energy is a term not commonly used - the generally accepted terminology is energy for sustainable development. There are many assertions and conclusions made in the chapter without adequate literature support and without any assessment of confidence - even when the conclusions may be based on a single study.	Chapter will be completely re-drafted to address these problems.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	0	-	-	-	-	-	-	There appears to be a fair bit of repetitive material in the introductory sections (9.1 and 9.2). I did not find any clear rationale for deviation from the Plenary Approved Outline. There appear to be some obvious errors - page 19 gives levelized costs for RET¹s in the range of $50 - $120 / kWh - this cannot be right, unless it is $ / MWh, in which case they are too low.	Noted.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Angel DE LA VEGA NAVARRO (UNAM - National Autonomous University of Mexico)	9	0	-	-	-	-	-	-	Since the start of the crisis, that became global in 2008, the analysis of it brought a new interest in renewable energies and environmental issues from different angles. In this chapter there are some mentions of the oil crisis of the 1970s and its impact on research, development and deployment of renewable energy. It is also mentioned for its effects on many developing regions, their development and well-being. Present crisis is mentioned no more than once, at Page 47; lines 41-42, only to lament its possible effects on grater role of governments: "it remains to be seen if the current financial crisis will affect policy tools in a potential move back towards more direct government regulation". This is an important deficiency considering that financial crisis that turned into economic crisis present also aspects of an energy and ecological crisis (excessive consumption of natural resources, CC, impacts on biodiversity and ecosystems,). It is also remarkable that 'inequality' never appear in this chapter and 'equality' only twice. Behind financial and economic problems there are deep inequalities; more serious than before (e.g. sub-prime crisis was in part a manifestation of a deep indebtness of families because of the stagnation or reduction of their revenues). I suggest then to look at the relations between inequalities, ecological crises and the role of renewable energies: e.g. the relations between poverty, international inequalities and degradation of ecosystems and biodiversity. Idem for « natural catastrophes », specially in poor countries. Inequalities are bad not only for health, education, etc., but also for the stability of the global economic system. It is important in the present global crisis to try to make explicit the link between inequality and ecology: social inequalities are important causes of environmental contemporary problems, at the same time that contemporary environmental problems affect specially the poor. There are some researches in that direction that can be reviewed (Fitousi, Laurent (2009), Emelianoff, 2006). There is an interest in this chapter for energy and environmental policies. Taking into account points signaled above, it can be shown that these policies (fiscal, regulatory) can have unequal impacts according to social categories and local groups. Those categories and groups have also unequal access to the definition of energy and environmental policies.	Noted.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Australia (0)	9	0	-	-	-	-	-	-	This chapter could perhaps be divided into 'developed' and 'developing' worlds. Inconsistency between renewable energy being referred to as RE or renewable energy. First reference should be renewable energy (RE) then RE thereafter as authors have done correctly for SD.	Rejected. Topics discussed have different relevance to developed and developing countries and are addressed as appropriate. Also, the final draft of the SRREN will be processed by a professional copy-editor. All editorial comments such as this will be resolved at that time.
Christoph von Stechow (IPCC WGIII TSU)	9	0	-	-	-	-	-	-	Please provide a more in-depth discussion on barriers and opportunities that deals at least with the topics that were assigned to the chapter during the LA3 meeting in Oxford (i.e. governance/institutional, social/distributional, resource use transitions for realizing SD potentials).	Aspects are included in analysis and are covered in sections 9.3.1, 9.3.3 and 9.5.
Daniel Bouille (Bariloche Foundation)	9	0	-	-	-	-	-	-	The issue of Biomass, Bioenergy and Land use is considered in different sections of the chapter. There are several not always coherent overlapping. I suggest to go through the chapter with a critical view on Bioenergy and related issues, looking for a common and coherent approach and view.	Chapter will be completely re-drafted to address these problems.
David Clubb (European Environment Agency)	9	0	-	-	-	-	-	-	Overall comments: there is a tendency in this chapter for the text to wander from its remit of 'sustainable development' issues, and to consider renewable energy (and fossil fuel and nuclear) in a much wider context of overall society and energy issues. I would even go as far as to say that this chapter feels almost like an after-thought to the main report. The chapter would benefit from a much tighter grip on its content with regard to its remit. For example, almost the whole of page 19 could apply to a more general topic. Would it be more interesting and useful to focus on renewable energy in the developing world, or have a distinct bias towards off-grid issues? The use of English in this chapter (both grammar and sentence construction) is weaker than in most other chapters.	Re-drafting of chapter will concentrate on 4 topics to allow a focused analysis of the relevant issues in connection with RE and SD: economic development, energy access, energy security and environmental and health impacts.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Denis Aelbrecht (EDF)	9	0	-	-	-	-	-	-	This chapter gives a thoroughful view of the various processes available for renewable energy/electricity production. However, it does not always separate the various uses of energy (transports, electricity generation, heat/cooking generation, etc...), and the potential (and quantified) role that renewable could play in the future in each of them. The chapter actually to focus to a large extent on electricity generation (see various tables), but does not really address the possible role of renewables in other sectors responsible of large parts of GHG emissions like transport and heat. Similarly, it tends to give a list of possible technologies, without putting them in perspective in terms of significance for actually tackling GHG emissions in the future. A quantified scenario (probable, or desirable), of development of each of the technologies, detailing how and to what extent they could contribute to addressing the issue, would be useful as a conclusion.	Transport and heat will be included in LCA section on GHG emissions. The mitigation potential of different technologies is addressed in Chapter 10 of the report.
Emmanuel Branche (Electricité de France)	9	0	-	-	-	-	-	-	Several times in this chapter 9 (page 19 line 9, page 19 line 19, Appendix A, ...), it is mentioned that nuclear is subsidized. What are the references for this statement? I'm not sure that one should oppose the CO2 free or low-carbon technologies in this IPCC Special Report	Noted.
Frank Krysiak (University of Basel)	9	0	-	-	-	-	-	-	In contrast to most other chapters, this chapter contains many statements that are not directly backed up by references or data. Many statements seem to stem from the references given in the tables in the appendix, but this is not always clear. It would be very helpful if sources of statements would be made more transparent. Examples are p. 11 (line 27-46), Tables 1+2, p. 38 (lines 29-40), and Section 3.3.	Accepted.
Frank Krysiak (University of Basel)	9	0	-	-	-	-	-	-	The notion of sustainability used here is somewhat vague and largely inoperational. Correspondingly, the conclusions drawn are rather general.	Re-drafting of chapter will concentrate on 4 topics to allow a focused analysis of the relevant issues in connection with RE and SD: economic development, energy access, energy security and environmental and health impacts.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Frank Krysiak (University of Basel)	9	0	-	-	-	-	-	-	There is a large body of economic literature on sustainability, renewable and exhaustible resource use, and growth that is largely ignored. In fact, this chapter does not even contain a single reference to the 30+ years of economic discussion on this point (a sleightly outdated review paper is Pezzey and Toman (2005, RFF, http://www.rff.org/documents/RFF-DP-02-03.pdf), another good review is Brock and Taylor (2005, Handbook of Economic Growth, Elsevier)). A consequence is that some important questions (how the exhaustible/renewable energy mix influences future welfare, whether there is a trade-off between switching to clean technologies and economic development) are either not addressed at all or only from a somewhat specific perspective.	Re-drafting of chapter will concentrate on 4 topics to allow a focused analysis of the relevant issues in connection with RE and SD: economic development, energy access, energy security and environmental and health impacts.
Garcia Javier (Garcia Monge Consultant)	9	0	-	-	-	-	-	-	General comment: there is little mention to landfill to gas potential for RE when biomass source is treated. Landfills is a business as usual option in many developing countries to deal with Urban solid waste and could be an important source of electricity and/or biogas.	Noted.
Geoffrey Heal (Columbia University)	9	0	-	-	-	-	-	-	I am disappointed with this chapter. It is not incisive. Using carbon-free energy is essential to any interpretation of sustainable development, perhaps the most essential element of sustainability.	Noted.
Geoffrey Heal (Columbia University)	9	0	-	-	-	-	-	-	The chapter does not discuss nuclear power (it is mentioned in some of the tables): it is not renewable, but it is the main alternative to renewable energy and is being used extensively in China and to some degree in India, as well as in most industrial countries. It is one of the ways of making more energy-intensive economies compatible with sustainability.	Nuclear power will be included in analysis.
Geoffrey Heal (Columbia University)	9	0	-	-	-	-	-	-	The spread of cell phones in developing countries is an interesting example of technological leapfrogging: invented for use in industrial countries, they have made their greatest social impacts in poor countries (see Heal When Principles Pay, Columbia Univeristy Press, 2008). Wireless technology is less expensive than landlines where no landlines are in place. Similarly, distributed power generation by solar panels is already less expensive than diesel generators or coal plants in countries with no national power grid. Ten years from now we may see solar power more widely used in developing than in developed countries, making power available to rural communities.	Example will be included in text box on leapfrogging.
Gerrit Hansen (TSU)	9	0	-	-	-	-	-	-	discussion on sustainable potentials is missing	Noted.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Greece (National Observatory of Athens)	9	0	-	-	-	-	-	-	The chapter presents almost exclusively the prespective of developing countries, namely how to make development paths in these countries more sustainable through the increased use of RE. The significance of RE in industrialized countries and their contribution to achieve decoupling of economic growth from energy use and atmospheric emissions is rather overlooked. It is suggested to make clear the different role of RE in developed and developing countries and to include a separate section (or subsection) for developed countries.	Accepted. Role of RE for developed and developing countries is discussed in a more differentiated manner.
Greece (National Observatory of Athens)	9	0	-	-	-	-	-	-	The structure of the whole chapter is not sufficiently firm. The scope and content of each section and paragraph is not clear. Many iterations.	Re-drafting of chapter will concentrate on 4 topics to allow a focused analysis of the relevant issues in connection with RE and SD: economic development, energy access, energy security and environmental and health impacts.
Gregory Keoleian (University of Michigan)	9	0	-	-	-	-	-	-	Overall this chapter addressed many key aspects well. Several aspects can be improved: 1) comparison renewable energy vs other strategies for reducing carbon emissions and other sustainable development objectives (e.g., Pacca and Socolow wedges and comparison of the cost effectiveness of approaches), 2) limitations on the deployment of renewable energy in developing countries and the problems with mechanisms such as the CDM to drive implementation (my doctoral student is getting ready to publish on this topic but unfortunately won't be ready in time for this review); 3) benefits on renewable energy deployment in developed countries with respect to job creation (cite by Wei 2010 is good but other studies such as Wind Turbine Development: Location of Manufacturing Activity (Sterzinger and Svrcek 2004) and DOE 20% wind by 2030 can be added) and improving import/export balance (e.g., US imported over $400 billion of non-renewable energy in 2007), 4) the length of the chapter can be reduced significantly (lots of repetition), and 5) many places where reference need to be inserted particularly where specific data are provided. Many other areas for improvement are provided below.	Noted.
HONGGUANG JIN (Thermophysics engineering ,Chinese Academy of Scinces)	9	0	-	-	-	-	-	-	It can be easily find that some context is repeating in chapter 9 with Chapter 8. It is necessary to check the repeating part between two chapters.	Noted.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
IBRAHIM ABDEL GELIL (Arabian Gulf University)	9	0	-	-	-	-	-	-	RE contribution to povert eradication needs to be discuused in a separate section with examples from developing or LDC countries.	Noted.
Japan (the Japanese Ministry of Foreign Affairs)	9	0	-	-	-	-	-	-	One of the barriers to harnessing available renewable energy sources in developing countries is the high upfront costs required to install necessary equipment and to secure the human resources required to operate and maintain the systems. Cost-oriented barriers are discussed separately in different parts of the Special Report but there is no comprehensive discussion on such costs and the prospects for overcoming these barriers. The concept of "appropriate renewable energy" should be included in the discussion of Renewable Energy in the Context of Sustainable Development.	Noted.
Jean-Yves CANEILL (EDF SA)	9	0	-	-	-	-	-	-	It should be valuable to quote in this chapter the report of a study that was published in 2009 and presented at various occasions, especially in the course of the Poznan Conference (an article is in preparation but the whole material is available on different think tank sites of IDDRI and Entreprises pour l'Environnement). The study consisted in looking at different scenarios of decarbonisation of the economy with two economic models (one global sectoral model and a global equilibrium model). In one of the scenarios an interesting attempt was made to simulate a 'non mimetic scenario' in which in some sectors and/or appliances more decentralised renewable energies were introduced. As a result compliance with the overall objective was compared with the reference case (the so called 'mimetic scenario') and energy mixes were also compared at the end of the day. Although the latter scenario still exhibited a part of centralised power generation, the balance was changed, and as a result the shadow price of carbon was lowered.I am proposing the suggestion of inculsion in the following line 3.	Noted.
Jyri Seppälä (Finnish Environment Institute)	9	0	-	-	-	-	-	-	The current version is much improved compared to the earlier version. However, the repetition between the sections can be found. The summary does not describe well the current main massage from the chapter: how do the different RE sources causes SD concequenses described in Tables 9.1 and 9.2. In addition, it is worth to add the view about the co-operation between developing and developed countries in the case of biomass: developed countries should not increase the acquisition of biomass raw materials in developing countries causing harmful effects from the viewpoint of SD in the developing countries. Furthermore, it is not clearly describe the possible synergestic SD advantages of bigas (for example). See, Chapter 3.	Noted.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Luc Gagnon (Hydro Quebec)	9	0	-	-	-	-	-	-	Many authors interpret the concept of Sustainable Development as an effort to identify all major environmental, social and economic impacts. This effort is often relevant at a project level, where an effort is required to do a good environmental assessment. Chapter 9 uses the same approach to make a generic assessment of global renewable energy sources. This approach is not relevant for a generic assessment. A project is implemented in a given context with a few specific issues, that need to be identified. In contrast, an option (generic) can be implemented in a very wide range of contexts with, unavoidably, a huge list of potential impacts. Obvious cases are hydropower, where a reservoir can be built for numerous purposes, and biomass, where conditions of exploitation show huge variations. As a result of this approach, chapter 9 gives a misleading picture that all renewable sources have serious environmental and social impacts. Even if it is not explicit, the conclusion of chapter 9 is the following: only a tiny fraction of renewable energy potential should be realized, because of the numerous environmental, social and economic constraints. As a further consequence, it is unlikely that climate change can be mitigated and scenarios of high impacts (for example, 4 times pre-industrial CO2 concentration) are unavoidable. The basic methodological mistake is the assumption that sustainable development cannot set priorities or that other environmental or social issues have the same importance as climate change. In reality, large warming scenarios (4 times CO2 concentration) will have huge social and biodiversity impacts, that are orders of magnitudes greater than the local impacts of renewable energy projects. Therefore, I am suggesting major changes to this chapter: Firstly, a new section, at the beginning of the chapter, should summarize the environmental and social impacts of large warming scenarios (for example 4 x pre-industrial CO2 concentration). Secondly, another section (short) can use the data from other chapters to show that large CO2 reductions are improbable, without a very large development of renewable sources. Thirdly, the sections on impact categories (existing text) can describe each sustainable development issue, but also comparing local impacts of renewable projects with the expected impacts of climate change. Only major "structural" impacts of renewable sources should be included (for example, land use), not impacts that are exceptional. Finally, the conclusion should be a summary that makes a contrast between the local impacts of renewables, relative to global impacts of climate change. We think that such a revision is needed to show the global benefits of renewable development.	Chapter will be completely re-drafted to address these problems.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Michael Hübler (Potsdam Institute for Climate Impact Research)	9	0	-	-	-	-	-	-	Referring to chapters 9 and/or 11 concerning international technology transfer/diffusion (here short ITT). ITT is implicitly covered by chapters 9 and 11. I suggest to add a text box or a section that treats ITT explicitly and systematically. What are potential source and recipient countries/regions for which technologies (hardware) or technological skills (software)? Through which channels and policy measures can ITT be achieved regarding the international dimension; are there differences between countries/regions and technologies? What are the necessary local conditions in recipient countries/regions to install transferred technologies? In how far is the adjustment of technologies, which have been developed in industrialized countries, to the local conditions in developing countries in terms of costs, management and practical realization challenging? In how far is maintenance in terms of skilled technicians, technical equipment and spear parts possible and guarantied in certain developing countries/regions? What are possible solutions for these aspects? Can transferred technologies be imitated and modified in recipient countries in the future? What role do Intellectual Property Rights (IPR) play, should they be strengthened or relaxed; and if so in which cases? For which developing countries/regions and technologies is innovation (in form of substantial changes based on existing technologies) an option besides ITT? What are the local preconditions for successfully adopting technologies - such as education and technical skills summarized as absorptive capacity; what are the local preconditions for imitating and possibly innovating? How can industrialized countries improve these preconditions in developing countries?	Technology transfer will be covered in Chapter 11.
Michael Hübler (Potsdam Institute for Climate Impact Research)	9	0	-	-	-	-	-	-	The chapter may be improved in terms of langugage style. Moreover, the structure of paragraphs and the logic within paragraphs may be improved.	Accepted.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	9	0	-	-	-	-	-	-	The overall quality of the chapter is not very high; the link between sustainable development and renewable energy is addressed only partially and in an inconsistent manner, several sections of the chapter are outside its thematic focus, other (relevant) issues are addressed in an incomplete manner and the examples given are often biased towards one country (e.g. examples from Japan feature dominantly in this chapter). On the chapter's form it has to be said that the text doesn't flow, with several paragraphs completely out of context of the section they are in, which causes the argumentation line to lack any logical sequencing. The language leaves much to be desired, several section headings are partially or completely unrelated to the actual section content and there is a lot of repetition, adding unnecessarily to the lenght of the document. The information is presented in a very scattered, incoherent manner, which makes it very difficult for the reader to follow the line of thought behind the arguments presented. A thourough consistency check is needed throught the whole chapter, which could be shortened considerably.	Chapter will be completely re-drafted to address these problems.
Oluf Ulseth (Statkraft AS)	9	0	-	-	-	-	-	-	General comment: Need to enhance consistency with technical chapters. It seems that this chapter has been written in parallel and not based on what the technical working groups have gathered as information.	Accepted. Cross-chapter consistency will be improved.
Oluf Ulseth (Statkraft AS)	9	0	-	-	-	-	-	-	The chapter gives examples on sustainability issues regarding different technologies. The examples are used as evidence of sustainability issues for the different technologies. The examples does not reflect state of the art for the different technologies and you will always be able to find examples on bad historic performance. This chapter should entirely rely on the different technology chapters regarding sustainability issues for the different technologies.	Noted.
Oyvind Christophersen (Climate and Pollution Agency)	9	0	-	-	-	-	-	-	A general comment is that there is a need for this cross-cutting chapter to be consistent with technical chapters, and should not be written in parallel and not based on what the technical working groups have gathered as information	Accepted.
Patrick Matschoss (TSU)	9	0	-	-	-	-	-	-	check definitions in glossary: p. 7, l.33-40; liaise with chapter 1 if not consistent	Accepted.
Saviz Sehat Kashani (atmospheric sciences and meteorological research center)	9	0	-	-	-	-	-	-	My general view are as follow:1. I think there is not ppropriate geographical balance in the whole text. By this I mean, more attention has been done on the european countries, Russia and China, and unfortunately I didn't find complete description abpout middle east in comparison with the notes had written about India and China.	Geographical balance will be improved.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Stephan Klasen (University of Göttingen)	9	0	-	-	-	-	-	-	General comment. This chapter is not very analytical and largely does not address what it sets out to do, namely examining RE from a SD perspective. Instead, it summarizes much information on RE that is also provided in other chapters, has extensive discussions of who is doing what in the RE field, but it lacks a clear analytical focus of why some RE might be better for promoting SD than others and what policy implications could be derived from this.	Chapter will be completely re-drafted to address these problems.
Stephan Klasen (University of Göttingen)	9	0	-	-	-	-	-	-	General comment: This chapter is in many ways rather confusing. It particularly mixes SD issues with poverty issues and then links them somehow to RE and other energy issues. It would be much better to have a clear statement what sustainable development is all about and how that links to particular energy uses. In addition, one should have a clear discussion about the relationship between poverty and energy mix and the potential and limitations of RE to improve access to energy for the poor. Currently, all these things are mixed together in a conceptually rather unclear way.	Chapter will be completely re-drafted to address these problems.
Susanne Kadner (Technical Support Unit)	9	0	-	-	-	-	-	-	As agreed in the Oslo-Oxford Accord (section 3.2.2), Chapter 9 was supposed to discuss SD potentials (i.e. the amount of RE output that would be obtained in an ideal setting of perfect economic markets, optimal social (institutional and governance) systems and achievement of the sustainable flow of environmental goods and services). It is currently not clear where this is attempted to be covered.	Scenario analysis in section 9.4 of re-drafted chapter will assess the representation of certain SD critieria within IAM analyses. This assessment comes as close as possible to a comprehensive analysis addressing some of the aspects mentioned in the comment.
Susanne Kadner (Technical Support Unit)	9	0	-	-	-	-	-	-	The use of scientific references to supplement statements needs to be improved drastically throughout the entire chapter.	Accepted.
Taishi Sugiyama (Central Research Institute of Electric Power Industry (CRIEPI))	9	0	-	-	-	-	-	-	History tells that hydro, in particular large ones, and fossil fuels have been the key driver of WEHAB in modern society in UK, US, Japan and everywhere. The same goes to many developing countries. The draft neglects this reality . It is very biased.	Noted.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Thomas Wilbanks (ORNL)	9	0	-	-	-	-	-	-	Generally, although the chapter tries to be fair in assessing contributions of RE to SD, it often has the flavor of an exercise that says: 'RE is the answer; now what is the question? Part of the problem (not a problem everywhere in the chapter, but noticeable in the overall flavor) is that it puts such strong emphasis on the environmental stewardship aspect of SD, where RE has clear advantages. On the other hand, it tends to underemphasize the economic/social development aspect of SD, where RE is sometimes at a disadvantage, at least based on currently available technologies. There, the biggest issue is higher energy costs, at least for the foreseeable future. A secondary issue is the intermittency of solar and wind energy, which requires either energy storage or backup systems, usually fossil-fuel based.	Re-drafting of chapter will concentrate on 4 topics to allow a focused analysis of the relevant issues in connection with RE and SD: economic development, energy access, energy security and environmental and health impacts.
Thomas Wilbanks (ORNL)	9	0	-	-	-	-	-	-	Strongest criticisms of the chapter may come from the energy efficiency community. To energy efficiency advocates, energy efficiency is clearly the approach that is preferable for increasing supplies of energy services for sustainable development. We do know that potentials for energy efficiency are both abundant and limited. They are abundant because our current systems for supplying and using energy are often so inefficient. They are limited because, as we reduce these inefficiencies, potentials for further improvements shrink. Inefficiency is in fact a depletable resource.... But for now, in most circumstances, efficiency improvements are usually the least expensive ways to make relatively rapid progress -- not renewable energy applications.One possibility would be to add a column in Tables 6.1 and 6.2 for energy efficiency improvement, along with some additional text about this in sections 9.3, 9.5, and 9.6 -- recognizing that efficiency improvement should be a key part of a clean energy/development strategy but also pointing out that its ability to replace increased increased supplies of energy is limited, especially in the longer run.	Noted. However, SRREN does not explicitely address energy efficiency but discusses the issue in Chapter 1.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Thomas Wilbanks (ORNL)	9	0	-	-	-	-	-	-	The chapter seems to be framed by what we know from our experiences in the current world, where the RE contribution is less than 20 percent and, of course, much smaller without large-scale hydropower. It is not entirely clear whether the assessments of various RE options and their implications would be the same if, say, the RE contribution were to be increased to 40 percent by, say 2050. What would a massive scaleup mean, on both the energy cost and social/environmental impact sides?	Current modeling efforts do not allow such an analysis - despite its obvious necessity! However, new analysis carried out for this chapter will provide a comprehensive assessment of e.g. current environmental impacts using attributinal LCAs (costs are addressed in Chapter 10!). To better answer these questions, more data on consequential LCAs would need to become available.
Thomas Wilbanks (ORNL)	9	0	-	-	-	-	-	-	when explaining the clear relationship between energy services and SD, the chapter tends to assume that such a relationship means energy services from RE, when that does not always follow very persuasively	Noted.
United Kingdom (Department of Energy and Climate Change)	9	0	-	-	-	-	-	-	The report as a whole does not distinguish sufficiently between liquid fuels used for transportation and other fuels used for electricity generation. There is very little useful discussion on substitutes for oil and how the global transportation system could work without oil. The omission of a discussion on oil misses out on the significant contribution that the transport sector makes to global emissions and how this can be mitigated given the high levels of dependence on this resource. There is also little analysis of relative contributions to CO2 emissions of different fossil fuels.	Accepted. New section on LCA will make a clear differentiation between electricity generation, transport and heating.
United States (U.S. Department of State)	9	0	-	-	-	-	-	-	General Comment on the Introduction and beginning of Chapter 9: The chapter would be improved by referencing the WSSD 2002, this means specifically acknowledging the multiple dimensions of sustainable development.	Noted.
United States (U.S. Department of State)	9	0	-	-	-	-	-	-	General comment to consider in Chapter 9: Although Chapter 4 Geothermal does not comment on small-scale, distributed geothermal development, such development could be an important base-load power source for isolated population centers in close proximity to shallow geothermal resources. Particular areas include Indonesia, Philippines, and Central and South America.	Noted.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
United States (U.S. Department of State)	9	0	-	-	-	-	-	-	General comment: In general, the authors have done a fine job of pulling together the issues and discussing how RE can be used to enhance SD in developing nations. They've also highlighted some general issues with RE technology. The authors have done a fine job and should be congratulated. However, there are additional issues that need to be addressed to increase the value of their work. Many comments focus on these gaps. However, before moving to critical comments, the reviewers want to take a moment to compliment the authors and provide the positive feedback that this chapter deserves. Nice job.	Noted.
United States (U.S. Department of State)	9	0	-	-	-	-	-	-	General comment: Biofuels are not one single RE resource, but rather a group of resources that have very different properties from a technology, energy services, policy, and SD perspective, and therefore should be treated accordingly in the text.	In re-drafted chapter, biofuels are discussed in a more differentiated manner.
United States (U.S. Department of State)	9	0	-	-	-	-	-	-	General Comment: No consistent thematic thread. Define the terms to be used, elaborate on the concept of SD and use those as the foundation for the thematic thread that should be woven in each of the sections. Eliminate extraneous words and phrases and, as per the substance, refer only to factual data. Work to unify session of document. A good example of this is the paragraph 9.5.2	Re-drafting of chapter will concentrate on 4 topics to allow a focused analysis of the relevant issues in connection with RE and SD: economic development, energy access, energy security and environmental and health impacts.
United States (U.S. Department of State)	9	0	-	-	-	-	-	-	General comment: Significant gaps to be addressed at multiple points; perhaps through the addition of new sections. The chapter should give equal weight to SD in developed nations and developing nations. The issue of how wealthy nations can improve the quality of life, economic security, and physical security of their citizens through RE integration is an important aspect of SD and should not be neglected. This chapter does not effectively address the economic and social aspects of SD, for example: by identifying the links between population, health and human development.	Re-drafting of chapter will concentrate on 4 topics to allow a focused analysis of the relevant issues in connection with RE and SD: economic development, energy access, energy security and environmental and health impacts.
United States (U.S. Department of State)	9	0	-	-	-	-	-	-	General comment: This chapter needs a more comprehensive definition of renewable energy, including time scales, production scales and lifecycle assessments. See section 9.6.2 Additional examples in page 4 lines 1-6. The concept of "the consumption of energy no subject to depletion" cannot be limited to primary energy resources, but should consider all natural resources required to produce energy services on lifecycle basis.	Accepted. Extensive LCAs are included in re-drafted chapter.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
United States (U.S. Department of State)	9	0	-	-	-	-	-	-	Much of the discussion seemed to focus on utility scale issues and did not really tease out the different barriers/issues/problems/pluses between utility scale and distributed generation and the pluses and minuses of these two models, particularly in the context of developed and developing nations.	Chapter will be completely re-drafted to address these problems.
United States (U.S. Department of State)	9	0	-	-	-	-	-	-	Need more concrete examples, concrete statistics, percentages, regulations, measurements, etc. drawn from scientific literature.	Chapter will be completely re-drafted to address these problems.
United States (U.S. Department of State)	9	0	-	-	-	-	-	-	Reviewers were not entirely certain about how the first and second half of the chapter work together -- It seems as if the second half was written by entirely different people -- some of the same topics are covered again more depth -- Where the information is repeated, it should but cut from first half.	Chapter will be completely re-drafted to address these problems.
United States (U.S. Department of State)	9	0	-	-	-	-	-	-	The paragraphs do not yet flow into each other and too often information is present but not discussed	Chapter will be completely re-drafted to address these problems.
United States (U.S. Department of State)	9	0	-	-	-	-	-	-	The reviewers were not entirely sure that the first half of the chapter shouldn't be cut -- and then the second half of the chapter reworked and expanded. It seems to have a lot of the basics down -- just isn't as complete as it should be.	Chapter will be completely re-drafted to address these problems.
United States (U.S. Department of State)	9	0	-	-	-	-	-	-	Very large hydropower projects at large storage reservoirs, especially in tropical environments, can have much greater impacts than smaller projects. This chapter should be careful not to attribute these adverse impacts with all types of projects. Also, over the last few decades, we have learned from past mistakes and now can avoid or at least minimize most adverse impacts from hydro, to the point that positive net environmental benefits can be realized. Advanced technologies like fish-friendly turbines, highly efficient aerating turbines, and new tools to design environmental flows are leading to even better environmental performance. This story needs to be told in a balanced way that acknowledges that with more R&D investments, we can improve hydropower even more and make it more sustainable.	Noted.
Chile (CONAMA)	9	0	-	-	-	9.1.	-	-	In the introduction, where it mentions 'aid sustainable development', I suggest incorporate a sentence regarding the importance of job creation. (Comments made by Alwine Woischnik)	Noted. Employment aspects will be considered in the re-drafted chapter.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Canada (Environment Canada)	9	2	-	-	-	-	-	-	While there is significant discussion of life cycle analysis and sustainability tools, there is no mention of environmental impact assessment as a policy, process and decision-making tool either strategically or at the project-level for helping to ensure the environmental sustainability of renewable energy projects, programs or policies. The addition of a separate section on this topic, or inclusion of environmental impact assessment as a component of section 9.5 "Policy framework for renewable energy in the context of sustainable development", would make an overview of this topic more comprehensive.	LCA is one option that allows assessments on a rather general level. Other assessment tools such as EIAs are too case specific to be of much use in such a comparative exercise on a macro-level. Hence, the authors agreed to include a large section on LCAs in the re-written chapter.
Peter Johnston (Environmental & Energy Consultants, Ltd)	9	2	7	2	13	-	-	-	Is the 1987 Brundtland definition of sustainable development the 'most important' or really just the most widely known? Operationally, it is so vague that proponents of even very destructive activities claim to embrace it. It has long been been criticized as ambiguous and open to a wide range of contradictory interpretations. It might be preferable to consider this definition a minimal or weak meaning of SD, which is a process involving change in a direction toward sustainability. It is, and always will be, an elusive target that will change as technologies evolve, resources are better defined, peoples' perceptions of their basic needs change, etc. Even in the absence of a clear definition of SD overall, it can be a useful broad guiding principle as a rational shift in direction rather than some static end product. If (chap 9, page 6, lines 4-5) "every chapter of this WGIII SRREN focuses to some extent on its links to sustainable development practices" it is essential to clarify that SD remains poorly defined and controversial & must therefore be see as a shift in development direction.	In the re-drafted chapter a number of different definitions and frameworks of SD are presented and clear criteria are introduced which allow a coherent assessment of RE in the context of SD.
Stephan Klasen (University of Göttingen)	9	2	1	-	-	-	-	-	Are we talking about development globally? Or in poor countries? Generally, this chapter is unclear about whether sustainable development is something that is intricately linked with poverty reduction in poor countries.	In the re-drafted chapter a clear definition of SD is understood is presented in the introduction.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	3	3	-	-	-	-	-	How does development disregard "physical limits from the environment"? Not clear	ES will be re-written based on re-drafted chapter.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	3	14	3	15	-	-	-	Reference needed for the three "pillars"	ES will be re-written based on re-drafted chapter which clearly outlines the three SD pillars.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	3	17	-	-	-	-	-	sustainable energy' is not commonly used - energy for sustainable development is the general term, also do not conflate RE with sustainable energy	Noted.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	3	29	3	30	-	-	-	The text is awkward.	ES will be re-written based on re-drafted chapter.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	3	17	3	20	-	-	-	This formulation is awkward. Sustainability also has aspects related to exhaustable resources, not only about environmental degradation	ES will be re-written based on re-drafted chapter.
Emmanuel Branche (Electricité de France)	9	3	1	4	11	-	-	-	Water is a major issue in this chapter but it is not reflected in the Executive Summary. At least, the inextricably link between water and energy should be underlined (e.g. water/energy nexus)	ES of re-drafted chapter will adequately address water issue.
Emmanuel Branche (Electricité de France)	9	3	11	3	13	-	-	-	Why focusing on poverty as main impact? It should be balanced by impact of the industry on the environment, refered to BP oil spill in Mexico Gulf.	Noted.
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	9	3	24	3	31	-	-	-	A clearer and more detailed description of the two-way relationship between sustainable development (SD) and renewable energy (RE) would be useful.	ES will be re-written based on re-drafted chapter.
Gregory Keoleian (University of Michigan)	9	3	36	-	-	-	-	-	change "billions" to "over one billion" last estimate I've seen for the population without access to electricity was 1.6 billion	ES will be re-written based on re-drafted chapter.
Gregory Keoleian (University of Michigan)	9	3	34	-	-	-	-	-	change "for permitting" to "and will require"	ES will be re-written based on re-drafted chapter.
Gregory Keoleian (University of Michigan)	9	3	6	-	-	-	-	-	change "some" to "many"	The word "some" is not in the text referenced by the comment!
Gregory Keoleian (University of Michigan)	9	3	-	-	-	-	-	-	Renewable energy is characterized as energy sources regenerated on a short time scale which are derived directly (e.g., PV) or indirectly from the sun (e.g., wind). I don't think the dicotomy indicated in the following sentence is the best way to frame the relationship between renewable energy and sustainable development. Renewable energy is a type of energy sources. It is also more than a response to non-renewable energy depletion. The benefits of renewable energy in terms of avoiding GHG and other impacts are generally highlighted in addition to displacement of non-renewable energy. "The questions of renewable and sustainable energy have their roots in two distinct issues: while renewability is a response to concerns about the depletion of primary energy sources (such as fossil fuels), sustainability is a response to environmental degradation of the planet and leaving a legacy to future of a reduced quality of life."	ES will be re-written based on re-drafted chapter.
Michael Hübler (Potsdam Institute for Climate Impact Research)	9	3	41	3	41	-	-	-	Relationship of energy services, extreme poverty and mproviding more jobs appears not clear…	ES will be re-written based on re-drafted chapter.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	9	3	14	3	16	-	-	-	what about universal access to clean and efficient energy resources?	ES will be re-written based on re-drafted chapter which discusses energy access in depth.
Roberto Acosta Moreno (CITMA)	9	3	37	-	-	-	-	-	I suggest to delete ""developing"". Comment: This concept is not only related to developing countries. Wide disparities among developing and developed countries also contribute to social inestability. Wide disparities within developed countries also affect basic human development. Deleting the word ""developing"" avoids to only point out to a group of countries and covers all possible situations.	ES will be re-written based on re-drafted chapter.
Stephan Klasen (University of Göttingen)	9	3	32	-	-	-	-	-	Is there an inheent link between sustainable development and poverty reduction? Are we talking about (absolute) poverty reduction in poor countries or poverty reduction anywhere?	ES will be re-written based on re-drafted chapter.
Stephan Klasen (University of Göttingen)	9	3	42	-	-	-	-	-	Replace 'halve' with 'reduce'	ES will be re-written based on re-drafted chapter.
Steve Sawyer (Global Wind Energy Council)	9	3	28	3	28	-	-	-	suggest '...and health benefits, and contribute to economic development'	ES will be re-written based on re-drafted chapter.
Supachai Panitchpakdi (United Nations Conference on Trade and Development)	9	3	11	3	13	-	-	-	"The report recognized that poverty is one of the main causes of environmental degradation and that equitable economic development is a key to addressing environmental problems." First, the notion of sustainable development could be made clearer by highlighting the three intertwined dimensions of development: economic, social and environment. Second, today poverty might still increase environmental degradation, but causality in some places will work the other way around: environmental degradation causing increased poverty.	ES will be re-written based on re-drafted chapter which clearly outlines the three SD dimensions and presents criteria to assess RE within this concept.
Thomas Wilbanks (ORNL)	9	3	17	-	-	-	-	-	energy applications are clearly essential, but why RE in particular?	ES will be re-written based on re-drafted chapter.
United States (U.S. Department of State)	9	3	41	3	46	-	-	-	More attention to be paid to the possible conflict between energy development and SD. More energy = more environmental demand, more economic growth, more demand for surface water, faster depletion of aquifers. More energy production is not sustainable unless it is balanced by reduced demand on natural resources.	ES will be re-written based on re-drafted chapter.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
United States (U.S. Department of State)	9	3	35	3	40	-	-	-	Page 3, lines 35 - 40. The link between these factors and education clearly needs to be made. This access cannot happen without education, and without education this access will not increase sustainability. Education is a pillar of SD, effective voluntary population control, and effective use of new technologies and resources. (e.g. electricity)	ES will be re-written based on re-drafted chapter which discusses energy access in depth.
United States (U.S. Department of State)	9	3	1	4	11	-	-	-	The main text does mention barriers in section 9.1.3, which is only about a half page in length. There, reference is made to "Appendix A." Appendix A presumably is the huge and heterogeneous table at the end of the chapter, which is not easy to digest. Barriers, and approaches to overcome them, merit a fuller treatment in prose in the main text, as well as highlighting in the Executive Summary.	The new section 9.5 of the re-drafted chapter will discuss barriers specific for SD in a more detailed manner and the ES will reflect this.
Youba SOKONA (Sahara and Sahel Observatory)	9	3	22	3	28	-	-	-	I wonder if it is correct to formulate that much of the discurses on SD historically focus on economic and environmental dimension of of renewable energy technology and their implementation? If this is the case then it will be necessary to give some references	ES will be re-written based on re-drafted chapter.
China (China Meteorological Administration)	9	3	2	3	13	Executive Summary	-	-	Delete it. Reason: Too general discussion on SD. No need to be included in Executive Summary.	ES will be re-written based on re-drafted chapter.
Finland (Finniah Meteorological Institute)	9	3	1	4	11	Executive Summary	-	-	It is important to give clear message about the GHG mitigation potentials of different RE sources in the beginning of Executive Summary. Although there are difficulties to give life cycle based GHG emissions per produced energy (e.g. kWh), it is necessary to offer the magnitudes of life cycle based GHG emissions caused by different RE technologies/sources and fossil/nuclear fuels. The data should be gathered from different sources in the chapters of the report and literature. For example, "the GHG emissions of RE technologies are lower than those of fossil technologies (typically 600-1200 CO2 e/kWh (electricity)). The life cycle based GHG emissions of wind turbines are 7-27 e/kWh (electricity). For hydroelectricity etc". In the case of biomass it is important to say that variation is very large, and non-climatefriendly energy systems are possible.	The GHG mitigation potential of different technologies is covered in Chapter 10. With resepct to the LCAs gathered for the re-draft of Chapter 9, these data will be presented in the ES.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	4	2	4	4	-	-	-	Are these really 'solvable'? What is meant by 'not fully accessible'?	ES will be re-written based on re-drafted chapter.
Denis Aelbrecht (EDF)	9	4	10	-	11	-	-	-	remove remark	ES will be re-written based on re-drafted chapter.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	9	4	10	4	11	-	-	-	The line "(Reword using Tom´s paragraph)" should be deleted.	ES will be re-written based on re-drafted chapter.
Greece (National Observatory of Athens)	9	4	14	-	16	-	-	-	Pillars (1) and (3) appear as being identical. Better distinction between energy conservation (reducing energy use) and energy efficiency (producing energy with less energy resources).	ES will be re-written based on re-drafted chapter.
Greece (National Observatory of Athens)	9	4	22	-	23	-	-	-	The discourses on SD is not restricted to RE. Change to: Much of the discourses on the role of RE for SD have historically focused on economic and environmental dimensions.	ES will be re-written based on re-drafted chapter.
Greece (National Observatory of Athens)	9	4	26	-	28	-	-	-	This sentence is not illustrating the importance to be given to social and institutional dimennsions. Either to be removed or to include examples of social and institutional implications	ES will be re-written based on re-drafted chapter.
Ladislaus Rybach (Geowatt AG Zurich (company))	9	4	9	-	-	-	-	-	In line 9 'geothermal' must be added after hydro, wind, and solar: Also geothermal resources do not stop at country borders.	ES will be re-written based on re-drafted chapter.
Ladislaus Rybach (Geowatt AG Zurich (company))	9	4	-	5	-	-	-	-	The Executive Summary is rather an introduction than a summary. A summary should contain the main findings of the chapter.	ES will be re-written based on re-drafted chapter.
Peter Johnston (Environmental & Energy Consultants, Ltd)	9	4	1	4	2	-	-	-	"Renewable energy technologies are ones that consume primary energy resources that are not subject to depletion." Not true -- except to the extent that the depletion of RE resources is offset by an equivalent growth in the new stock of renewables. Renewables obviously are often subect to depletion, e.g massive deforestation. (This is acknowledged later in chap 9, p 31 lines 19-23.)	ES will be re-written based on re-drafted chapter.
Youba SOKONA (Sahara and Sahel Observatory)	9	4	9	4	11	-	-	-	The case of hydro is different from the other renewables as it can be suject to disruption by international political events	ES will be re-written based on re-drafted chapter.
Youba SOKONA (Sahara and Sahel Observatory)	9	4	1	4	2	-	-	-	This definition of renewable energy technologie is not clear as I do not think that the technologies are consuming primary energy resources	ES will be re-written based on re-drafted chapter.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Doug Arent (Joint Institute for Strategic Energy Analysis)	9	4	7	4	11	Executive Summary	-	-	“relatively benign” seems very cautious vs no or low GHG emissions. Perhaps more clearly stating: With an enormous resource base, enabled by advancing technologies and supported by public policies, renewable energies offer both a near term, high leverage option to mitigate potential future climate change, and address many other public policy goals such as economic prosperity and energy security, and a long term technology platform for a sustainable energy economy. the term fossil fuels should be replace with "oil, coal and natural gas", as many do not know what "fossil" means.	ES will be re-written based on re-drafted chapter.
Doug Arent (Joint Institute for Strategic Energy Analysis)	9	4	1	4	6	Executive Summary	-	-	In the executive summary, I suggest the following be considered: The chapter does not recognize that the costs (total over life, or LCOE if that metric can be applied, or per kJ delivered) for fossil solutions in developing countries is often much greater than RETs due to : fuel costs, envir damage, trade balance, loss of life (many die from drinking kerosene stored in Coke bottles), indoor air pollution, etc. See report by Kirk Smith in Lancet on the health/cilmate impacts. The challenge, therefore, is awareness of RET based solitions and mechanisms to address the initial high capital costs of RET solutions thru effective financing approaches, in combination with creation of sustainable, scalable businesses (employment, income generation...) and training for use and operations and maintenance. This msg would be important for policy makers to hear (again!), not that RETs have “solvable problems"….	ES will be re-written based on re-drafted chapter. The new sections 9.3.1 and 9.5 will address the issue of higher costs for RE. Also, Chapter 11 discusses RE financing trends and options in more depth.
Garcia Javier (Garcia Monge Consultant)	9	4	8	7	8	Executive Summary	-	-	May I suggest the following phrasing: "...and the fact that they are environmentally more friendly compared to fossil fuels." instead "environmentally relatively benign"	ES will be re-written based on re-drafted chapter.
Garcia Javier (Garcia Monge Consultant)	9	4	7	4	8	Executive Summary	-	-	May I suggest to include in the sentence as follows: "From the policy perspective, the main attractions of renewable energy are their security of supply, the prevention facing energy shock prices and the fact that they ..."	ES will be re-written based on re-drafted chapter.
Richard Taylor (International Hydropower Association)	9	4	9	4	11	Executive Summary	-	-	Reword to a more appropriate tone.	ES will be re-written based on re-drafted chapter.
Garcia Javier (Garcia Monge Consultant)	9	5	41	5	41	9.1	-	-	May I suggest the following phrasing: "...a multilateral environmental agreement (MEA) aiming to curb down worldwide emissions."	Section will be re-written.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Garcia Javier (Garcia Monge Consultant)	9	5	5	5	5	9.1	-	-	May I suggest to add at the end of the paragraph: "... with externalities present at global level that remain for very long periods of time (centuries)."	Section will be re-written.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	5	3	-	-	-	-	-	Please explain how physical limits are disregarded?	Section will be re-written.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	5	29	-	-	-	-	-	Please explain who's Initiatives are addressed as "Early initiatives"	Section will be re-written.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	5	34	-	-	-	-	-	Please explain who's Initiatives are addressed as "Early initiatives"	Section will be re-written.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	5	18	5	19	-	-	-	The text is a repetition of the text in lines 9 and 10 on page 5.	Section will be re-written.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	5	44	5	45	-	-	-	This reference cited (Hourcade et al 2001) cannot refer to the Second assessment report(SAR)	Noted.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	5	39	-	-	-	-	-	Use the correct phrase from UNFCCC Art 2	Section will be re-written.
Daniel Bouille (Bariloche Foundation)	9	5	6	-	14	-	-	-	I suggest to make reference also to the concept of human development of UNDP, more broader and clear than the one of the Bruntland Report.	Noted.
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	9	5	23	5	24	-	-	-	Repetitive: terms "maintenance of essential biophysical life support systems", "ecosystem wellbeing" refer basically to the same aspects.	Section will be re-written.
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	9	5	15	5	20	-	-	-	Very meagre definition of SD bearing in mind that it is the central concept of the whole chapter. Perhaps it would useful to describe various competing SD definitions and than present the one used as criterion in this chapter.	In the re-drafted chapter a number of different definitions and frameworks of SD are presented and clear criteria (environmenal and health impacts, energy access, energy security and social and economic development) are introduced which allow a coherent assessment of RE in the context of SD.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Michael Hübler (Potsdam Institute for Climate Impact Research)	9	5	11	5	12	-	-	-	poverty is one of the main causes of environmental degradation"", yes, but at the same time emissions such as CO2 rise with increasing income/production. In this sense, wealth is also a main cause of environmental degredation. Thus, the argument appears misleading. Mentioning the environmental Kuznets curve principle may help. And a brief explanation of the poverty-environment relationship the text refers to.	Noted.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	9	5	35	-	-	-	-	-	"from" a development perspective (not "under")	Section will be re-written.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	9	5	18	5	20	-	-	-	The definition of SD is a repetition of the previous paraghraph and can be left out.	Section will be re-written.
Oluf Ulseth (Statkraft AS)	9	5	7	-	-	-	-	-	Editorial improvement suggested given the proposed WSSD 2002 addition to harmonise the recommended insertion: - Put a fullstop after "There are several definitions of SD. The most common defintion has been published in the UN report "Our Common Future" elaborated by the Brundtland Commission in 1987. The term "sustainable development" was adopted by the Agenda 21 program of the United Nations in 1992. The 1995 World Summit on Social Development further defined this term as "the framework for our efforts to achieve a higher quality of life for all people", in which "economic development, social development and environmental protection are interdependent and mutually reinforcing components"'. The 2002 World Summit on Sustainable Development expanded this definition identifying the "three overarching objectives of sustainable development" to be (1) eradicating poverty, (2) protecting natural resources, and (3) changing unsustainable production and consumption patterns.	Noted.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Oluf Ulseth (Statkraft AS)	9	5	-	9	20	-	-	-	Redundancy in defining key elements of SD - proposal to delete repetitive passages (lines 15-20) and introduce a more recent and more operational definition before highlighting key elements of SD (lines 21-26). Although the Bruntland definition from 1987 is the most common, it is also extremely general. The definition adopted by the UN at the World Summit on Sustainable Development in 2002 deems more relevant for this purpose - Proposal to replace lines 15-20 with the following definition/text passage: "Since the Rio Earth Summit in 1992, sustainable development has emerged as a new paradigm integrating (1) economic growth, (2) social development and (3)environmental protection as interdependent and mutually supportive elements of long-term development. Sustainable development also emphasizes a participatory, multi-stakeholder approach to policy making and implementation, mobilizing public and private resources for development and making use of knowledge, skills and energy of all social groups concerned with the future of the planet and its people." (Nitin Desai, Secretary-General, World Summit on Sustainable Development 2002, p. 1)	In the re-drafted chapter a number of different definitions and frameworks of SD are presented and clear criteria (environmenal and health impacts, energy access, energy security and social and economic development) are introduced which allow a coherent assessment of RE in the context of SD.
Oluf Ulseth (Statkraft AS)	9	5	6	-	-	-	-	-	Statement to be completed, as the most important dimension of SD is missing: integration of different perspectives. Proposal: add after (...) aiming to consider such impacts, "while balancing different needs and interests in a holistic perspective".	Noted.
Oyvind Christophersen (Climate and Pollution Agency)	9	5	15	5	20	-	-	-	The text about sustainable development should refer to the more recent definition adopted in 2002. We propose that the following text is inserted between line 20 and 21: "Since the Rio Earth Summit in 1992, sustainable development has emerged as a new paradigm adopted by the UN at World Summit on Sustainable Development in 2002 the integrating (1) economic growth, (2) social development and (3)environmental protection as interdependent and mutually supportive elements of long-term development. Sustainable development also emphasizes a participatory, multi-stakeholder approach to policy making and implementation, mobilizing public and private resources for development and making use of knowledge, skills and energy of all social groups concerned with the future of the planet and its people."	In the re-drafted chapter a number of different definitions and frameworks of SD are presented and clear criteria (environmenal and health impacts, energy access, energy security and social and economic development) are introduced which allow a coherent assessment of RE in the context of SD.
Peter Johnston (Environmental & Energy Consultants, Ltd)	9	5	29	5	35	-	-	-	"Initiatives" is unclear. Initiatives to implement SD or to further develop the concept? Or both?	Section will be re-written.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Peter Johnston (Environmental & Energy Consultants, Ltd)	9	5	28	5	28	-	-	-	"Needs" actually seems to refer to demands at current levels of efficiency of resource use, which would be higher than needs.	Section will be re-written.
Stephan Klasen (University of Göttingen)	9	5	1	5	40	-	-	-	It would be good to mention economic views of sustainable development such as the Hicks-Hartwick-Solow rule of non-declining capital stock (and ist weak and strong form)	Accepted. Relevant references are included in re-drafted section.
United Kingdom (Department of Energy and Climate Change)	9	5	31	5	33	-	-	-	"new crops and management strategies" are not necessarily required for biomass to be low carbon emitting	Section will be re-written.
United States (U.S. Department of State)	9	5	2	5	5	-	-	-	Needs to be rewritten -- should be rewritten to draw you into chapter. As it is, the paragraph is unclear and hard to follow.	Accepted.
United States (U.S. Department of State)	9	5	6	5	17	-	-	-	Page 5, lines 6-14: This is an example of where the report should focus more on data and analysis rather than advocacy: The authors refer to the Brundtland report in defining sustainability, which is entirely appropriate. However, the link between poverty and CO2 emissions is not as strong as the link between poverty and local land and water degradation (focus of Brundtland). CO2 emissions come primarily from fossil fuel emissions; and those come primarily from wealthy nations. Thus, fossil-powered wealth aggregation is a root cause of global warming. In poor areas, a major GHG impact is deforestation and increased fossil use for reliable energy. The authors need to clearly discuss how RE integration can simultaneously reduce GHGs while improving energy security in both developed and developing nations. This discussion should account for the link between bioenergy use and deforestation.	In the re-drafted chapter a number of different definitions and frameworks of SD are presented and clear criteria (environmenal and health impacts, energy access, energy security and social and economic development) are introduced which allow a coherent assessment of RE in the context of SD.
United States (U.S. Department of State)	9	5	6	5	20	-	-	-	These two paragraphs are somewhat repetitive, as consolidating this chapter is a goal of the editor, I would recommend consolidating these.	Section will be re-written.
China (China Meteorological Administration)	9	5	8	5	8	9.1.	-	-	Change "published by" to "commissioned by". This is a commissioned work, published by Oxford University Press.	Noted.
China (China Meteorological Administration)	9	5	8	5	20	9.1.	-	-	Combine the discussion on the definition of SD: repeatition.	Section will be re-written.
Garcia Javier (Garcia Monge Consultant)	9	5	24	6	24	9.1.1.	-	-	May I suggest to change ""over the past several centuries"" for ""the past three centuries"".	Section will be re-written.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	6	36	6	37	-	-	-	Confusion between the energy services and energy resources.	Noted.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	6	22	-	-	-	-	-	Instead of productivity it should be Mechanical power.	Noted.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	6	43	6	44	-	-	-	Resources are obviously not uniformly distributed. Affordability and abundance are not independent.	Noted.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	6	28	-	-	-	-	-	Typical attributes for energy services are access, affordability and reliability	These aspectes will be clearly discussed in re-drafted chapter in connection with energy access.
Brazil (Ministry of Science and Technology)	9	6	36	7	16	-	-	-	Lack of references.	Accepted.
Emanuela Menichetti (Observatoire Méditerranéen de l'Energie)	9	6	3	6	3	-	-	-	I would avoid any judgement regarding the quality of the current work; therefore I would suggest eliminating "good" and just write "the SREN report will also serve as a starting point..."	Section will be re-written.
Frank Krysiak (University of Basel)	9	6	36	7	16	-	-	-	References to support these statements seem to be missing.	Accepted.
Michael Hübler (Potsdam Institute for Climate Impact Research)	9	6	45	-	-	-	-	-	countries and regions are becoming laboratories"" may be re-formulated.	Section will be re-written.
Steve Sawyer (Global Wind Energy Council)	9	6	20	6	22	-	-	-	suggest '...energy services for meeting basic human needs, such as comfort...'	Section will be re-written.
Susanne Kadner (Technical Support Unit)	9	6	38	-	-	-	-	-	As mentioned in the comments to the FOD, liaise with Chapter 5 on the usage of small and large hydro.	Accepted.
Susanne Kadner (Technical Support Unit)	9	6	12	6	17	-	-	-	Section numbering needs to be adjusted to match new structure of the chapter.	Section will be re-written.
United States (U.S. Department of State)	9	6	27	6	35	-	-	-	Care should be taken with normative statements such as "Energy is viewed not as a commodity but as an entitlement"	Noted.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
United States (U.S. Department of State)	9	6	20	6	26	-	-	-	Page 6, lines 20-26. This is an example of where the authors need to be more careful in dealing with biomass. While biomass is renewable, human use of biomass for energy and building is not sustainable in many places. Keep track of animal waste, wood crops, municipal waste, and animal waste.	Re-drafted chapter will make a clear differentiation between modern and traditional biomass use.
United States (U.S. Department of State)	9	6	14	-	-	-	-	-	Section 9.1.1, p.6 line 14. Could also include geothermal. High grade resources, including The Geysers in California are low cost. Pacific Gas and Electric cited their Geysers production in the 1970 to 1995 as their lowest cost power after hydropower electrical from dams built before 1950.	Noted.
Youba SOKONA (Sahara and Sahel Observatory)	9	6	4	6	5	-	-	-	Suggest ""In light of this background , every chapter of this report...""	Section will be re-written.
Youba SOKONA (Sahara and Sahel Observatory)	9	6	2	6	3	-	-	-	Suggest to formulate ""This special report will also serve as an import input to the AR5	Section will be re-written.
Doug Arent (Joint Institute for Strategic Energy Analysis)	9	6	-	6	-	9.1.	-	-	2nd, in the first section in which Abundance, reliability and affordability are called out, I would suggest the abundance focus on the resource potential not the installed capacity. Reliability is more than energy storage, it could be system solutions such as water systems that combine solar pumping to a holding pond/tank and gravity fed distribution. Affordability is also about 'cash flow' and availability of capital to pay for high up front costs (vs low capital and more fuel).	Noted.
Richard Taylor (International Hydropower Association)	9	6	38	6	38	9.1.1	-	-	Rephrase to delete distinction between large and small hydropower. The classification of hydropower by scale is out of step with the SRREN SOD Hydropower Chapter (5).	Accepted.
Supachai Panitchpakdi (United Nations Conference on Trade and Development)	9	6	36	7	16	9.1.1	-	-	All three dimensions, (i) Abundance, (ii) Reliability and (iii) Affordability described in the report, are also common issues for the access to medicine in the modern context. (See for example. presentation by Richard Laing from WHO, at 17 September 2010 "Access to Medicine: Pricing and Procurement Practice" WHO-WIPO-WTO joint technical symposium Available at http://www.wto.org/english/tratop_e/trips_e/techsymp_july10_e/laing_e.pdf. He describes the three elements as "quantification", "quality assurance", and "affordable pricing"). The SRREN authors could pay more attention to the other global challenge issues, and contrast or use the parallel discussions regarding the policy consideration for RE.	Noted.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	7	17	7	18	-	-	-	Please explain why? Support from the literature	Accepted. Section will be re-written.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	7	4	-	-	-	-	-	Technically both water flow and plant growth are also seasonal.	Accepted. Section will be re-written.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	7	27	7	28	-	-	-	The sentence is awkward.	Section will be re-written.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	7	1	7	2	-	-	-	What does this goal have to do with abundance?	Accepted.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	7	42	7	43	-	-	-	What does this mean?	In the re-drafted chapter, an analysis is carried out study exactly that: how (much) RE can contribute to the different dimensions of SD.
Brazil (Ministry of Science and Technology)	9	7	17	7	25	-	-	-	Although RE can be thought as the best choice to deliver results on Millennium Development Goals it isn't essential to it.	Accepted.
Brazil (Ministry of Science and Technology)	9	7	44	8	1	-	-	-	GHG emissions reductions are not ""side-effects"" of biofuels use. They are the main reason for biofuels support nowadays.	Accepted. Section will be re-written.
Brazil (Ministry of Science and Technology)	9	7	17	7	25	-	-	-	Lack of references.	Accepted. Use of references will be improved in re-drafted chapter.
Denis Aelbrecht (EDF)	9	7	12	-	12	-	-	-	is it rather "...when kerozene is NOT subsidized." ?	Accepted. Section will be re-written.
Emanuela Menichetti (Observatoire Méditerranéen de l'Energie)	9	7	43	8	2	-	-	-	I do not understand why reducing GHG emissions would produce an indirect effect on sustainability (and not a direct one). Moreover, all RE technologies lead to a reduction of GHG emissions compared to fossil alternatives - not just biofuels. Please, reformulate this sentence in order to make it clearer	Accepted. Section will be re-written.
Emanuela Menichetti (Observatoire Méditerranéen de l'Energie)	9	7	26	7	28	-	-	-	I have already pointed out in my comments to the FOD report that this sentence is not clearly articulated and would benefit from re-writing	Section will be re-written.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	9	7	34	7	37	-	-	-	Point of paragraph already has already been metioned in introduction. Paragraph could be deleted to shorten text.	Section will be re-written.
Greece (National Observatory of Athens)	9	7	32	-	-	-	-	-	Delete the word "sustainable". Or replace "sustainable development" with "economic growth"	Noted.
Greece (National Observatory of Athens)	9	7	36	8	16	-	-	-	Section 9.1.1 is too long and includes different concepts and arguments not all reflected in the title. The indicated area comprises three central issues for RE that could be moved to section 9.1.3 introducing the analysis of barriers.	Section will be re-written.
Greece (National Observatory of Athens)	9	7	12	-	17	-	-	-	The paragraph shows a problematic structure of the chapter. Title and description of 9.1 is identical to 9.2. What is the difference between the two way relationship and the interaction? The same for 9.3 and 9.4. In addition, the proposed changes of titles of 9.3 and 9.4 are not reported here.	Accepted. Section will be re-written.
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	9	7	23	7	25	-	-	-	Add the sentence below after line 25; "But nuclear power under normal operation is benign to the atmosphere and to the earth and its inhabitants locally, regionally and globally." http://www.iaea.org/Publications/Booklets/Development/devnine.html	Noted.
Jan Steckel (PIK)	9	7	15	-	-	-	-	-	Grid parity"" is not clear at this point	Noted.
Jyri Seppälä (Finnish Environment Institute)	9	7	34	41	-	-	-	-	The reader is expecting to read this kind of restrictions in Section 9.1 "Introduction"	Section will be re-written.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	9	7	43	-	-	-	-	-	"in line" with all three dimensions of SD would sound better then oversuinf the word "sustainable"	Noted.
Stephan Klasen (University of Göttingen)	9	7	30	-	-	-	-	-	Here a new concept of SD is introduced that claims that equitable sharing is necessary. This is not related to the earlier concepty and confuses. Instead one keep the issues of SD and equity/poverty reduction conceptually distinct and then explore their linkages.	In the re-drafted chapter a number of different definitions and frameworks of SD are presented and clear criteria (environmenal and health impacts, energy access, energy security and social and economic development) are introduced which allow a coherent assessment of RE in the context of SD.
Stephan Klasen (University of Göttingen)	9	7	9	7	16	-	-	-	One should be more specific with the cost advantage of fossil fuels; is this based on current prices, on total costs (including externaities)?	Accepted. Re-written chapter will be more precise and clearly state this when talking about costs.
Stephan Klasen (University of Göttingen)	9	7	17	-	-	-	-	-	Which MDGs are referred to? How are they linked to SD?	Section will be re-written.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Supachai Panitchpakdi (United Nations Conference on Trade and Development)	9	7	17	7	25	-	-	-	Renewable energy applications are a prerequisite for the Millennium Development Goals. The important linkages between modern energy services and the MDGs also include: - Goal1: Eradicate extreme poverty and hunger - Goal 2: Achieve universal primary education - Goal 3: Promote gender equality and empower women - Goal 4: reduce childe mortality - Goal 5: Improve maternal health - Goal 6: Combat HIV/AIDs, malaria, and other major diseases - Goal 7: Ensure environmental sustainability See. United Nations, Economic and Social Council (E/CN.16/2010/4), Commission on Science and Technology for Development, Report of the Secretary-General, page 3, Table 1 (available at http://www.umic.pt/images/stories/publicacoes3/ecn162010d4_en.pdf).	Noted.
Supachai Panitchpakdi (United Nations Conference on Trade and Development)	9	7	18	-	-	-	-	-	The connection between clean energy and rural development has been further reinforced by international commitment to the Johannesburg Plan of Implementation (JPOI) adopted at the 2002 World Summit on Sustainable Development (WSSD) in Johannesburg.	Noted. Reference to JPOI will be included.
Susanne Kadner (Technical Support Unit)	9	7	4	-	-	-	-	-	As agreed in the Management Team Meeting in Oxford and accordingly noted in the Oslo-Oxford Accord (p. 12, section 3.2.1) "Use the term 'variable' rather than 'intermittent' when referring to sources such as wind and solar".	Accepted.
Susanne Kadner (Technical Support Unit)	9	7	17	7	18	-	-	-	Relevant MDGs should be listed accordingly at this point in the text - the information in Box 9.1. would need to be adapted. Then highlight in which respect REs contribute to meeting the MDGs and impact WSSD components. Note coverage of MDGs in Chapter 1.1.6.	Noted.
Susanne Kadner (Technical Support Unit)	9	7	34	7	41	-	-	-	These sentences should be moved to section 9.1 where the structure of the SRREN is described.	Section will be re-written.
United States (U.S. Department of State)	9	7	3	7	8	-	-	-	Page 7, lines 3-8. Avoid broad statements, be technically accurate. For example biomass and hydropower are not continuous, but vary monthly, seasonally, and interannually.	Accepted. Section will be re-written.
United States (U.S. Department of State)	9	7	17	-	-	-	-	-	The paragraph seems to come out of the blue and does not follow the text that came before. Need to set up for this transition better.	Section will be re-written.
United States (U.S. Department of State)	9	7	2	-	-	-	-	-	We suggest removing some examples and focusing on the core points.	Accepted. Section will be re-written.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Youba SOKONA (Sahara and Sahel Observatory)	9	7	34	7	37	-	-	-	This paragraph can be droped	Section will be re-written.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	8	44	8	46	-	-	-	I fail to see how sea level rise will affect hydro power and biomass. If this connection has indeed been studied, I would be very interested in seeing the references to support this statement	Section will be re-written.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	8	9	-	-	-	-	-	Need reference for "promote social harmony". Also explain how?	Section will be re-written.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	8	22	-	-	-	-	-	This chapter (and report) is about RE, not mitigation. In general, when talking about costs it may be more appropriate to refer to investment or annualized life cycle costs for various RE options, rather than mitigation costs.	Accepted. LCOEs are included in Chapter 10 of the report.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	8	39	-	-	-	-	-	This is a rather simplistic way of referring to future climate change outcomes, suggest use appropriate language (and reference) from AR4 synthesis report	Section will be re-written.
Brazil (Ministry of Science and Technology)	9	8	4	-	-	-	-	-	Correct the number of the table 2 (see pages 18 (table 9.1) and 21(table 9.2))	Tables will be removed.
Brazil (Ministry of Science and Technology)	9	8	4	-	-	-	-	-	Correct the number of the table 3 (see pages 18 (table 9.1) and 21(table 9.2))	Tables will be removed.
Brazil (Ministry of Science and Technology)	9	8	31	8	36	-	-	-	Examples (solar lanterns and biogas-driven electric pumps) seem somewhat in contradiction to first part of the sentence since electrification was and is generally done by insertion to grid and provide its whole set of benefits: access to night illumination, refrigeration for food, possibility of electric appliances, improvement of productivity. Examples, although acting on specific issues, are restricted to them.	Section will be re-written.
Brazil (Ministry of Science and Technology)	9	8	26	8	29	-	-	-	Lack of references.	Accepted. Use of references will be improved in re-drafted chapter.
Brazil (Ministry of Science and Technology)	9	8	46	-	-	-	-	-	Suggest change to: ""... Than the change in wind and precipitation patterns and regimes.""	Section will be re-written.
Daniel Bouille (Bariloche Foundation)	9	8	34	-	35	-	-	-	I agree that rural electrification is a contribution to sustaianble development, but solar lanterns area not a happy example.	Noted.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
David Clubb (European Environment Agency)	9	8	38	8	40	-	-	-	Balance: should this text also include the 'lower' predicted limit of temperature increase? Otherwise an equally correct statement could read 'temperature increases as low as 1.4°C'. There could be explanatory text describing the benefits of preparing for higher-end temperature rises (precautionary principle)	Section will be re-written.
Denis Aelbrecht (EDF)	9	8	28	-	28	-	-	-	consider using "gender equity" instead of "gender equality"	Section will be re-written.
Denis Aelbrecht (EDF)	9	8	4	-	4	-	-	-	typo, replace "ands" by "and"	Section will be re-written.
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	9	8	22	8	30	-	-	-	There should be one paragraph each for the description of the economic dimension and one for the description of the social dimension of SD (greater clarity).	Section will be re-written.
Germany (Federal Ministry for the Environment, Nature Conservation and Nuclear Safety)	9	8	39	8	39	-	-	-	Revise text to say: "It is projected to lead to temperature increases as high as 4.5 degrees C by 2100 above pre-industrial levels under high business-as-usual scenarios ..." Reason: For the highest scenario assessed in AR4, A1FI, the temperature projection above 1980-1999 is 4.0 degree, thus 4.5 degree above pre-industrial levels (see Table 5.1 in IPCC AR4 SYR). It is safer to state the best-estimate warming for the highest scenario. It should be added, that this is a non-mitigation scenario.	Section will be re-written.
Greece (National Observatory of Athens)	9	8	42	-	-	-	-	-	Relace "often" with "always". Positive effects always exist even if (in rare cases) the net outcome is negative	Section will be re-written.
Greece (National Observatory of Athens)	9	8	27	-	28	-	-	-	Rephrase to: institutional aspects of SD, including climate change. Dimensions to be removed	Section will be re-written.
Gregory Keoleian (University of Michigan)	9	8	4	-	-	-	-	-	typo: ands	Section will be re-written.
Gustavo Nadal (Fundacion Bariloche)	9	8	18	8	21	-	-	-	In some cases the relation between GHG and local pollutants is inverse (e.g. CO2 and aldehydes emissions form ethanol as transport fuel)	Accepted. Re-drafted chapter will include detailed LCAs on GHG emissions and air pollutants.
Jan Steckel (PIK)	9	8	5	-	-	-	-	-	Not clear which SD indicators are referred to and why	Section will be re-written.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	9	8	37	9	3	-	-	-	The severity and potetnial CC impacs are already highlighted several times in the report, so they can be skipped here. A mention that CC will affect renewables and what these impacts could be eould be sufficient.	Accepted.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	9	8	4	-	-	-	-	-	where are tables 2 and 3?	Tables will be removed.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Oyvind Christophersen (Climate and Pollution Agency)	9	8	40	-	-	-	-	-	"...and cause changes in regional and severity of..." - this wording is hard to understand.	Section will be re-written.
Oyvind Christophersen (Climate and Pollution Agency)	9	8	44	-	46	-	-	-	We do not precisely understand the meaning of this sentence (the wording appears to indicate that sea level rise is a renewable source). Is the intention to relate impacts from climate change to the availability of renewable energy? If this is the case, we would suppose that the impacts from changed precipitation on hydro power and biomass would be more relevant than sea level rise.	Section will be re-written.
Oyvind Christophersen (Climate and Pollution Agency)	9	8	39	-	-	-	-	-	We propose that a temperature interval (consistent with other parts of the report) is used instead of the SRES maximum increase.	Section will be re-written.
Peter Johnston (Environmental & Energy Consultants, Ltd)	9	8	32	8	33	-	-	-	"rural evelopment in all countries .. has been accelerated through the process of electrification." All countries? NO!! Not always so. A study in Pacific Island Countries (PICs) suggests that the costs to rural communities of rural electrification in PICs very often exceeds the development benefits. Although electrification is often justified on the basis of new income earning opportunities, net income often decreases. These findings would probably be replicated elsewhere if studied. See "Energy Access and Poverty Reduction in the Pacific Island Countries (PICs) - An Overview of Some of the Key Challenges and Opportunities" (March 2007, UNDP Regional Centre in Bangkok) for which I was a principal consultant. This is available from UNDP in Bangkok.	Noted.
Stephan Klasen (University of Göttingen)	9	8	14	8	40	-	-	-	Another concept of SD is now introduced including environmental, economic, and social components. This causes further confusion. One should stick to one definition (such as the one from the Brundlandt Commission), thus focusing on long-term implications of RE on ability to meet future needs, rather than keep on mixing concepts.	In the re-drafted chapter a number of different definitions and frameworks of SD are presented and clear criteria (environmenal and health impacts, energy access, energy security and social and economic development) are introduced which allow a coherent assessment of RE in the context of SD.
Susanne Kadner (Technical Support Unit)	9	8	14	8	30	-	-	-	Can't these paragraphs be linked to the MDGs and WSSDs introduced above?	Section will be re-written.
Susanne Kadner (Technical Support Unit)	9	8	22	8	27	-	-	-	These sentences have been copied and pasted from the AR4 (Chapter 12.3, p. 726). Obviously, the SRREN is not assessing the costs of mitigation policies buts rather looks at the role of RETs in different mitigation scenarios and provides supply cost curves instead. Please check Chapter 10!	Noted.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Thomas Wilbanks (ORNL)	9	8	37	-	-	-	-	-	climate change impacts on RE are far too important for an IPCC report to get so little attention here, even where the best we can do right now is to describe vulnerabilities. Adding some sort of a summary table of vulnerabilities might be useful.	Section will be re-written.
United States (U.S. Department of State)	9	8	4	8	4	-	-	-	Reference is made to "Tables 2 and 3." It would appear that these actually are Table 9.1 on page 18 and Table 9.2 on page 21. Table 9.1 is incomplete, distorts facts, and is not rigorous. Unless it is radically revised it should be eliminated.	Accepted. Tables will be removed.
China (China Meteorological Administration)	9	8	26	8	26	9.1.1	-	-	Delete "and availability of jobs". Reason: this is implied in "employment".	Section will be re-written.
Emmanuel Branche (Electricité de France)	9	8	44	8	45	9.1.1	-	-	Sea level has virtually no impact on hydropower sources. (ref Chapter 5)	Section will be re-written.
Garcia Javier (Garcia Monge Consultant)	9	8	37	8	46	9.1.1	-	-	The paragraph deal with the impacts of Climate Change on energy production. It is very important to include the impacts on glaciers and snow cover in mountains. Many rivers, suitable to deliver energy as a run-of-river power plant, will be affected with the retreat of glacier that feed them in srping and summer. Also the elevation of the zero isotherm in the mountain will produce more extreme run-off for high precipitation events and less stock of ice for spring flow, affecting energy generation, human consumption and agriculture irrigation	Section will be re-written. This topic should be coverd in more detail in the technology chapter on hydropower which has a specfic section that discusses the impacts on hydro from climate change (i.e. altered precipitation etc.)
Michael Hübler (Potsdam Institute for Climate Impact Research)	9	8	-	8	-	9.1.1	-	-	This section enumerates aspects such as social harmony, gender equity, income equity etc. without an explanation. Therefore, the reader needs to guess why this is so. Therefore, I suggest to add short explanations, not only on this page, but also elsewhere where such aspects are mentioned.	Section will be re-written.
Richard Taylor (International Hydropower Association)	9	8	44	8	44	9.1.1	-	-	Delete reference to hydropower. Sea level rise will have little if no impact on availability of hydropower sources.	Section will be re-written.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	9	14	9	15	-	-	-	Are these 30 the ones used in tables 9.1 & 9.2?	Tables will be removed.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	9	16	-	-	-	-	-	Energy for sustainable development should be used instead of sustainable energy development	Noted.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	9	5	-	-	-	-	-	How is "implementation" to be made more sustainable?	Section will be re-written.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	9	37	-	-	-	-	-	Intermittency and variability are the typical barriers - storage is a solution	Overall classification of barriers is covered in Chapter 1; the re-drafted chapter 9 will discuss barriers that are relevant in an SD context.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Angel DE LA VEGA NAVARRO (UNAM - National Autonomous University of Mexico)	9	9	4	-	-	-	-	-	Chapter 9, Page 9, Lines 4 to 31, 9.1.2 Energy Indicators of Sustainable Development; I refer specifically to lines 8-11: United Nations Department of Economic and Social Affairs (UNDESA) began working to produce an overall set of indicators for sustainable development and concluded with a package of 58 indicators, of which only energy related: annual energy consumption per capita, intensity of energy use and share of consumption of renewable energy resources. And 22-27: "According to the field of activities, different organizations have developed 23 sustainability criteria and tools, e.g. International Labour Organization (ILO) for acceptable labor conditions, the WWF for ecological aspects, the Worldbank for financial results; the OECD and the UN for development policymaking and information (Lewandowski and Faaij, 2006). Measurement and reporting of indicators is thus a critical aspect of the implementation of sound renewable energy technologies". It would be useful to take into account the Report of the 'Commission on the measurement of economic performance and social progress' (2009) chaired by Nobel prize Joseph Stiglitz and including another Nobel prize winner Amartya Sen who, among others contributions, has produced important works that have deeply changed the concept of development (human development). The objective of this commission was to propose new indicators on measuring economic performance and social progress. As is well known, concerns coming from different origins have been raised about the adequacy of current measures, in particular those based on GDP figures, as measures of societal well-being and of economic, environmental, and social sustainability. An important result of the Stiglitz report is that it proposes to modify the existing accounting framework in order to take better into account actual evolutions of the economy and society: inequalities, security, public services and goods (education, health, clean environment). Considering that several phenomena that determine well being are not measured in present statistical apparatus, in particular those related with environment (air and water quality, etc.), this report tries to propose acceptable measures, as indicators of quality of life: capabilities, leisure, freedoms, participation to the city life, etc.). What is important, also, is that this effort to find more adequate indicators can influence the redefinition of new instruments of public action and the very philosophy of public policies in the field of environment. In this field standard economics focuses on economic instruments (taxes, regulation, emission permit markets), taking only into account criteria of efficacy, 'cost-effective', etc. It is possible now to try to incorporate sustainability criteria better suited than analysis with market emphasis.	Accepted. Reference will be included.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Angel DE LA VEGA NAVARRO (UNAM - National Autonomous University of Mexico)	9	9	4	-	-	-	-	-	In this direction, it is necessary to revise the narrow conception of policies present in this chapter: See for example, page 47; lines 33 to 41: In very broad terms, policies can be grouped into seven main categories i) research, development and demonstration incentives; ii) investment incentives; iii) tax measures; iv) incentive tariffs; v) voluntary programs; vi) mandatory programs or obligations; and vii) tradable certificates. (REN 21, 36 2006). The evolution of these policies since the 1970s reflects among other things, an increased market orientation or policies moving from regulation towards economic policy tools. Presently, feed-in tariffs, obligations and tradable green certificates are emerging as the main policy instruments in many developed and increasingly some developing countries. Investment incentives and various tax measures do, however, remain important mechanisms to stimulate renewable energy investment.	Chapter will be completely re-drafted to address this - the detailed policy discussion can be found in Chapter 11.
Brazil (Ministry of Science and Technology)	9	9	3	-	-	-	-	-	Better remove ""earthquake"", since it's not related to climate change and can be misinterpreted.	Section will be re-written.
Brazil (Ministry of Science and Technology)	9	9	14	9	16	-	-	-	Lack of explicit reference	Section will be re-written.
Daniel Bouille (Bariloche Foundation)	9	9	33	-	41	-	-	-	As mentioned before in the chapter, need of back-up for intermitent sources is and important economic barrier.	Overall classification of barriers is covered in Chapter 1; the re-drafted chapter 9 will discuss barriers that are relevant in an SD context.
Daniel Bouille (Bariloche Foundation)	9	9	33	-	41	-	-	-	I can add ""inadequate estructure of price and tariff"" in energy related with grids. This ussue is, several times, more important than subsidies as a barrier.	Noted. The re-drafted chapter 9 will discuss barriers that are relevant in an SD context.
Daniel Bouille (Bariloche Foundation)	9	9	5	-	31	-	-	-	Section 9.1.2 should make reference to an early effort (2000) of the Latin American Energy Organization (OLADE in spanish) that wit the support of GTZ and ECLAC developed a Guidelines to Assess Energy Policy Sustainability includign several energy specific indicators. The name of the book (published in 2003) in spanish is ""energía y Desarrollo Sustentable en América Latina y Caribe"" - Guía para la formulación de políticas - CEPAL-OLDADE-GTZ. 2003	Noted.
Daniel Bouille (Bariloche Foundation)	9	9	5	-	31	-	-	-	The definition and apliccability of indicators should consider the availability of information. The best set of indicator could not useful, especially in developing countries, if there is no information to calculate them.	Accepted.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
David Clubb (European Environment Agency)	9	9	42	10	5	-	-	-	Comment: This paragraph is poorly articulated and somewhat vague. Would benefit from rewriting	Section will be re-written.
David Clubb (European Environment Agency)	9	9	34	9	34	-	-	-	Suggested change: FROM ""high first cost"" TO ""higher proportion of capital cost compared with fossil-fuel equivalent""	Section will be re-written.
David Clubb (European Environment Agency)	9	9	37	9	37	-	-	-	Suggested change: FROM ""lack of storage facilities"" TO ""current lack of electricity storage capacity""	Section will be re-written.
David Clubb (European Environment Agency)	9	9	37	9	37	-	-	-	Suggested change: FROM ""subsidies for conventional supplies"" TO ""historical and current levels of subsidy to fossil and nuclear generation""	Noted.
Emanuela Menichetti (Observatoire Méditerranéen de l'Energie)	9	9	41	9	41	-	-	-	Please, clearly state what you intend by "inadequate capacity to build and monitor performance of renewables"	Section will be re-written.
Emanuela Menichetti (Observatoire Méditerranéen de l'Energie)	9	9	5	9	5	-	-	-	To make implementation of what? Please, specify…	Section will be re-written.
Emmanuel Branche (Electricité de France)	9	9	1	9	3	-	-	-	Proposition to add: "large hydropower with reservoirs can be used to adapt to more extrem events (floods and droughts)", reference chapter 5	Section will be re-written.
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	9	9	29	9	31	-	-	-	The relevant indicators provided by IAEA used in this chapter are not explicitly mentioned here; nevertheless, they should be mentioned.	Section will be re-written.
Greece (National Observatory of Athens)	9	9	4	-	-	-	-	-	Remove "s" from "ands"	Section will be re-written.
Gustavo Nadal (Fundacion Bariloche)	9	9	34	9	37	-	-	-	high cost + lack of adequate financing + low payment capacity (mostly rural areas). Also lack of adequate legal/regulatory and institutional frameworks, since these are generally structured for supply with conventional energies. In developing countries enforcement of policies is another key issue.	Overall classification of barriers is covered in Chapter 1; the re-drafted chapter 9 will discuss barriers that are relevant in an SD context.
Japan (the Japanese Ministry of Foreign Affairs)	9	9	45	-	46	-	-	-	"Water usage for crops and fertilizer nitrate pollution from bioenergy sources has been documented as an important issue" does not make sense.	Accepted. Section will be re-written.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	9	9	36	-	-	-	-	-	on point 4): Not just electricty grid, also the gas grid and transport fuel distribution infrastructure would face some challenges	Noted.
Oluf Ulseth (Statkraft AS)	9	9	25	-	-	-	-	-	Recommended addition: Hydropower Sustainability Assessment Protocol (IHA).	IHA will be included in appropriate section in re-drafted chapter.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Oluf Ulseth (Statkraft AS)	9	9	2	-	-	-	-	-	Suggested insertion for the sake of clarification: "For example, hydropower projects with water storage capacity act as a buffer in adapting to climate change and its increasingly varying precipitation patterns."	Section will be re-written.
Oluf Ulseth (Statkraft AS)	9	9	44	9	45	-	-	-	This statements implies that all large-hydro projects with reservoirs involve population displacement. This is not true. Neither are all countries as populated as China. For example the whole hydropower generating fleet of Canada (74 000 MW installed capacity and about 355 TWh/yr) has involved no involuntary displacement.Therefore this sentence should be removed and replaced by:" For hydropower projects often the high up front investment needs are a major limiting factor."	Accepted. Section will be re-written.
Oyvind Christophersen (Climate and Pollution Agency)	9	9	2	-	-	-	-	-	A suggestion in order to clarify is to insert: "For example, hydropower projects with storage capacity will act as buffers in adapting to climate change and its increasingly varying precipitation patterns".	Section will be re-written.
Oyvind Christophersen (Climate and Pollution Agency)	9	9	45	-	-	-	-	-	Greenhouse gas emissions from fertilizer production might also be included here.	Noted.
Oyvind Christophersen (Climate and Pollution Agency)	9	9	25	-	-	-	-	-	It is highly recommended to add Hydropower Sustainability Assessment Protocol (IHA).	IHA will be included in appropriate section in re-drafted chapter.
Oyvind Christophersen (Climate and Pollution Agency)	9	9	14	9	26	-	-	-	Suggested rewritten: "Integration of RE into the energy supply system and infrastructure of many non-OECD countries today raises challenges that differ from those of OECD countries. There are significant regional and local differences in the potential and government support schemes (Chapters 10 and 11) with many developing country governments placing a higher priority on future economic development and security than on climate change mtigation. Integration of RE into an autonomous energy system in a rural region without energy infrastructure differs markedly from RE integration into regions which already have high shares of RE or where cross-border transmission options are possible. Small-scale, distributed, RE systems may be able to avoid the high capital cost of constructing infrastructure presently lacking (ARE 2009).Thus, the deployment of "stand alone" low-carbon technologies, particularly RE, could be a win/win solution (Chapter 9). However, due to the stocastic non-dispatchable nature of most RE technologies, backup systems will have to be accessable in order to maintain reasonable security of supply."	Noted.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Oyvind Christophersen (Climate and Pollution Agency)	9	9	44	9	45	-	-	-	The statement that implies that all large-hydro projects with reservoirs involve population displacement is highly unqualified. Norway, for example, has developed 30 000 MW (124 TWh/y) of hydropower with hardly any displacement of people. Canada is another example. However, up-front costs and long decision-making processes are major challenges. This sentence should therefore be change to a text like this:" High up front investment costs can be a major limiting factor for hydropower. Normally there is no need to displace population when large-hydro reservoirs are developed. However, in some cases displacement of population from such projects is limiting the expansion of this source of power".	Accepted. Section will be re-written.
Peter Johnston (Environmental & Energy Consultants, Ltd)	9	9	33	9	41	-	-	-	Barriers. Theree are many more key barriers to RE than the 6 listed. In small less-developed countries such as mine, these often include: 7) outdated policies, legislation & regulations, especially for the power sector but also regarding fuel standards; and 8) a lack of skilled people to specify, contract for, evaluate, install and operate & maintain RE systems, which require a different set of skills -- or additional skills -- than conventional energy systems. These seem to me to be at least as important as those listed. The GEF has prepared many reports on barriers to RE. For example, for 15 Pacific Island Countries, these are summarised in the Regional Overview report of the "Pacific Regional Energy Assessment 2004 : an assessment of the key energy issues, barriers to the development of renewable energy to mitigate climate change, and capacity development needs to removing the barriers" prepared by Herbert Wade, Peter Johnston & John Vos and available from the Secretariat of the Pacific Regional Environemnt Programme (SPREP, 2005) at http://www.sprep.org/climate_change/piggarep/pirepdocs.htm. There were significant barriers under various headings: market, fiscal & financial, knowledge & information, institutions, social, etc.	Overall classification of barriers is covered in Chapter 1; the re-drafted chapter 9 will discuss barriers that are relevant in an SD context.
Susanne Kadner (Technical Support Unit)	9	9	26	9	31	-	-	-	It would be interesting if the set of most relevant IAEA indicators presented and their underlying concepts would be introduced and discussed. Also, as the indicators are only clearly presented in the Annex table, the sentence needs to be adjusted accordingly.	Tables will be removed and section re-written.
United States (U.S. Department of State)	9	9	0	-	-	-	-	-	A new taxonomy needs to be adapted for barriers because current one is not comprehensive. Recommend something along the lines of knowledge, regulatory, policy, technical, economic, environmental, etc.	Overall classification of barriers is covered in Chapter 1; the re-drafted chapter 9 will discuss barriers that are relevant in an SD context.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
United States (U.S. Department of State)	9	9	43	-	-	-	-	-	Section 9.1.3, p. 9, line 43 Subsidence from geothermal can be avoided through proper management. For example geothermal plants in the Imperial Valley are strictly monitored for both subsidence due to withdrawal of fluids and inflation due to injection. Imperial Valley agriculture is inte4nsive and relies on flood irrigation so level land is an important aspect of the agricultural production. Many fields in the Western US to have subsidence, however these are field in semi-desert areas with little or no surface use other than grazing of cattle. However, subsidence is a problem elsewhere in the world.	Noted.
Richard Taylor (International Hydropower Association)	9	9	3	9	3	9.1.1	-	-	Add the following at the end of the sentence: ""and reservoir hydropower in managing the spatial and temporal variability of a changing hydrologic cycle.	Section will be re-written.
Susanne Kadner (Technical Support Unit)	9	9	5	9	25	9.1.2	-	-	This section could benefit from being slightly restructured. At present, indicators of SD are discussed at first, then the focus is shifted to indicators that are energy related; at the end of the paragraph, the reference of Lewandowski and Faaij provides examples for general SD criteria. It would therefore be clearer to introduce this reference and the associated information on SD critieria (p.9 line 20-25) at the beginning of the paragraph, followed by the introduction of SD indicators and then energy indicators.	Noted.
Greece (National Observatory of Athens)	9	9	-	-	-	9.1.2.	-	-	Remove "Energy" from the title. Different aspects of SD are affected by the type and quantity of energy, however relevant indicators are not characterised as energy indicators. I suppose that the scope of the subsection is to underline the importance of measuring and correlating RE development with different SD aspects by using appropriate indicators.	Noted.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	9	-	-	-	9.1.3	-	-	If there are different types of barriers a better characterization and categorization may be required.	Overall classification of barriers is covered in Chapter 1; the re-drafted chapter 9 will discuss barriers that are relevant in an SD context.
Garcia Javier (Garcia Monge Consultant)	9	9	33	9	38	9.1.3	-	-	May I suggest to add the following barrier: ""(7) lack of logistics for biofuels use and deployment.""	Section will be re-written.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Richard Taylor (International Hydropower Association)	9	9	44	9	44	9.1.3	-	-	Delete ""Displacement of population from large hydro reservoirs is limiting the expansion of this source of power"" and replace with ""Financing and environmental/social issues can limit opportunities for reservoir hydropower"". Comment: The classification of hydropower by scale is out of step with the SRREN SOD Hydropower Chapter (5). Population displacement is not a generic limitation to the technology's expansion - it's only a relevent factor in some cases. Financing and social/environmental issues are relevent in most instances.	Noted.
Garcia Javier (Garcia Monge Consultant)	9	9	34	9	34	9.1.3.	-	-	It is not clear the meaning of ""(1) high first cost of renewable technologies,"". Does the sentence refers to the high investment cost of RE or to the high cost when RE are in the R&D or pre commercial phase?	Section will be re-written.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	10	42	10	44	-	-	-	Check language.	Section will be re-written.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	10	34	-	-	-	-	-	Do the RET's enhance agricultural practice or the availability of electricity for pumping?	Section will be re-written.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	10	28	-	-	-	-	-	Explain assertion - what is the significance of 'efficient' energy systems?	Section will be re-written.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	10	22	-	-	-	-	-	It should be the other way round (i.e. substitute modern energy for human power)	Section will be re-written.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	10	16	10	17	-	-	-	The logic of why conventional energy options cannot contribute rural development is not clear. What do you mean by concentrated 'production', 'transformation' and 'distribution chains'?	Section will be re-written.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	10	18	10	21	-	-	-	The same benefits can be achieved through rural electrification.	Noted.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	10	3	-	-	-	-	-	What is the connection with energy?	Section will be re-written.
Australia (0)	9	10	3	-	-	-	-	-	More info needed re gender equity concerns. Do these concerns come before or after adoption of RE technologies? What are they?	Section will be re-written.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Brazil (Ministry of Science and Technology)	9	10	2	10	5	-	-	-	Sentence on gender equity isn't clear. Seems disconnected to the rest of the paragraph.	Section will be re-written.
Daniel Bouille (Bariloche Foundation)	9	10	36	-	-	-	-	-	..force in MANY developing countries	Section will be re-written.
David Clubb (European Environment Agency)	9	10	18	10	18	-	-	-	Comment: I would specify 'biomass stove' or steer clear of more generic SD issues	Section will be re-written.
David Clubb (European Environment Agency)	9	10	45	10	45	-	-	-	Incorrect: 'Headloaded'? Presume you meant handloaded?	Section will be re-written.
David Clubb (European Environment Agency)	9	10	31	10	33	-	-	-	Suggested change: REPLACE ""is often done at the expense of"" WITH ""are a reduction in time for""	Section will be re-written.
Greece (National Observatory of Athens)	9	10	34	-	37	-	-	-	It would be better to classify barriers in groups, e.g. technical like (4) and (6), economic like (1), (2) and (5), administrative like (3). An alternative distinction is between technical and non-technical barriers. In addition, the list of barriers is certainly not exhaustive.	Overall classification of barriers is covered in Chapter 1; the re-drafted chapter 9 will discuss barriers that are relevant in an SD context.
Greece (National Observatory of Athens)	9	10	38	-	41	-	-	-	The issues listed are not barriers. You mean that possible negative effects on SD aspects like water pollution etc. may restrict the introduction and scaling of RE technologies.	The re-drafted chapter 9 will discuss barriers that are relevant in an SD context.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	9	10	6	-	-	-	-	-	"capacitybuilding" is certainly not a barrier, "lack of capacity", as mentioned in the following sentence is	Section will be re-written.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	9	10	40	-	-	-	-	-	"energy power"?! Just "energy" will be more correct	Section will be re-written.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	9	10	42	-	-	-	-	-	renewableS	Section will be re-written.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	9	10	44	-	-	-	-	-	renewableS or renewable energy	The multipurpose use of hydropower is covered in detail in Chapter 5.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	9	10	33	-	-	-	-	-	the expense of education is probably more relevant then leisure	Section will be re-written.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	9	10	22	-	-	-	-	-	what is meant by "human energy"?	Section will be re-written.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	9	10	38	-	-	-	-	-	what is meant by "the bulk of agricultural production is energy-dependent"? That it requires energy as an input?	Section will be re-written.
Oluf Ulseth (Statkraft AS)	9	10	42	-	-	-	-	-	Recommendation to insert here a reference to the potential of hydropower to contribute not only energy but also water services to reach vital development goals. Proposal: " Besides providing energy, sustainable hydropower projects with freshwater storage capacity can make a major contribution to reach the UN MDGs, as they facilitate multiple water uses such as irrigation, drought and flood control, navigation, fisheries, by increasing the availabel water quantity for the region."	The multipurpose use of hydropower is covered in detail in Chapter 5.
Oluf Ulseth (Statkraft AS)	9	10	16	10	21	-	-	-	Recommendation to remove "and large hydro" as this formulation leads to the erronous statement that large-hydro is not renewable. Furthermore, the description of development potential for smal-scale solutions in remote areas which are not conected to central electricity system, should be completed by the following sentence regarding medium and large-scale solution required for urban and highly industrialised areas, especially since according to WEO projections for 2030 about 90 % of the world population might live in such urban areas. Proposal to add in lines 17/ 18 after (...) in rural "and urban" development. Specify at the beginning of the following sentence "To respond to needs of rural communities, simple smal scale and off-grid solutions" (...) such as solar panels, improved cookstoves or hydro plants can provide (...). Then complet: "For densly populated areas or industrialised regions depending on intensive and continuous electricity supply, flexible and reliable energy services are required which can only be provided by an integrated electricity system based on large-scale production".	Section will be re-written.
Oluf Ulseth (Statkraft AS)	9	10	2	-	-	-	-	-	The statement about "potential infrastructure dammage due to inundation" should be deleted for the following reasons: (1) many hydropower with storage capacity are built to prevent flood damages not only to existing infrastructure further downstream of a river bassin (completely contrary fact leading to confusion), (2) in cases where a reservoir inundates existing infrastrucutre national and international legislation forsees either replacement or adequate compensation, so that this issue can not really be considered as a barrier for expansion.	The re-drafted chapter 9 will discuss barriers that are relevant in an SD context.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Oyvind Christophersen (Climate and Pollution Agency)	9	10	42	-	-	-	-	-	One recommends to refer also to the potential of hydropower to contribute not only to energy but also water services. One proposal: " Besides providing energy, hydropower projects with freshwater storage capacity can make a major contribution to sustainable development by facilitating multiple water uses such as irrigation, drought and flood control, navigation, fisheries, and increase the available water quantity."	Section will be re-written.
Oyvind Christophersen (Climate and Pollution Agency)	9	10	16	10	21	-	-	-	Removal of "and large hydro" is recommended because this formulation leads to the wrong conception statement that large hydro is not renewable. Furthermore, it is not documented that large hydro has higher unit costs than other RE sources, which one may get the impression of by reading this statement.	Section will be re-written.
Oyvind Christophersen (Climate and Pollution Agency)	9	10	3	-	-	-	-	-	The mentioning of gender equity in rural areas appears somewhat out of context, as it might be interpreted as a particular concern related to renewable energy. Since this topic is dealt with in more detail later in the next chapter, we propose that this topic is not dealt with here.	Section will be re-written.
Oyvind Christophersen (Climate and Pollution Agency)	9	10	2	-	-	-	-	-	The statement of "potential infrastructure dammage due to inundation" should be deleted because many hydropower plants which have storage capacity are built to prevent flood damages and in cases where a reservoir inundates existing infrastrucutre, both national and international legislation/safeguards demand either satisfactory replacement or adequate compensation. This issue can therefore not be considered as a barrier for expansion.	The re-drafted chapter 9 will discuss barriers that are relevant in an SD context.
Stephan Klasen (University of Göttingen)	9	10	13	10	21	-	-	-	Again a new set of SD goals. How are they linked to the earlier discussion?	Section will be re-written.
Susanne Kadner (Technical Support Unit)	9	10	16	-	-	-	-	-	As mentioned in the comments to the FOD, liaise with Chapter 5 on the usage of small and large hydro.	Accepted.
United States (U.S. Department of State)	9	10	22	10	23	-	-	-	Suggest to drop the whole statement "There is a need to substitute human energy for modern energy systems that will reduce drudgery and increase wellbeing."	Section will be re-written.
Youba SOKONA (Sahara and Sahel Observatory)	9	10	6	10	6	-	-	-	How capacity building acn be a barrier? It is rather lack of capacity	Section will be re-written.
Youba SOKONA (Sahara and Sahel Observatory)	9	10	16	10	16	-	-	-	Why large hydros are not considered as rewable energy?	Section will be re-written.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Susanne Kadner (Technical Support Unit)	9	10	13	10	15	9.1.2.	-	-	The table in Appendix A lists several SD indicators but does not describe "the most relevant SD goals" per se - a clear differentiation needs to be made here. In the context of this section and the SD links to RE options, a reference to the MDGs and WSSD may be worthwhile.	In the re-drafted chapter a number of different definitions and frameworks of SD are presented and clear goals/criteria (environmenal and health impacts, energy access, energy security and social and economic development) are introduced which allow a coherent assessment of RE in the context of SD.
Richard Taylor (International Hydropower Association)	9	10	2	10	2	9.1.3	-	-	Delete "potential infrastructure damage due to inundation act as additional barriers to RE expansion". Comment: this is not a real SD barrier to the development of hydropower for the following reasons: (1) many reservoir hydropower projects are built to prevent flood damage to existing infrastructure downstream; and (2) in cases where a reservoir inundates existing infrastrucutre national legislation/regulations and international standards require either replacement or adequate compensation.	The re-drafted chapter 9 will discuss barriers that are relevant in an SD context.
Garcia Javier (Garcia Monge Consultant)	9	10	20	10	21	9.2.1	-	-	In the sentence there is a ""good"" atribute for both a good and a bad feature. I suggest to phrasing as follows: ""Local environmental quality (air, water, soil) and health benefits are improved.""	Section will be re-written.
Richard Taylor (International Hydropower Association)	9	10	15	10	16	9.2.1	-	-	Rephrase sentence. Incorrectly implies that hydro is not a renewable energy. Note also that the classification of hydropower by scale is out of step with the SRREN SOD Hydropower Chapter (5).	Section will be re-written.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	11	43	-	-	-	-	-	"Productive survival" is a new term for this reviewer. Please explain and provide a reference	Section will be re-written.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	11	22	-	-	-	-	-	Is this true? What percentage does "fair part" actually refer to? References?	Section will be re-written.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	11	39	-	-	-	-	-	Please explain "basic level" of what?	Section will be re-written.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	11	21	-	-	-	-	-	Please explain the new term 'energy matrices'	Section will be re-written.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	11	26	-	-	-	-	-	Resource limitation for what?	Section will be re-written.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	11	13	11	19	-	-	-	This explanation is not clear. Sources, conversion devices and end-uses are mixed up.	Section will be re-written.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	11	1	-	-	-	-	-	What are the constraints?	Section will be re-written.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	11	27	11	34	-	-	-	What is the point of this paragraph? Relevance to the SRREN?	Section will be re-written.
Daniel Bouille (Bariloche Foundation)	9	11	20	-	-	-	-	-	Content of the section does not reflect the tittle. The section should be expand to include the description and the difference between past and present role of renewable.	Section will be re-written.
Daniel Bouille (Bariloche Foundation)	9	11	25	-	-	-	-	-	I suggest to make reference to more recent numbers.	Section will be re-written.
Daniel Bouille (Bariloche Foundation)	9	11	13	-	19	-	-	-	The statement is confuse and contradictory, if peole is poor to have access to commercial energy, how renewable (that are more expensive as is clearly said in page 19) are going to be more affordable to them?	Section will be re-written. The aspect of higher costs for RE will be covered in new section on social and economic development.
Daniel Bouille (Bariloche Foundation)	9	11	1	-	4	-	-	-	What is the relation between ""pricing level"" ""energy services"" and Renewable. Confuse statement.	Section will be re-written.
David Clubb (European Environment Agency)	9	11	21	11	22	-	-	-	Comment: This sentence is poorly worded; suggest a rewrite	Section will be re-written.
David Clubb (European Environment Agency)	9	11	32	11	34	-	-	-	Missing reference: Instinctively one would expect the elite to be more likely than the poor to emigrate	Section will be re-written.
David Clubb (European Environment Agency)	9	11	45	11	46	-	-	-	Unnecessary text: If this is obvious then why include it?	Section will be re-written.
David Clubb (European Environment Agency)	9	11	35	11	37	-	-	-	Unsupported assertion: A 'large part' of energy comes from human beings and animals. What proportion? How are 'poorer developing countries' defined? Reference needed	Section will be re-written.
David Clubb (European Environment Agency)	9	11	37	11	40	-	-	-	Unsupported assertion: which rural areas? Reference needed	Section will be re-written.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	9	11	24	-	-	-	-	-	use kerosene for what exactly? Cooking and lighting and water heating or just cooking?	Section will be re-written.
Oyvind Christophersen (Climate and Pollution Agency)	9	11	39	-	41	-	-	-	We propose that "A basic level" is deleted - leaving sentence as this: "The fulfilment of basic human needs, may vary with…"	Section will be re-written.
Peter Johnston (Environmental & Energy Consultants, Ltd)	9	11	24	11	25	-	-	-	50 kg a year of kerosene. Unclear: to meet basic per capita needs of cooking, heating and lighting? Or just cooking.	Section will be re-written.
Susanne Kadner (Technical Support Unit)	9	11	5	11	12	-	-	-	Paragraph unclear and needs rewording.	Section will be re-written.
Susanne Kadner (Technical Support Unit)	9	11	35	11	46	-	-	-	Parts of this paragraph may be moved to section 9.2.1. or 9.2.3 depending on how these sections will be restructured (see my comment no. 18 on section 9.2.1)	Section will be re-written.
United States (U.S. Department of State)	9	11	28	-	-	-	-	-	The "elite try to mimic..." comment could be viewed as very offensive. This needs to be removed.	Section will be re-written.
Youba SOKONA (Sahara and Sahel Observatory)	9	11	24	11	25	-	-	-	I wonder if you are not mixing kg and koe (toe)?	Section will be re-written.
Youba SOKONA (Sahara and Sahel Observatory)	9	11	20	12	8	-	-	-	The development of this paragraph does not reflect the title. It seems to me that the development reflect a dual energy pactrice	Section will be re-written.
Youba SOKONA (Sahara and Sahel Observatory)	9	11	23	11	23	-	-	-	What you mean by basic needs as it can not be restricted to cooking	The re-drafted chapter will contain a section on energy access where a table will describe what energy services are required to fulfil basic human needs.
Greece (National Observatory of Athens)	9	11	-	12	-	9.2.1	-	-	Needs reduction. Too many iterations, especially as regards the role of RE for rural development and the benefits for women.	Section will be re-written.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	12	14	-	-	-	-	-	How does this "feed opposition" to major changes?	Section will be re-written.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	12	21	-	-	-	-	-	I find this a rather surprising statement - I would have thought that the dominant mode of rural electrification (at least so far) was grid extension. Of course there are examples of off-grid generation, but I doubt that that is the general rule.	Section will be re-written; in new section on energy access both off-grid generation and grid extension will be covered.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	12	1	12	8	-	-	-	In general, this is a somewhat vague paragraph	Section will be re-written.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	12	35	-	-	-	-	-	Is it true that urban supply institutions emphasize supplies to relatively large customers? Are there any numbers for this? References?	Section will be re-written.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	12	1	-	-	-	-	-	Negative aspects of what? The term "resource depletion" clearly cannot apply since RE's are renewable, by definition?	Section will be re-written.
Daniel Bouille (Bariloche Foundation)	9	12	35	-	40	-	-	-	I do understand clearly the last sentences. Is this wood commercial or non commercial energy?	Section will be re-written.
David Clubb (European Environment Agency)	9	12	35	12	40	-	-	-	Editing: This paragraph currently has grammatical errors which give a meaning the opposite of that which is (I assume) intended	Section will be re-written.
David Clubb (European Environment Agency)	9	12	1	12	8	-	-	-	Unclear or irrelevant: This paragraph is poorly written with respect to the section heading. Why discuss weapon proliferation in the context of renewable energy and sustainable development? The negative impacts of RE exist of course, but how do they relate specifically to SD, and in particular when considering them against 'conventional energy'? Suggest deletion or rewriting	Section will be re-written.
David Clubb (European Environment Agency)	9	12	2	12	4	-	-	-	Unclear: Competition with food for land. What does this mean? Agricultural land vs unproductive? The rest of the sentence is meaningless without this clarity	Section will be re-written.
Greece (National Observatory of Athens)	9	12	13	-	19	-	-	-	Move as 1st paragraph in the beginning of 9.2.1	Section will be re-written.
Gregory Keoleian (University of Michigan)	9	12	2	-	-	-	-	-	change "contaminating" to "pollutant"	Section will be re-written.
Gregory Keoleian (University of Michigan)	9	12	24	-	-	-	-	-	delete "led by Richard Hanson and Enersol Associates" citation is sufficent	Section will be re-written.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	9	12	3	-	-	-	-	-	biodiversity protection is an ADDITIONAL issue to competition with food for land, not the cause of the controversy	Section will be re-written.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	9	12	5	-	-	-	-	-	geopolitical disputes and international security? Please elaborate or leave out	Section will be re-written.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	9	12	1	12	8	-	-	-	The paragraph seems completely out of context, if it trying to convey the message that the issues mentioned in it also have a role in determining the role of renewavles in past and present development, it is not clear from the text.	Section will be re-written.
Oyvind Christophersen (Climate and Pollution Agency)	9	12	31	-	32	-	-	-	"Local industrial" should be changed to "local industry" or "local industrial production". We propose that the phrase "which affect rich and poor alike" is either deleted or modified, since we suspect that poorer settlements will often be located in the areas most affected by local air pollution.	Section will be re-written.
Oyvind Christophersen (Climate and Pollution Agency)	9	12	5	-	-	-	-	-	The rationale for including weapon proliferation under this context is not obvious and should be explained.	Section will be re-written.
United States (U.S. Department of State)	9	12	0	-	-	-	-	-	Page 12, rural settlement. Many valuable lessons can be learned from the U.S. experience with rural electrification and the use of PMAs to market hydropower from dams built for water management purposes. These programs predate much of UNEP's work; and had impressive results in improving the quality of life of poor Americans at the turn of the century. It would be worthwhile to investigate this history as a case study in highly successful use of RE development for SD goals.	Noted.
Youba SOKONA (Sahara and Sahel Observatory)	9	12	19	12	40	-	-	-	This is electricity access and not energy access. In addition there is a need to make distinction in rural areas between lighting and electrification. The case of Dominican Republic is ligting	The re-written chapter will have a section on energy access where a clear differentiation between access to energy and access to electricity will be made.
Greece (National Observatory of Athens)	9	12	-	13	-	9.2.2	-	-	Either to completely change the content of the subsection and report the interactions between SD and RE in industrialized countries or completely remove by shifting one-two paragraphs in 9.2.1.	Section will be re-written.
China (China Meteorological Administration)	9	12	19	12	40	9.2.3	-	-	This section on settlements and use of renewable energies, but the focus is only on developing regions. It should also look at the developed regions why renewable energy use has not been commercially viable. This would give some lessons with regard to the choice of energies in the poor regions in their development process.	Chapter 11.4 deals with the Barriers to renewable energy policymaking, implementation and financing.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	13	10	-	-	-	-	-	"improvements" in what?	Section will be re-written.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Brazil (Ministry of Science and Technology)	9	13	8	13	9	-	-	-	Detail ""refs to China's growth in solar energy"" (Incompleted reference)	Section will be re-written.
Daniel Bouille (Bariloche Foundation)	9	13	2	-	-	-	-	-	Content of the section is very brief and poor and does not reflect the tittle. The section should answer HOW.	Section will be re-written.
David Clubb (European Environment Agency)	9	13	-	13	-	-	-	-	Unclear: 'Energy sector reform is having a profound impact on access'. What impact is it having? If it's profound then it is worth stating	Section will be re-written.
David Clubb (European Environment Agency)	9	13	-	13	-	-	-	-	Unclear: 'Making the joint achievement of promoting access…' to what? If it's energy then that should be specified. And if so, then surely 'enabling access' is a better way of putting it.	Section will be re-written.
David Clubb (European Environment Agency)	9	13	-	13	-	-	-	-	Unsupported assertion: Reference needed for an extra 3 billion people by 2020: this is very far from the average estimates which the UN produced (2004)	Section will be re-written.
Emanuela Menichetti (Observatoire Méditerranéen de l'Energie)	9	13	8	13	9	-	-	-	References to be added	Section will be re-written.
Gregory Keoleian (University of Michigan)	9	13	-	-	-	-	-	-	Box 9.1 "and the additional 3 billion people projected to increase world population by 2020" these must be old projections. World population is close to 7 billion but UN projection are much less than 10 billion by 2020; see World Population Prospects: The 2008 Revision for example.	Box will be removed in re-drafted chapter.
Gregory Keoleian (University of Michigan)	9	13	8	-	-	-	-	-	job creation potential in developed countries from renewable energy manufacturing should also be highlighted in this chapter. For example, wind manufacturing jobs - Wind Turbine Development: Location of Manufacturing Activity (Sterzinger and Svrcek 2004) and DOE 20% wind by 2030.	Re-drafted chapter will have a separate section on employment impacts from RE.
United States (U.S. Department of State)	9	13	1	-	-	-	-	-	This Box 9.1 captures the essence of the chapter and should be considered for introduction	Section will be re-written.
Daniel Bouille (Bariloche Foundation)	9	13	-	-	-	-	Box 9.1	-	It seems to me that the key issue to remark is the importance of access (to modern energy?) from the economic, social and environmental dimension. Another issue are the structural reforms that did not have as an objective energy access for the poor. The reference to the ""profound impact"" should be say is the impact was positive o negative, if the idea is to relate reform and access.	Noted. Re-drafted chapter will have a specific section on energy access, where the access to modern energy sources will be clearly discussed.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	9	13	-	-	-	-	Box 9.1	-	The information that 95% of food needs cooking is neither correct nor relevant for this report	Box will be removed in re-drafted chapter.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	9	13	-	-	-	-	Box 9.1	-	What population projections estimate the increase of world population by 2020 by 3 billion?! If it's meant that by 2020 3 billion people are expected to lack access to modern forms of energy than rephrase to state so.	Box will be removed in re-drafted chapter.
Greece (National Observatory of Athens)	9	13	-	14	-	9.2.3	-	-	Again many iterations of concepts already presented in 9.2.1 and 9.2.2. Should be drastically reduced and merged with 9.2.1. Another option is to change the title to: "the importance of access to energy" by transforming the box into normal text. In any case, settlements is not the key notion in this subsection.	Section will be re-written.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	13	-	-	-	-	Box 9.1	-	4 Line - This is true in general. The 10-11 line - what is the significance of R&D not being relevant to policy? 14-15 line- What kind of impact are we looking at- positive or negative. Lines 30-33 are rather general and I don't see what they have to do with access (the subject of this box)	Box will be removed in re-drafted chapter.
Youba SOKONA (Sahara and Sahel Observatory)	9	13	-	-	-	-	Box 9.1	-	It would be more relevant here to give an overview of the impact of the electricity reforms on access as this has been largely covered by the GNESD	Box will be removed in re-drafted chapter.
Emanuela Menichetti (Observatoire Méditerranéen de l'Energie)	9	14	17	14	18	9.3	-	-	I would drop the "global and regional assessment" from the title; in fact, I do not see any impact assessment, particularly at regional level	Plenary title cannot be changed; however, in the re-drafted chapter more regional information will be available.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	14	3	14	5	-	-	-	How will this happen? If at all there is a negative effect it is of commercial biofuel production rather than local bioenergy development. The needs to be better explained and supported through references.	Section will be re-written.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	14	26	14	30	-	-	-	Table 9.1 is titled social and environmental impacts, and Table 9.2 is social and economic impacts. There is repetition of social impacts. Why not just one table that covers all the different types of impacts?	Table will be removed.
Brazil (Ministry of Science and Technology)	9	14	26	14	36	-	-	-	Correct the number of the table 1 (see page 18 (table 9.1))	Table will be removed.
Brazil (Ministry of Science and Technology)	9	14	29	14	35	-	-	-	Correct the number of the table 2 (see page 21 (table 9.2))	Table will be removed.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Daniel Bouille (Bariloche Foundation)	9	14	13	-	16	-	-	-	And they should not also control the technology? To control the resources is sufficient to guarantee energy security?	Section will be re-written.
Daniel Bouille (Bariloche Foundation)	9	14	9	-	10	-	-	-	Examples?	Section will be re-written.
Daniel Bouille (Bariloche Foundation)	9	14	12	-	13	-	-	-	Why are they more vulnerable?	Section will be re-written.
David Clubb (European Environment Agency)	9	14	42	14	44	-	-	-	Lack of perspective: The text here suggests that without impact mitigation, renewable and conventional energy have similar negative impacts. It is probably more informative to say that with impact mitigation the environmental credentials improve still further over conventional sources.	Section will be re-written where the environmental and social impacts of renewable and conventional energy sources will be analysed in detail (GHGs, air pollution, health, employment etc.)
David Clubb (European Environment Agency)	9	14	3	14	5	-	-	-	Unclear: What are the effects of local bioenergy developments on biosphere protection?	Section will be re-written.
Emanuela Menichetti (Observatoire Méditerranéen de l'Energie)	9	14	37	14	38	-	-	-	What do you intend by "they are relatively cleaner"?	Section will be re-written and new chapter will contain a comprehensive review of LCA data so that such statements can be adequately backed by the literature.
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	9	14	35	-	-	-	-	-	Insert the sentence "In addition, actual impacts vary due to differences in the energy system and related infrastructure currently in place as well as varying national and local ambitions and cultures. " after "... in AppendixA". As you mention page 85 of 135 in Technical Summary, actual impacts depend on regional situation etc. So you should insert the sentence above, as the introductory information.	Section will be re-written.
Oyvind Christophersen (Climate and Pollution Agency)	9	14	36	18	-	-	-	-	Effects on emissions of climate gases are dealt with rather superficially in this chapter. Since this is a crucial environmental argument associated with renewable energy, we think that it should be described in a separate sub-chapter and not only included under air. Both direct and indirect emissions of climate gases should be dealt with systematically.	The re-drafted chapter will contain a section with a comprehensive review of LCA data.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Oyvind Christophersen (Climate and Pollution Agency)	9	14	36	18	-	-	-	-	This chapter deals with both effects and energy sources on an equal sub-heading level. This might appear somewhat confusing unless more explanatory text is included. One alternative might be to base the sub-headings only on effects (land use, air and water etc) and highlight the energy sources when they are mentioned in the body text. Generally, we think that the chapter could be considerably improved if the text was more closely aligned with the information in Table 9.1 and in chapter 9.3.2- 9.3.7.	Section will be re-written.
Oyvind Christophersen (Climate and Pollution Agency)	9	14	36	20	22	-	-	-	We observe that both chapter 9.3.1.1 and 9.3.1.2 have "Social impacts" in the heading. We propose that a change of heading for chapter 9.3.1.1 to deal only with "health impacts" is considered.	Re-drafted chapter will contain a section that is only dedicated to assessing health impacts.
Peter Johnston (Environmental & Energy Consultants, Ltd)	9	14	9	14	16	-	-	-	Oil crisis of 1970s. Why not update to 2008, when oil peaked at $147 per barrel and there were impacts on food prices (as oil is a huge input in fertilizers, transport, etc.)?	Section will be re-written.
Stephan Klasen (University of Göttingen)	9	14	36	17	20	-	-	-	This discussion is far too general and not focused on a clear SD conception. It basically adds little new information to what is presented in the more technically focused chapters.	Section will be re-written.
Susanne Kadner (Technical Support Unit)	9	14	42	14	44	-	-	-	Where are these options to mitigate the adverse impacts of RETs discussed? In the technology chapters? Should be checked and reference to appropriate chapter sections provided.	Section will be re-written. However, impact mitigation options for different technologies are discussed in more detail in the technology chapters.
United States (U.S. Department of State)	9	14	22	30	39	-	-	-	This entire section was incredibly problematic. Written in a very vague way. Build on the 3 original articulated themes of the chapter and rewrite in a more coherent manner. Focus should be on SD issues with data-driven discussion	Section will be re-written to address these problems.
Youba SOKONA (Sahara and Sahel Observatory)	9	14	26	14	30	-	-	-	This is not clear	Table will be removed.
Greece (National Observatory of Athens)	9	14	-	-	-	9.2.4	-	-	Needs extension to cover more aspects of scale of action and relationships with SD (barriers, benefits, risks etc).	Section will be re-written. Barriers and risks will be discussed in more detail in new chapter where separate sections are dedicated to each of these topics.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	14	-	-	-	9.2.5	-	-	The connection of energy security needs to be better developed.	New chapter will have a specific section to discuss energy security.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Garcia Javier (Garcia Monge Consultant)	9	14	37	14	37	9.3.1	-	-	I don't understand the expression: ""RE technologies are relatively cleaner in terms of GHG emissions and pollution than fossil energy sources."" What does ""relatively cleaner"" means in this context? It is possible to put a stronger adjective or, in direct terms: In general terms, RE technologies are cleaner in terms of GHG emissions and pollution than fossil energy sources."" ?	Section will be re-written and new chapter will contain a comprehensive review of LCA data so that such statements can be adequately backed by the literature.
Richard Taylor (International Hydropower Association)	9	14	35	14	35	9.3.1	-	-	Insert new paragraph as follows: "There are fundamental methodological challenges with the LCA approach which limits the utility of Tables 1 and 2 and Appendix A. Major issues include lack of credible data to conduct full LCAs for most RE technologies, defining sound functional units such that RE technologies can be properly compared to each other and to existing fossil fuel sources, and consensus on analytical system boundaries. Furthermore, for increased policy relevance LCA needs to move beyond characterization of straightforward RE technology 'footprints' (i.e., an attributional LCA approach) towards analyses that assess the impacts of RE technologies in more dynamic and macro-economic contexts (i.e., a consequential LCA approach). A move toward the latter approach would allow the full effects RE technologies on environmental, social, and economic systems to be assessed simultaneously for more informed policy making."	The re-drafted chapter will contain a section with a comprehensive review of LCA data. Problems related to comparability due to e.g. different system boundaries can be compensated for by showing the range of values obtained in the different studies. As such, LCAs can be regarded as a standardized framework that allows comparison of environmental performance of technologies across categories.
Susanne Kadner (Technical Support Unit)	9	14	35	-	-	9.3.1	-	-	Appendix A constitutes a significant part of the chapter - hence, a more detailed description of the information it is based on would be justified here.	Appendix will be removed.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	15	15	-	-	-	-	-	Competition with 'fishing in oceans' is for which RET?	Section will be re-written.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	15	28	-	-	-	-	-	The statement is not clear.	Section will be re-written.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	15	22	-	-	-	-	-	What does it mean to "amortize" strong winds?	Section will be re-written.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	15	43	15	46	-	-	-	Would be good to have a sense (if possible) the aspects for which RE effects may be marginal. Built environment might be one such.	Noted.
David Clubb (European Environment Agency)	9	15	39	15	39	-	-	-	Incorrect and/or unclear: It is not by the 'same token' that there are negative effects from bioenergy and positive effects from reservoirs.	Section will be re-written.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
David Clubb (European Environment Agency)	9	15	23	15	27	-	-	-	Incorrect perspective: This parapgraph implies that the water impacts of renewable technologies are comparable to conventional energy sources ('similar to fossil fuel sources'), whereas in reality there are orders of magnitude difference between them.	Section will be re-written and comprehensive analysis on water consumption for renewable and conventional energy sources will be included.
David Clubb (European Environment Agency)	9	15	43	16	2	-	-	-	Suggested improvement: The statistics demonstrate a higher level of employment with renewables than with nuclear or fossil fuels. See http://rael.berkeley.edu/sites/default/files/WeiPatadiaKammen_CleanEnergyJobs_EPolicy2010.pdf	The positive impact of RE on employment is not as clear-cut as this comment may make seem. A comprehensive assessment of the literature will be provided, showing the range of views regarding the impact RE will may on emplyoment opportunities.
David Clubb (European Environment Agency)	9	15	37	15	42	-	-	-	Unclear: General lack of clarity to this paragraph. Is wind farm noise really a nuisance, and if so, is that a legitimate health concern or a social impact?	Detailed assessment of impacts from wind and how they can be mitigated are presented in wind chapter.
David Clubb (European Environment Agency)	9	15	22	15	22	-	-	-	Unsupported assertion: Can wind farms really amortize strong winds? This is a remarkable assertion to make without supporting evidence	Section will be re-written.
David Clubb (European Environment Agency)	9	15	26	15	27	-	-	-	Unsupported assertion: What health impacts are 'established' to occur due to swell/waves and tidal/ocean currents, or installations (if that is meant)? Poorly written	Section will be re-written.
Denis Aelbrecht (EDF)	9	15	22	-	-	-	-	-	is the amortization of strong winds a proven effect, or is it theoretical? Any reference?	Section will be re-written.
Emanuela Menichetti (Observatoire Méditerranéen de l'Energie)	9	15	17	15	18	-	-	-	I would suggest eliminating this sentence since it is very misleading; e.g.: biomass burning releases the same amount of CO2 that was absorbed by the plant and therefore are considered neutral. Also for hydro reservoirs you usually consider net emissions; therefore either you better specify or remove the sentence. Emissions from industrial processes are not direct, are indirect ones.	The LCA review to be included in the re-drafted chapter will be very specific about which emissions are included or excluded (such as LUC) from the analysis.
Frank Krysiak (University of Basel)	9	15	8	17	10	-	-	-	References can made out only via the appendix. Perhaps the most important claims should be directly supported in the text.	Appendix will be removed and section re-written.
Greece (National Observatory of Athens)	9	15	22	-	25	-	-	-	1st sentence to be deleted or moved to the introductory section (9.1).	Section will be re-written.
Greece (National Observatory of Athens)	9	15	37	-	-	-	-	-	1st sentence: The phrasing undermines the big difference between RE and fossil fuels in emission intensity and other environmental impacts.	Section will be re-written.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Greece (National Observatory of Athens)	9	15	42	-	-	-	-	-	1st sentence: The phrasing undermines the big difference between RE and fossil fuels in emission intensity and other environmental impacts.	Section will be re-written.
Gregory Keoleian (University of Michigan)	9	15	34	-	-	-	-	-	useful to provide some data on the magnitude of the impact of wind turbines which is often exaggerated; for example: Source 'National Wind Coordinating Committee, November 2004, Wind turbine interactions with birds and bats: A summary of research results and remaining questions'	Magnitude of impact on biodiversity from wind turbines is discussed in detail in the wind chapter.
Gustavo Nadal (Fundacion Bariloche)	9	15	24	15	27	-	-	-	and water quality demand and degradation from biofuel feedstock production as well (e.g. nitrate and other agrochemicals leaching)	Section will be re-written and comprehensive analysis on water consumption for renewable and conventional energy sources will be included. In addition, pollution aspects will be discussed.
Gustavo Nadal (Fundacion Bariloche)	9	15	17	15	18	-	-	-	biomass burning (including transport biofuels emissions)	Is included in analysis of new chapter.
Michael Hübler (Potsdam Institute for Climate Impact Research)	9	15	45	15	45	-	-	-	Advantages like protection of coasts from erosion, but also disadvantages like change of the natural look of the coast.	Section will be re-written.
Michael Hübler (Potsdam Institute for Climate Impact Research)	9	15	16	15	27	-	-	-	Better structure and connection of sentences.	Section will be re-written.
Michael Hübler (Potsdam Institute for Climate Impact Research)	9	15	29	15	30	-	-	-	Please add explanation how shaded solar reflectors may improve micro-climate and how ocean energy sources may increase biodiversity.	Section will be re-written.
Michael Hübler (Potsdam Institute for Climate Impact Research)	9	15	8	15	9	-	-	-	Which renewables do improve the use of deserted land in which way?	Section will be re-written. However, this technology specific information will be covered by Chapter 2 on bioenergy.
Oluf Ulseth (Statkraft AS)	9	15	18	-	-	-	-	-	A small change should be made here: To be accurate the text should read "from a specific type of reservoir", as it suggest otherwise that all hydro reservoirs do have methane emissions, which is not the case.	Section will be re-written but comment is obviously accepted.
Oluf Ulseth (Statkraft AS)	9	15	30	-	-	-	-	-	Positive effects of hydropower on Ecosystems and Biodiversity have been forgotten: Proposal to add in line 30 after (...) in some locations, "while hydropower projects stabilise the groundwater level and sustain wetland conservation."	The potential benefits of hydropower are discussed in detail in the hydropower chapter.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Oyvind Christophersen (Climate and Pollution Agency)	9	15	43	16	2	-	-	-	Effects from extraction of resources, equipment manufacturing, new infrastructure (power lines, roads) and waste management might also be relevant to deal with in this chapter.	These aspects are included in the LCAs that will be provided for e.g. the impacts from electricity generation.
Oyvind Christophersen (Climate and Pollution Agency)	9	15	23	-	27	-	-	-	Increased water demand and pollution caused by bio-fuel production should be dealt with here.	Section will be re-written and comprehensive analysis on water consumption for renewable and conventional energy sources will be included. In addition, pollution aspects will be discussed.
Oyvind Christophersen (Climate and Pollution Agency)	9	15	8	15	-	-	-	-	It is our understanding that large scale use of renewable energy sources, due to relatively low energy density and the need for additional infrastructure and resources/building materials, generally poses considerable challenges as regards land use. We think that the trade-offs between cleaner energy and stress on land use should be described in more detail (referring, among others, to chapter 9.4.3.3). It is also our impression that the chapter focuses on the strictly economic aspects of land use, and we think that effects on more marginalized populations (e.g.. nomadic and indigenous people) and recreational values should be described comprehensively.	New chapter will have a specific section to discuss land use in depth; this will entail both economic aspects as well as ecological ones resulting from the transformation and/or fragmentation of land(scapes).
Oyvind Christophersen (Climate and Pollution Agency)	9	15	16	-	17	-	-	-	It should be noted that direct local emissions from bio-energy are comparable to emissions from similar fossil fuels (the technology being equal, except for SO2 from solid fuels).	Partially accepted (for NOx). New chapter will have a specific section that provides a comprehensive analysis of LCA emissions from fossil and bioenergy sources (NOx, SO2, NMVOC, PM25).
Oyvind Christophersen (Climate and Pollution Agency)	9	15	46	-	-	-	-	-	The connection between "bio energy plant landscape" and built environment is somewhat unclear and should be explained.	Section will be re-written.
Oyvind Christophersen (Climate and Pollution Agency)	9	15	20	-	-	-	-	-	The phrase "or even with nuclear material accidents" appears somewhat out of context and we propose that it is deleted.	Section will be re-written.
Oyvind Christophersen (Climate and Pollution Agency)	9	15	17	-	20	-	-	-	We think that emissions of particulates are more relevant than methane-emissions as regards biomass burning. The statement that such releases are less toxic than emissions from fossil fuels might appear misleading - we think that the main message should be that primary advantage fuels produced from biomass have compared to their fossil counterparts is not related to the fuel itself but the production of the fuel and the associated life-cycle emissions of (primarily) greenhouse gases.	The re-drafted chapter will provide comprehensive GHG and air pollutant LCA review to substantiate this statement.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Oyvind Christophersen (Climate and Pollution Agency)	9	15	38	-	39	-	-	-	We think that possibly negative effects on recreation (e.g.. decreased "wilderness quality" and declining fish resources in rivers) caused by reservoirs should also be mentioned in this context.	Section will be re-written.
Oyvind Christophersen (Climate and Pollution Agency)	9	15	16	-	27	-	-	-	We think that this chapter is to short to sufficiently describe the wide variety of effects on both air and water from the different types of renewable energy sources. Consequently, we propose that the chapter is split into three - dealing with "Local and regional air pollution", "emissions of climate gases" and "water" (pollution and availability). The text should preferably focus on a life-cycle approach (both direct and indirect emissions).	New chapter will aim to address the most important impacts for GHG, air pollution, water, health, land, biodiversity ..). However, the assessment aims to focus on the most important impacts from the different technologies.
Oyvind Christophersen (Climate and Pollution Agency)	9	15	28	-	29	-	-	-	We think that this sentence is somewhat unclear. Would a sentence such as "Renewable energy has a potential to lessen long-term impacts on ecosystems due to global warming, but poses in itself shorter term challenges as regards biodiversity and habitats" better reflect this main message?	Section will be re-written.
Peter Johnston (Environmental & Energy Consultants, Ltd)	9	15	22	-	-	-	-	-	"Wind farms offer a way to amortize strong winds"? How so? And in any case, what has this to do with air & water impacts?	Section will be re-written.
Peter Johnston (Environmental & Energy Consultants, Ltd)	9	15	23	15	27	-	-	-	Adverse effect on water. There can be a huge impact from water-intensive crops raised for biofuel production	Section will be re-written and comprehensive analysis on water consumption for renewable and conventional energy sources will be included.
Peter Johnston (Environmental & Energy Consultants, Ltd)	9	15	37	15	42	-	-	-	Pollution from cooking indors on open fires with biomass can have huge health impacts, including emphysema and eye infections. See the work of Kirk Smith, UC Berkeley in Gugarat & the Pacific	Relevant references from Kirk Smith will be included in re-written chapter, which will contain a specific section on health impacts.
Steve Sawyer (Global Wind Energy Council)	9	15	23	15	24	-	-	-	Add "...water sources, although wind, solar pv and solar heating use virtually no water to produce power, heat and motive power."	Section will be re-written.
Steve Sawyer (Global Wind Energy Council)	9	15	41	15	42	-	-	-	Add that noise at wind farms is "mitigatable" by proper siting of wind turbines	Detailed assessment of impacts from wind and how they can be mitigated are presented in wind chapter.
Susanne Kadner (Technical Support Unit)	9	15	46	-	-	-	-	-	changes in bioenergy plant landscape - should be reworded to include the word "aesthetic" as this is how the impact is described in Chapter 2 (Table 2.51)	Noted.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Susanne Kadner (Technical Support Unit)	9	15	45	-	-	-	-	-	protection from coastal erosion - the only statement that is given in Chapter 6 in this context reads "Wave energy farms could reduce swell conditions at adjacent beaches and modify wave dynamics along the shoreline" (page 25, line 5-6). Hence, the statement made is too general and needs to be reworded.	Section will be re-written.
Susanne Kadner (Technical Support Unit)	9	15	46	16	1	-	-	-	risk from dam burst - no such incidents are mentioned in Chapter 5. This needs to be clarified and adapated accordingly.	A section on risks and accidents will be included in re-written chapter where a comprehensive assessment of the risks ofdifferent energy technologies will be inlcuded.
Susanne Kadner (Technical Support Unit)	9	15	16	15	27	-	-	-	The distinction between environmental and social impacts is not made clear here - however, as commented previously section 9.3.1 should be merged with sections 9.3.2 - 9.3.7 to avoid redundancies.	Chapter will be re-written, with the new structure allowing a clear assessment of social (social and economic development, energy access, energy security) and environmental impacts.
Susanne Kadner (Technical Support Unit)	9	15	29	-	-	-	-	-	There is no comment on the benefits of "shaded solar reflectors" that may "improve micro-climates" to be found in Chapter 3. Hence, this point needs to be removed. Also, as commented previously section 9.3.1 should be merged with sections 9.3.2 - 9.3.7 to avoid redundancies and be more coherent.	Section will be re-written.
Susanne Kadner (Technical Support Unit)	9	15	1	15	7	-	-	-	This paragraph is redundant with the previous one (page 14, line 42 - 44) - as commented before, where are these options to mitigate the adverse impacts of RETs discussed? In the technology chapters? Should be checked and reference to appropriate chapter sections provided.	Section will be re-written. However, impact mitigation options for different technologies are discussed in more detail in the technology chapters.
United States (U.S. Department of State)	9	15	28	15	36	-	-	-	Need to expand on this.	Section will be re-written.
United States (U.S. Department of State)	9	15	25	-	-	-	-	-	Section 9.3.1.1, p 15, line 25 Typically in arid or scenic areas of the USA binary power plants with air cooling are used to limit consumption of water. As an aside, dry cooling should also be used to create longer lived, more sustainable, geothermal resource development.	This will be addressed in re-written section.
United States (U.S. Department of State)	9	15	46	-	-	-	-	-	Section 9.3.1.1, p 15, line 46, Seismicity is not a problem in non-built areas. As well, most hydrothermal systems do not generate sensible seismicity. For example the Steamboat geothermal facility is within the metropolitan area of Reno, Nevada, USA and does not have any seismic impact on the surrounding homes, high school or college campus. All within a mile of the operating plants.	Noted.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
United States (U.S. Department of State)	9	15	8	15	15	-	-	-	This is an example of where the use of RE and its impact on land use is not cut and dry. It depends on a number of assumptions such as the boundaries of lifecycle calculations.	New chapter will have a specific section to discuss land use in depth; this will entail both economic aspects as well as ecological ones resulting from the transformation and/or fragmentation of land(scapes).
United States (U.S. Department of State)	9	15	16	15	27	-	-	-	This is an example of where the use of RE and its impact on land use is not cut and dry. It depends on a number of assumptions such as the boundaries of lifecycle calculations.	New chapter will have a specific section to discuss land use in depth; this will entail both economic aspects as well as ecological ones resulting from the transformation and/or fragmentation of land(scapes).
Youba SOKONA (Sahara and Sahel Observatory)	9	15	8	15	9	-	-	-	Could you please give some concrete examples?	Section will be re-written. However, this technology specific information will be covered by Chapter 2 on bioenergy.
Greece (National Observatory of Athens)	9	15	-	-	-	9.2.5	-	-	Needs extension and broadening of view. Very important issue for developed countries, as well.	Comment unclear.
Richard Taylor (International Hydropower Association)	9	15	46	15	46	9.3.1.1	-	-	Add "" and land subsidence"" after ""local seismicity""	Land subsisdence will be dealth with in re-drafted chapter in sections on land use and risks.
Richard Taylor (International Hydropower Association)	9	15	24	15	24	9.3.1.1	-	-	Add ""if not well planned and managed"" at end of first sentence	Section will be re-written.
Richard Taylor (International Hydropower Association)	9	15	15	15	15	9.3.1.1	-	-	Add ""where ocean energy is implemented"" at end of sentence.	Section will be re-written.
Richard Taylor (International Hydropower Association)	9	15	17	15	18	9.3.1.1	-	-	Reword as ""Exceptions include release of net GHG emissions from some hydro reservoirs"".	The LCA review to be included in the re-drafted chapter will be very specific about which emissions are included or excluded (such as LUC) from the analysis.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Oluf Ulseth (Statkraft AS)	9	16	35	-	-	9.3.1	-	-	The report indicate larger consequences from large hydro than from smaller hydro. This is not necessary correct as all hydro projects are site spesific and tailor made. It is more correct to adress hydropower with large or with small environmental concerns. Large hydro offers more possibilities for mitigation and in terms of land use and biodiversity a 2000 MW plant is often preferred compared to establishing 2000 1MW plants.	Section will be re-written.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	16	3	-	-	-	-	-	Check language	Section will be re-written.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	16	26	-	-	-	-	-	Check language	Section will be re-written to account for such problems. Also, comprehensive review of LCAs for different energy technologies will be included where such statements will be substantiated by the underlying literature.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	16	14	16	15	-	-	-	Is it the case that 'soil disinfection' is the main interaction between solar energy and land? I find the prominence given to 'soil disinfection' rather curious.	Section will be re-written.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	16	44	-	-	-	-	-	It may be desirable to assess the separate ocean energy options separately - tidal energy and OTEC are quite different	Section will be re-written and impacts of different ocean technologies will be listed separately.
Daniel Bouille (Bariloche Foundation)	9	16	5	-	6	-	-	-	Not only in the use of land but also in the indirect impacts on food prices if land has an opportunity cost related to oil prices (Biofuels production). Deforestation to produce bioenergy is another issue.	Noted.
David Clubb (European Environment Agency)	9	16	26	16	26	-	-	-	Incorrect statement: "Emissions from such plants are seldom none to negligible"; yet this is perfectly contradicted in the following sentences	Section will be re-written to account for such problems. Also, comprehensive review of LCAs for different energy technologies will be included where such statements will be substantiated by the underlying literature.
David Clubb (European Environment Agency)	9	16	32	16	32	-	-	-	Incorrect statement: "hydropower projects ...providing irrigation water"; this is a generalisation which does not hold true for many (possibly most) hydropower installations	Section will be re-written.
David Clubb (European Environment Agency)	9	16	32	16	43	-	-	-	Poorly written: This paragraph needs rewriting	Section will be re-written.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
David Clubb (European Environment Agency)	9	16	3	16	8	-	-	-	Poorly written: This paragraph needs rewriting, and the issue of Indirect Land Use Effects should be highlighted (see comments on bioenergy section)	Section will be re-written and a detailed discussion on direct and indirect land use change will be included in context with the LCAs.
David Clubb (European Environment Agency)	9	16	1	16	1	-	-	-	Unclear: what is an ocean discharge site?	Section will be re-written.
David Clubb (European Environment Agency)	9	16	14	16	14	-	-	-	Unsupported assertion: "Solar energy is being used for soil disinfection". (this is subsequently mentioned later but the reference should be used here; and is this a significant enough issue to be included here? Some indication of magnitude of use would be useful)	Section will be re-written.
Denis Aelbrecht (EDF)	9	16	32	-	-	-	-	-	Hydropower has the unique advantage in electric systems to be able to (i) dispatch high generation capacity in a few minutes, whenever necessary, (ii) store energy. Therefore the energetic benefits go far beyond simple "energy generation", but are also essential for an electric system in term of stability and supply.This should be reflected in the list of benefits here.	Noted. Will be covered in Chapter on integration.
Denis Aelbrecht (EDF)	9	16	22	-	-	-	-	-	recycling issue is mainly for batteries (for stand-alone PV systems), not really PV modules.	Noted.
Denis Aelbrecht (EDF)	9	16	35	-	-	-	-	-	The distinction of large hydro here does not seem appropriate, for several reasons : - there is no clear definition of "large" vs "small" hydro; distinction could be equally made on installed capacity, dam height, reservoir volume, reservoir area, residence time, run-of-river vs storage, etc... - similar things should be compared only, for instance a 1000 MW scheme vs 1000 "small" 1MW schemes spread on the same watershed; in that case many environmentalist object that the impact of the small schemes are different but certainely not more benign, especially in terms of habitat fragmentation, area of impact, control and management of impacts, transmission lines, accesses, etc... - large schemes with large reservoirs and small schemes with smaller storage capacity don't fit the same purpose for the electric system, they are not interchangeable by this point of view, and cannot be compared and even less opposed It is therefore suggested to drop this distinction, which is misleading as it infers that small (whatever it is) is good and large is bad and ugly.	Section will be re-written.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Denis Aelbrecht (EDF)	9	16	34	-	-	-	-	-	This section gives a comprehensive list of potential impacts associated to each technology. It does however not provide systematic information on how common these impacts are. For instance, is the issue of subsidence associated with geothermy almost syste	Section will be re-written to address these problems.
Denis Aelbrecht (EDF)	9	16	39	-	-	-	-	-	typo : "in many cases, fish habitat can BE restored.."	Section will be re-written.
Emmanuel Branche (Electricité de France)	9	16	34	16	35	-	-	-	This sentence provides wrong messages (reference Table SPM3 and section 5.6). Proposition "hydropower is mainly a no GHGs emitting technology, however in tropics under particular conditions, methane may be emitted during the first years after impoundment"	Section will be re-written and new assessment will differentiate between emissions from land use change through reservoir creation and those from the generation phase. Also, chapter on hydropower has a detailed discussion of this topic.
Greece (National Observatory of Athens)	9	16	23	-	-	-	-	-	"...many types of RE technologies..." change to "...some types... and in particular, bioenergy, geothermal etc.	Editorial issue.
Greece (National Observatory of Athens)	9	16	43	-	-	-	-	-	Employment can not be the example of impacts on built environment. It is treated as a separate social impact category in the subsequent section.	Section will be re-written.
Greece (National Observatory of Athens)	9	16	28	-	-	-	-	-	The statement "RE plants offer limited benefit to ecosystems and biodiversity" is rather misleading. The comparison is with fossil fuels that considerable damage ecosystems. With most RE these damages can be avoided.	Section will be re-written. New section on ecosystems and biodiversity will mention impacts from both fossil and RE.
Gustavo Nadal (Fundacion Bariloche)	9	16	11	-	-	-	-	-	the concept of marginal land could be quite misleading. Land classified as marginal in developing countries could be the resource base for subsistence and traditional agriculture and people with informal land rights.Expansion of biofuel feedstock production into these lands could negatively impact these people unless adequately involved. This argument is repeated a few times through the document.	Section will be re-written. However, this is an important comment that is addressed in Chapter on bioenergy.
Jyri Seppälä (Finnish Environment Institute)	9	16	16	27	-	-	-	-	Burning of biomass causes particular matters	Section will be re-written and this aspect will be addressed in sections on health impacts and air pollution.
Jyri Seppälä (Finnish Environment Institute)	9	16	37	42	-	-	-	-	Burning of biomass causes particular matters, causing adverse effects on health	Section will be re-written and this aspect will be addressed in sections on health impacts and air pollution.
Ladislaus Rybach (Geowatt AG Zurich (company))	9	16	28	-	-	-	-	-	Line 28 should read: 'Adverse impacts of power plants include:... since geothermal direct use has only low to negligible environmental impacts [4.5.1].	Section will be re-written.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Michael Hübler (Potsdam Institute for Climate Impact Research)	9	16	20	16	20	-	-	-	Definition of CSP (and of other abbreviations used in the text).	Editorial issue.
Michael Hübler (Potsdam Institute for Climate Impact Research)	9	16	14	16	14	-	-	-	Solar energy is being used for soil disinfection"" sounds unusual as a starting sentence.	Section will be re-written.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	9	16	-	-	-	-	-	-	This whole page is to a large extent a repetition of what has already been said in this chapter. The mitigation options for possile negative impacts of RE should be included in the previous page under the relevant environmental and social effects, and the rest can be left out.	Section will be re-written. The mitigation options for negative impacts will be covered in the technology chapters.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	9	16	3	16	5	-	-	-	What is stated here for bioenergy applies to all RE. It is an unnecessary repetition.	Section will be re-written.
Oluf Ulseth (Statkraft AS)	9	16	34	-	-	-	-	-	Hydropower is said to be relatively cleaner than fossil fuels regarding GHG emissions. There are studies showing different emissions from reservoirs in different areas and there is no scientific conclusion in this matter. The statements is not correct and should reflect the actual situation.	Section will be re-written and new assessment will differentiate between emissions from land use change through reservoir creation and those from the generation phase. Also, chapter on hydropower has a detailed discussion of this topic.
Oluf Ulseth (Statkraft AS)	9	16	33	-	-	-	-	-	It is an incorrect statement that only in desert areas dams allow for the creation of fisheries. Like the other benefits mentioned in the previous sentence, the establishment of fisheries and aquacultures in the reservoir can be a development option for all hydropower projects with a reservoir. For this reason, this extra sentence should be deleted and the reference to fisheries included into the previous sentence as part of the enumeration.	Section will be re-written. Also, these detailed benefits will be discussed in hydropower chapter.
Oluf Ulseth (Statkraft AS)	9	16	34	-	-	-	-	-	It should be included that hydropower offers the largest energy payback ratio meaning that it offers the most energy in return on invested energy during construction and operation.	Section will be re-written and a detailed discussion on energy payback ratios etc. will be included.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Oluf Ulseth (Statkraft AS)	9	16	32	16	33	-	-	-	This first sentence implies that all hydropower projects provide irrigation water, etc. However, this is only the case for hydropower plants with storage capacity. Therefore, there is a need to specify (Proposed modification:) "While all hydropower generate benefits from clean and low-carbon electriciy generation, only those which do have freshwater storage capacity in form of a reservoir can provide additional multi-purpose benefits such as providing water for irrigation, industrial and residential use, flood and drought control, navigation, fisheries and enhances recreational opportunities. However, these increased array of benefits comes also with higher negative impacts on other environmental and social aspects". - then continue with - "For hydropower projects, especially the larger ones (...)" - The sentence "It is relative cleaner (...)emissions" could then be deleted as its substance is suggested to be integrated into the first part of the passage which applies to all types of hydropower projects, before making nuances.	Section will be re-written.
Oyvind Christophersen (Climate and Pollution Agency)	9	16	28	16	29	-	-	-	Induced seismicity should be included in Adverse impacts.	Section will be re-written and induced seismicity will be included in section on 'Accidents and risks'.
Oyvind Christophersen (Climate and Pollution Agency)	9	16	32	16	33	-	-	-	The first sentence gives the impression that all hydropower projects provide irrigation water. Thsi is not the fact as only hydropower plants with storage capacity can do this. Run of river projects have not this ability. A proposed modification is: "All hydropower projects produces clean and low-carbon electriciy. Projects which have storage capacity in form of a reservoir can in addition provide multi-purpose benefits such as flood and drought control, fisheries, providing water for irrigation, industrial and residential use, navigation, and enhanced recreational opportunities. - The sentence "It is relative cleaner (...) emissions" can be deleted as its substance is suggested to be integrated into the first part of the passage, applying to all types of hydropower projects.	Section will be re-written.
Oyvind Christophersen (Climate and Pollution Agency)	9	16	26	-	-	-	-	-	The sentence "Emission from such plants are seldom none to negligible" indicates that emissions are high - is this the intention?	Section will be re-written to account for such problems. Also, comprehensive review of LCAs for different energy technologies will be included where such statements will be substantiated by the underlying literature.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Oyvind Christophersen (Climate and Pollution Agency)	9	16	26	-	-	-	-	-	The word "seldom" should be changed to "typically".	Section will be re-written to account for such problems. Also, comprehensive review of LCAs for different energy technologies will be included where such statements will be substantiated by the underlying literature.
Oyvind Christophersen (Climate and Pollution Agency)	9	16	14	-	15	-	-	-	We suppose that the use of solar energy for soil disinfection and desalinization refers to some specific applications based on direct use of incoming solar radiation. We propose that the introductory parts of this (short) chapter focuses on the more widespread and general application of PV modules and possibly direct solar heating in general.	Section will be re-written.
Oyvind Christophersen (Climate and Pollution Agency)	9	16	34	-	35	-	-	-	We think that the statement "It is also relatively cleaner than fossil fuels regarding greenhouse gas emissions" is to general. A sentence like "hydropower has no direct emissions of greenhouse gases, but can generate indirect emissions from, among others, the reservoirs" might me more informative.	Section will be re-written and new assessment will differentiate between emissions from land use change through reservoir creation and those from the generation phase. Also, chapter on hydropower has a detailed discussion of this topic.
Oyvind Christophersen (Climate and Pollution Agency)	9	16	44	-	-	-	-	-	We think the statement "Ocean energy is mostly safe for the air quality" is too general and should be deleted or extended.	Section will be re-written.
Peter Johnston (Environmental & Energy Consultants, Ltd)	9	16	20	15	24	-	-	-	What is CSP? concentrating solar power? Not defined or explained in this chapter. Add somewhere a list of acronymns	Editorial issue.
Peter Johnston (Environmental & Energy Consultants, Ltd)	9	16	44	17	3	-	-	-	You missed possibly the biggest potential impact of OTEC: the effects (in open cycle systems) of bringing huge volumes of cold nutrient-rich water from the deep sea to the warm surface.	Section will be re-written and this impact will be included.
Susanne Kadner (Technical Support Unit)	9	16	35	-	-	-	-	-	As mentioned in the comments to the FOD, liaise with Chapter 5 on the usage of small and large hydro; in particular as the impacts described here seem to relate to reservoirs only.	Section will be re-written.
Susanne Kadner (Technical Support Unit)	9	16	14	-	-	-	-	-	Soil disinfection is not mentioned in Chapter 3. This needs to be clarified and adapated accordingly.	Section will be re-written.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Susanne Kadner (Technical Support Unit)	9	16	3	16	5	-	-	-	Suggest to remove second part of the sentence as the causal chain is in reality a bit more complicated. Instead the sentence should include a qualifier as stated in Chapter 2 (page 116: "Bioenergy at large has a significant GHG mitigation potential, provided resources are developed sustainably and provided the right bioenergy systems are applied".	Section will be re-written to be more in line with assessment in Chapter 2.
Susanne Kadner (Technical Support Unit)	9	16	3	17	10	-	-	-	The paragraphs listing the different RE technologies should be removed and integrated with the discussions in sections 9.3.2 - 9.3.7.	Section will be re-written.
Susanne Kadner (Technical Support Unit)	9	16	9	16	13	-	-	-	The word "ecozoning" is not mentioned in Chapter 2 - please check and adjust accordingly. Also, while the list of mitigative measures appears to include clear and concise options, these are not matched by an equivalent statement in Chapter 2. Hence, this statement needs to be checked by Chapter 2 authors and adjusted accordingly. Note that similar issues are discussed in Chapter section 2.8.2 and detailed in Figure 2.8.3. Here, the list of "Preconditions" includes some key limitations and criteria with respect to biodiversity protection, water limitations, soil degradation etc.	Section will be re-written.
Susanne Kadner (Technical Support Unit)	9	16	27	-	-	-	-	-	This sentence is a direct contradiction to what is written on in section 9.3.3, page 24, lines 18-26!	Section will be re-written to account for such problems. Also, comprehensive review of LCAs for different energy technologies will be included where such statements will be substantiated by the underlying literature.
Susanne Kadner (Technical Support Unit)	9	16	1	-	-	-	-	-	wind tower breakdown- no such impact is mentioned in Chapter 7. This needs to be clarified and adapated accordingly.	Section will be re-written.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
United States (U.S. Department of State)	9	16	0	-	-	-	-	-	As captured in the literature consider land degradation from bio energy, success with solar water heating (e.g. China Israel, Greece), ground source geothermal for heating and cooling, micro hydro, and other relevant examples from literature. Page 16, bioenergy. Bioenergy has large potential for large-scale, irreversible land degradation. This is a problem in Indonesia and Brazil. It's GHG savings are also questionable when the method of converting biomass to fuel and the nitrogen cycle are also taken into consideration (e.g. corn ethanol from coal-fired refineries has higher lifecycle GHGs than fossil gasoline; excess nitrogen can run into streams to produce N2O; which has a high warming coefficient). The potential downside from poor management of the N-cycle needs to be discussed. Page 16, solar. China's success with solar water heating needs to be discussed. PRC has greatly reduced biomass and NG demand by governmental intervention to expand the use of solar water heating. Page 16, geothermal. The potential for ground-source geothermal to offset electricity, biomass, coal, and NG for heating and cooling homes, sores, and offices needs to be discussed. There is massive untapped potential here, which is cheap and can have a large effect for low cost.	The technology chapters should be the main source for discussing these different technology-specific aspects.
United States (U.S. Department of State)	9	16	29	-	-	-	-	-	No one is going to know what you mean when you talk about the health hazards of hydrogen sulphide and geothermal --- Need to explain why a geothermal plant would be releasing hydrogen sulphide -- where that is coming from and how it is normally handled. The reviewers find this problem frequently throughout discussion in geothermal and RE technologies. Need to be made clear for lay persons.	Section will be re-written.
United States (U.S. Department of State)	9	16	0	-	-	-	-	-	Page 16, hydropower. Greater attention needs to be paid for small-scale microhydro that does not require dams. For example, the U.S. could double its hydropower generation with micro-hydro; and other nations may have similar potential. This reduces t	Noted.
United States (U.S. Department of State)	9	16	26	-	-	-	-	-	Section 9.3.1.1, P 16, Line 26: I believe seldom should be deleted	Section will be re-written to account for such problems. Also, comprehensive review of LCAs for different energy technologies will be included where such statements will be substantiated by the underlying literature.
United States (U.S. Department of State)	9	16	29	-	-	-	-	-	Section 9.3.1.1, P 16, Line 29: You might want to add: hydrogen sulfide when not properly mitigated	Section will be re-written.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Gian-Kasper Plattner (IPCC WGI TSU, University of Bern)	9	16	3	16	5	9.3.1.1	-	-	Comment by Simon Allen, Science Officer WGI TSU, University of Bern: I suggest that the wording here should be changed to something like - "due to reduced global warming and related extreme weather events". This avoids the misconception that all extreme weather events are being negatively influenced by global warming.	Section will be re-written.
Richard Taylor (International Hydropower Association)	9	16	42	16	43	9.3.1.1	-	-	Add ""Evolving"" before ""Sustainability"" and delete ""for dams"" and add ""and protocols (e.g. IHA Sustainability Guidelines 2004, IHA Sustainability Assessment Protocol 2006), as well as environmental regulations have help improve hydropower's sustainability performance over time"" and delete ""over time and compliance to these is better accepted nowadays by environmental protection groups"".	Section will be re-written. Reference to IHA sustainability guidelines will be included.
Richard Taylor (International Hydropower Association)	9	16	35	16	35	9.3.1.1	-	-	Add ""reservoir"" after ""For"" and delete ""especially the large ones"". Note the classification of hydropower by scale is out of step with the SRREN SOD Hydropower Chapter (5).	Section will be re-written.
Richard Taylor (International Hydropower Association)	9	16	34	16	34	9.3.1.1	-	-	Delete ""Dams in desert areas also allow"" and replace with "", and""	Section will be re-written.
Simon Allen (IPCC WGI TSU, University of Bern)	9	16	3	16	5	9.3.1.1	-	-	I suggest that the wording here should be changed to something like - "due to reduced global warming and related extreme weather events". This avoids the misconception that all extreme weather events are being negatively influenced by global warming.	Section will be re-written.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	17	4	-	-	-	-	-	Check language	Section will be re-written.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	17	8	-	-	-	-	-	How, and to what extent can they be reduced?	Section will be re-written. The mitigation options for negative impacts will be covered in the technology chapters.
David Clubb (European Environment Agency)	9	17	4	17	4	-	-	-	Unclear: "wind turbines occupy less space" - less space than what?	Section will be re-written.
Denis Aelbrecht (EDF)	9	17	4	-	-	-	-	-	typo : "it requires very small.." (remove "AND")	Section will be re-written.
Michael Hübler (Potsdam Institute for Climate Impact Research)	9	17	4	17	5	-	-	-	less space"" than...? Why is water input relevant for wind power? Least impact on water resources compared with what...?	Section will be re-written.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Oyvind Christophersen (Climate and Pollution Agency)	9	17	4	-	-	-	-	-	The statement that wind energy turbines occupy less space (less space than what?) and can co-exist with ecosystems (what about effects from noise and on birds and animal migration?) should be elaborated on further.	Section will be re-written.
Oyvind Christophersen (Climate and Pollution Agency)	9	17	4	-	5	-	-	-	We do not see any reason to mention the effects of water in this context (in case non-significant effects are to be mentioned effects on air quality might be included as well). We think that a statement such as "Wind energy is considered a clean energy as regards direct effects on water, air and greenhouse gas emissions, but challenges remain as regards ..... " might be a more appropriate way to introduce the topic.	Section will be re-written.
Steve Sawyer (Global Wind Energy Council)	9	17	4	17	5	-	-	-	suggest "It requires insignificant quantities of water, and...'	Section will be re-written.
Steve Sawyer (Global Wind Energy Council)	9	17	8	17	9	-	-	-	suggest '...signals, although all of these effects are mitigable through proper planning and siting'	Section will be re-written. The mitigation options for negative impacts will be covered in the technology chapters.
Susanne Kadner (Technical Support Unit)	9	17	4	-	-	-	-	-	Less space than what? Also, the numbers for water consumption in the Appendix table are not directly comparable due to the use of different units so this statement ("has the least impact on water") appears unvalidated and should be removed.	Section will be re-written.
Susanne Kadner (Technical Support Unit)	9	17	9	17	10	-	-	-	This statement is incorrect and chapter section 7.6.2.2 details the impacts associated with offshore wind-farming. Sentence needs to be adjusted accordingly.	Section will be re-written. The mitigation options for negative impacts will be covered in the technology chapters.
United States (U.S. Department of State)	9	17	5	-	-	-	-	-	Consider life cycle impacts of providing energy services at large scale using intermittent resources. These include air, water and land issues.	Chapter will be re-written, with the aim to provide exactly such an analysis.
Garcia Javier (Garcia Monge Consultant)	9	17	4	17	4	9.3.1.1	-	-	The sentence says: ""Wind energy turbines occupy less space and can co-exist..."" There a comparison -less space- but there is no second term of the comparison. Wind energy turbines occupy less space than what? According to which parameter (MW installed, energy produced per sq meter of land)?	Section will be re-written.
David Clubb (European Environment Agency)	9	18	-	18	-	-	-	9.1	Bias: why is ""no or little impact under normal operation"" considered a positive for nuclear energy? If this is relevant then it should also be included for other renewables. There is also a lack of perspective on the 'downside' of nuclear, which is highly catastrophic compared to most other installations (except fossil fuel and large hydro)	Table will be removed. Section on accidents and risks will be included in re-written chapter.
Denis Aelbrecht (EDF)	9	18	-	-	-	-	-	9.1	negative impact of fossil fuels (Land Use and Population) : should also include oil spills (aquatic or terrestrial) !	Table will be removed.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Denis Aelbrecht (EDF)	9	18	-	-	-	-	-	9.1	to be comprehensive this table should also have a column descibing the energetic services/features of each technology (intermittent/continuous, predictible/unpredictible, storage or not, require a backup/storage or not, etc..). This would illustrate the fact that technologies are not totally interchangeable, and that impacts are therefore difficult to compare.	Table will be removed.
Emmanuel Branche (Electricité de France)	9	18	-	-	-	-	-	9.1	Built environment -> benefits for hydropower : "high-level of socio-economics benefits from new infrastructure" (e.g. as windpower)	Table will be removed.
Emmanuel Branche (Electricité de France)	9	18	-	-	-	-	-	9.1	Built environment -> Concerns for windpower : add "changes in landscape" like for bioenergy and nuclear	Table will be removed.
Emmanuel Branche (Electricité de France)	9	18	-	-	-	-	-	9.1	From "Air and water" on "Hydropower" in "concerns", proposition to remove "high" in the sentence as it is too vague. Furthermore current quantification show when in cases where methane can occur, they represent GHG emissions extremely low (1 or 2 times less than a thermal unit). Reference to section 5.6	Table will be removed.
Emmanuel Branche (Electricité de France)	9	18	-	-	-	-	-	9.1	From "Ecosytem and Biodiversity" on "Direct Solar", positive and negative impacts are not consistent. Indeed it is written on positive that there are "no harm and some benefits" and in the cell just below "risks from large scale projects"	Table will be removed.
Emmanuel Branche (Electricité de France)	9	18	-	-	-	-	-	9.1	I am not sure that there is no negative "built environment" for Direct solar ... (for electricity and/or heat use, solar panel on roofs have a visual effect), and the costs are very high. Proposition to add such elements on that point as high costs of this technology compared to the alternatives may have negative consequences in terms of social-economic (increased electricity prices for instance)	Table will be removed.
Emmanuel Branche (Electricité de France)	9	18	-	-	-	-	-	9.1	Proposition to add "Creation of possible corridor/areas for nature conservation, as well as high-value ecosystems such as Ramsar reservoirs" as a positive impact for hydropower in the field Ecosystem & Biodiveristy. Such a conservation program/ sanctuary (wildlife park) was created for Nam Theun 2 project in Laos as an example. Several hydropower reservoir are also categorised as Ramsar (ref chap 5 and SPM p14). I am not sure that there is no negative "built environment" for Direct solar ... (for electricity and/or heat use, solar panel on roofs have a visual effect).	Table will be removed.
Garcia Javier (Garcia Monge Consultant)	9	18	-	18	-	-	-	9.1	4th row, 5th column: Add CO2 and hydrogen sulphide emissions	Table will be removed.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Garcia Javier (Garcia Monge Consultant)	9	18	-	18	-	-	-	9.1	9th row, 5th column: The expression is very broad, it is possible to identify some of the risks of contamination?	Table will be removed.
Garcia Javier (Garcia Monge Consultant)	9	18	-	18	-	-	-	9.1	last row, last column: add, impact from pipelines for oil and gas.	Table will be removed.
Japan (the Japanese Ministry of Foreign Affairs)	9	18	-	-	-	-	-	9.1	Chart should include impact on marine use (e.g. conflict with fishery rights) for wind power, and conflict with water concessions for hydropower.	Table will be removed.
Japan (the Japanese Ministry of Foreign Affairs)	9	18	-	-	-	-	-	9.1	Have the authors intentionally distinguished blank boxes from those that say "-"?	Table will be removed.
Modesto Fernandez Diaz-Silveira (Ministry of Science, Technology and Environment)	9	18	-	-	-	-	-	9.1	TO include text, in first column (Bioenergy), air and water, concerns (-) : "Competition for water usage..."	Table will be removed.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Oluf Ulseth (Statkraft AS)	9	18	-	-	-	-	-	9.1	The benefit/concern list on hydropower has only partially been completed and lacks important aspects both on the positive and negative side. A major positive contribution to land use/population is flood and drought control, as well as inland navigation which should be listed explicitely in this rubric, whereas under Air/Water the reference to the same "impounded water can be used for..." should be deleted to avoid redundnancy. However under the same category should be added instead "emits no toxic air pollutants" and "offers increased options for integrated water management in terms of quantity and quality" (e.g. increasing oxygen levels in polluted rivers by spilling water over the dam). Moreover, the following benefits to ecosystems and biodiversity have been disregarded: stabilisation of groundwater levels, improved wetland conservation and enhanced control mechanisms for invasive species. If the space allows it would also be important to highlight under this rubric that especially in nordic climates the replacement of an terrestrial environment by an aquatic one through the creation of a reservoir increases the overal biological productivity of this area (see governmental studies from Québec, Canada). In addition under the Human health benefits should not only be mentioned that water supply from reservoirs can contribute through improved health "and food quality". (The protein of fish produced in the reservoir is of much higher nutritional quality than the crops which might have been grown there before). Under the built Environment section it is important to specify in addition "socio-economic benefits from new infrastructure and flood/drought protection". For the negative aspects under the land use rubric is important to nuance that not all hydropower does involve population displacements or impacts on cultural heritage. For example the whole hydropower generating fleet of Canada (74 000 MW installed capacity and about 355 TWh/yr) has involved no involuntary displacement. Therefore, it would be more accurate to state "may involve" here. Furthermore, under negative contributions to ecosystems should be mentioned "may increase sedimentation" (as this is not the case for all areas - i.e. areas with predominat granit ground). The forumlation of the negative contribution under built environment"existing infrastructure dammage due to inundation" is somewhat ambigous and requires clarification. Does it mean the infrastructure which has been impounded through reservoir creation? Than it is necessary to nuance that "may flood existing infrastructure if storage is required" as not all hydropower projects come with a reservoir. However this deems not very relevant since this infractructure has to be replaced at a market value basis. Then it would be more accurate to specify "might submerge/displace existing infrastructure in impoundment areas". Otherwise, dams with reservoirs are more likely to prevent inundations and damage to infrastructure due to enhanced capacity of water absorbtion.	Table will be removed.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Oyvind Christophersen (Climate and Pollution Agency)	9	18	-	-	-	-	-	9.1	Related to adverse impacts for built environment for geothermal, induced local seismicity should not only be associated with EGS and hydrofracturing.Induced seismicity could also result from operation of the reservoir as mentioned in 4.5.3. We propose that the parantheses is adjusted or removed.	Table will be removed. Section on accidents and risks will be included in re-written chapter.
Oyvind Christophersen (Climate and Pollution Agency)	9	18	-	-	-	-	-	9.1	The list of benfits and concerns for hydropower is not complete and is missing important aspects on both the positive and negative side. A positive contribution to land use/population is flood and drought control, as well as inland navigation, which should be listed explicitely in this rubric. Moreover, the following benefits to ecosystems and biodiversity have been disregarded: stabilisation of groundwater levels, improved wetland conservation and enhanced control mechanisms for invasive species	Table will be removed.
Peter Johnston (Environmental & Energy Consultants, Ltd)	9	18	-	-	-	-	-	9.1	Ocean energy, air & water: see line 13 above for OTEC	Table will be removed.
Roberto Acosta Moreno (CITMA)	9	18	-	-	-	-	-	9.1	Comments 8, 9 and 10 on the SPM contained in this table also apply here.	Comment unclear.
Taishi Sugiyama (Central Research Institute of Electric Power Industry (CRIEPI))	9	18	-	18	-	-	-	9.1	This figure is very important, but need more works. Address costs, intermittency and stabililty of supply. Add WEHAB benefits of large hydro. Compare with fossile fuel and nuclear.	Table will be removed.
Richard Taylor (International Hydropower Association)	9	18	-	18	-	-	-	9.1	Add ""net"" before GHG reference and replace ""methane"" with ""net GHG"" in the Air and Water rows for hydropower	Table will be removed.
Denis Aelbrecht (EDF)	9	18	-	-	-	-	-	9.1	Positive impact of hydro (Built environment) : flood control is definitely one of them	Table will be removed.
Denis Aelbrecht (EDF)	9	18	-	-	-	-	-	9.1	positive impacts of hydro (Ecosyst. And Biodiv) : hydro reservoirs may also offer new habitats for lacustrine fish species, and usually generate a boom in fish biomass. Reservoirs margins can also offer interesting habitats for birds	Table will be removed.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Greece (National Observatory of Athens)	9	19	-	-	-	-	-	9.1	A descriptive assessment of examined technology options for each impact category is preferable. The way information is presented in the Table is rather misleading. Impacts are not simply positive or negative. The important is a) the difference (net outcome) for each single technology in each impact category and b) a relative evaluation scale across technologies. It's not of the same gravity e.g. "nuisances from noise" attributed to wind energy in air/water impact with the "atmospheric emissions ... etc" attributed to fossil fuels. In addition: why not separately air from water?	Table will be removed.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	19	22	-	-	-	-	-	How are costs of new transmission and upgrades to distribution system important factors?	Section will be re-written and appendix & table 2 removed. LCOEs will be provided in Chapter 1.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	19	12	19	15	-	-	-	How are these barriers?	Section will be re-written. Barriers such as those mentioned will be covered in new section 9.5.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	19	10	-	-	-	-	-	How does higher first cost offer possibility for larger returns?	Section will be re-written.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	19	45	19	46	-	-	-	Is this to do with off-grid power sources or simply the availability of electricity and lighting appliances?	Section will be re-written.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	19	26	19	27	-	-	-	Sentence appears to be incomplete	Section will be re-written.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	19	17	19	20	-	-	-	These numbers for levelized costs do not appear to be correct. See for example EIA Annual energy outlook 2010	Section will be re-written and appendix & table 2 removed. LCOEs will be provided in Chapter 1.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	19	37	19	39	-	-	-	This conclusion could be challenged. Are risks higher? Are costs higher? What is the empirical evidence?	Section will be re-written.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	19	41	-	-	-	-	-	What does the source of energy have to do with manpower for O&M? This has to do with the technology. It is unclear that at scale the manpower required for a RE plant will be smaller than that for a fossil fuel plant.	Section will be re-written.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	19	7	19	8	-	-	-	Why is there significant future investment potential only for direct solar & large & small hydropower?	Section will be re-written.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Brazil (Ministry of Science and Technology)	9	19	1	19	11	-	-	-	Correct the number of the table 2 (see page 21 (table 9.2))	Table will be removed
Daniel Bouille (Bariloche Foundation)	9	19	17	-	18	-	-	-	Rate of discount?	Section will be re-written and appendix & table 2 removed. LCOEs will be provided in Chapter 1.
David Clubb (European Environment Agency)	9	19	18	19	19	-	-	-	Incomplete assertion: the lower costs for nuclear tends to be because of limits to public liability and hence reduced insurance costs, plus subsidy for industry-related factors such as infrastructure, training, R&D etc.	Section will be re-written and appendix & table 2 removed. LCOEs will be provided in Chapter 1.
Denis Aelbrecht (EDF)	9	19	19	-	-	-	-	-	It is mentioned in several instances in this chapter that the low cost of the nuclear kWh is due to the fact that the investment cost of the units are subsidized. This statement should be either substantiated (with references), or removed.	Section will be re-written and appendix & table 2 removed. LCOEs will be provided in Chapter 1.
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	9	19	16	19	19	-	-	-	Subsidies to investment costs of nuclear should be subtstracted in order to get a more comparable picture.	Section will be re-written and appendix & table 2 removed. LCOEs (which do not include subsidies) will be provided in Chapter 1.
Geoffrey Heal (Columbia University)	9	19	16	19	21	-	-	-	These costs are wrong - they are the costs for a megawatt hour NOT a kilowatt hour. This is an embarassing error. See appendix A where the correct units are used. Even with this correction I am uneasy about the accuracy of these numbers. They appear to me to be out of date: renewable costs have declined sharply in the last 18 months in the US and in China, and these numbers do not reflect this decline.	Section will be re-written and appendix & table 2 removed. LCOEs will be provided in Chapter 1.
Gregory Keoleian (University of Michigan)	9	19	9	-	-	-	-	-	change "promotion" to "potential"	Section will be re-written.
Gregory Keoleian (University of Michigan)	9	19	16	-	21	-	-	-	error in units. Replace kWh with MWh	Section will be re-written and appendix & table 2 removed. LCOEs will be provided in Chapter 1.
Gregory Keoleian (University of Michigan)	9	19	25	-	27	-	-	-	incomplete sentence	Section will be re-written.
Gregory Keoleian (University of Michigan)	9	19	31	-	32	-	-	-	need a reference here	Section will be re-written.
Gregory Keoleian (University of Michigan)	9	19	37	-	39	-	-	-	very subjective statement - difficult to make comparisons of different types of costs and benefits; need to provide refs.	Section will be re-written.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Gustavo Nadal (Fundacion Bariloche)	9	19	18	-	-	-	-	-	hydrothermal?	Section will be re-written.
Gustavo Nadal (Fundacion Bariloche)	9	19	44	19	46	-	-	-	include wind. The use of off-grid power for productive uses is a key issue for ensuring increasing income, energy demand and sustainability of energy systems. Thus, productive uses not only cover night time hours. RE systems should help cover main energy requirements from existing and potential productive activities.	Section will be re-written. New section on energy access will provide more detail on energy for productive uses.
Jan Steckel (PIK)	9	19	31	-	32	-	-	-	by whom? References are missing	Section will be re-written.
Jan Steckel (PIK)	9	19	40	20	2	-	-	-	very general and vague statements	Section will be re-written.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	9	19	16	19	39	-	-	-	Another unnecessary repetition	Section will be re-written.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	9	19	2	19	15	-	-	-	Another unnecessary repetition. Investment costs as a barrier have already been mentioned few times. If they need to be mentioned again, their link with higher energy prices for users should be make and how that may affect development. Furthermore, the cost-efficiency of small scale distributed RE generation compared to large investments into grid infrastructure to connect remote unelectrified areas is not mentioned here.	Section will be re-written and appendix and table 2 removed. The difference for rural and urban settings will be addressed in re-written chapter. LCOEs will be provided in Chapter 1.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	9	19	10	-	-	-	-	-	Is there any evidence that high initial costs of RE can generate higher returns on investment? This sentence has also no relation with the rest of the paragraph.	Section will be re-written.
Peter Johnston (Environmental & Energy Consultants, Ltd)	9	19	32	-	-	-	-	-	60% lower? Unclear. Lower than 2005 costs?	Section will be re-written.
Peter Johnston (Environmental & Energy Consultants, Ltd)	9	19	16	19	21	-	-	-	Per kWH? Surely you mean per MWh.	Section will be re-written and appendix & table 2 removed. LCOEs will be provided in Chapter 1.
Susanne Kadner (Technical Support Unit)	9	19	2	19	9	-	-	-	As mentioned in the comments to the FOD, liaise with Chapter 5 on the usage of small and large hydro.	Section will be re-written.
Susanne Kadner (Technical Support Unit)	9	19	43	-	-	-	-	-	Has "short term" been defined somewhere?	Section will be re-written.
Susanne Kadner (Technical Support Unit)	9	19	16	19	39	-	-	-	It is not clear why this information has been included in the Appendix table - levelised costs of energy are provided in Chapter 1 (Table 1.4). This needs to be clarified and updated.	Section will be re-written and appendix & table 2 removed.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Susanne Kadner (Technical Support Unit)	9	19	17	-	-	-	-	-	Please be specific and clearly state that the "other technologies" are fossil based and nuclear.	Section will be re-written and appendix & table 2 removed. LCOEs will be provided in Chapter 1.
Susanne Kadner (Technical Support Unit)	9	19	2	19	3	-	-	-	This appears correct for the lower boundary of the ranges provided but does not hold true for the upper boundaries (compare for example in Appendix table large hydro 1970-2600 US$/KWh and coal without CCS 900-2800 US$/KWh; page 83). Also, use of large and small hydro needs to be clarified!	Section will be re-written and appendix & table 2 removed. LCOEs will be provided in Chapter 1.
United States (U.S. Department of State)	9	19	30	-	-	-	-	-	Be consistent in data presentation. Corollary data should be provided for all session. Define time frame, and use it consistently across sessions	Section will be re-written.
United States (U.S. Department of State)	9	19	37	19	39	-	-	-	Statement inappropriate for a science-based analysis that is supposed to be policy-neutral.	Section will be re-written.
United States (U.S. Department of State)	9	19	0	-	-	-	-	-	This is an example of the value of a systems approach. The difference in energy costs between RE and fossil in rural villages is very different than for urban settings and developed nations. In urban settings, economies of scale, preexisting infrastructure, and population density make large installations more cost effective. In rural settings, the lack of preexisting infrastructure and increased acceptance of intermittent power can make RE very cost effective.	Noted. The difference for rural and urban settings will be addressed in re-written chapter.
China (China Meteorological Administration)	9	19	17	19	20	9.3.1.2	-	-	The cost needs to be further checked: $50-240 per kWh?	Section will be re-written and appendix & table 2 removed. LCOEs will be provided in Chapter 1.
Emmanuel Branche (Electricité de France)	9	19	18	19	18	9.3.1.2	-	-	what is hydrothermal ?	Section will be re-written.
Garcia Javier (Garcia Monge Consultant)	9	19	17	19	18	9.3.1.2	-	-	prices are shown as $ 50 to $ 120 per kWh. Does should it say $ 50 to $ 120 per MWh?	Section will be re-written and appendix & table 2 removed. LCOEs will be provided in Chapter 1.
Garcia Javier (Garcia Monge Consultant)	9	19	2	19	2	9.3.1.2	-	-	The sentence : "Investment cost for all renewable technologies are uniformly higher than those for fossil power plants..." is not true. Al least for wind and small hydro run of river (some cases) investment cost are comparable when coal power plants must add pollution control devices.	Section will be re-written and appendix & table 2 removed. LCOEs will be provided in Chapter 1.
Garcia Javier (Garcia Monge Consultant)	9	19	25	19	27	9.3.1.2	-	-	the sentence is unclear. "The structure of renewable portfolio standards, tax policies and other policy initiatives directed at renewable electricity." What does it mean? Is there a comparison with other forms of renewable energy (heat, cooling, biofuels)?	Section will be re-written.
David Clubb (European Environment Agency)	9	20	-	-	-	-	-	9.2	Inaccurate phrasing: Nuclear does not have a high accidental risk potential; there is a very low risk of accident, but very high impact if it does occur	Table will be removed.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
David Clubb (European Environment Agency)	9	20	-	-	-	-	-	9.2	Inaccurate placing: ""Fluctuating prices of oil supply"" should not be considered a benefit of using fossil fuels	Table will be removed.
David Clubb (European Environment Agency)	9	20	-	-	-	-	-	9.2	Incomplete/inaccurate statement: nuclear does not only have investment risks related to waste disposal, but also to the long lead time before energy generation (which makes it susceptible to interest rates) and to uncertainty about regulatory affairs	Table will be removed.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	20	6	-	-	-	-	-	These numbers appear to be based on a single study, as such, I would have expected an assessment of confidence	Section will be re-written to provide a better assessment of impacts on employment opportunities.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	20	1	20	2	-	-	-	This is a somewhat vague sentence.	Section will be re-written.
Daniel Bouille (Bariloche Foundation)	9	20	3	-	12	-	-	-	The importance, at least from Developing Countries point of view, is in which phase of the project cycle the job are created.If the technology is not produced internally, the impact is very low.	Section will be re-written to provide a better assessment of impacts on employment opportunities.
Denis Aelbrecht (EDF)	9	20	9	-	-	-	-	-	sentence unclear : "Energy efficiency too shows much higher values at 0.38". Consider rewording, or removing.	Section will be re-written.
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	9	20	10	20	12	-	-	-	Offshore wind parks are a further example of a possible source of eco-tourism and attraction in ist own right.	Noted.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	9	20	3	20	12	-	-	-	The number of jobs are too specific	Section will be re-written to provide a better assessment of impacts on employment opportunities.
Oyvind Christophersen (Climate and Pollution Agency)	9	20	11	-	-	-	-	-	The use of the term 'eco-tourism' is wrong. What is meant here (line 5, 20) is marine tourism or nature-based tourism. There may even be a new kind of tourism focusing on renewable energy sources ('technotourism'); the term eco-tourism refers specificially to tourism that is not environmentally harmful and fulfills a range of other criteria. I suggest the use of the generic term 'tourism'.	Section will be re-written.
Oyvind Christophersen (Climate and Pollution Agency)	9	20	10	-	-	-	-	-	We do not understand what this energy efficiency value refers to.	Section will be re-written.
Oyvind Christophersen (Climate and Pollution Agency)	9	20	11	-	-	-	-	-	We think that the threats to eco-tourism and attraction from renewable energy projects might, in general, be as high or higher than the proposed benefits - particularly if the projects are large scale and carried out in pristine environments.	Section will be re-written.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Susanne Kadner (Technical Support Unit)	9	20	3	20	12	-	-	-	This paragraph is difficult to understand and should provide a better interpretation of the values presented.	Section will be re-written.
United States (U.S. Department of State)	9	20	0	-	-	-	-	-	Make the case with data. Cite the literature. This is a complex subject	Section will be re-written.
Youba SOKONA (Sahara and Sahel Observatory)	9	20	5	20	6	-	-	-	Could you please explain why solar PV is a particular case. Why more jobs are needed?	Section will be re-written to provide a better assessment of impacts on employment opportunities.
Thomas Wilbanks (ORNL)	9	20	3	-	-	9.3.1.2	-	-	regarding employment, one argument has been that distributed RE technology manufacture and use brings the jobs closer to the users, rather than importing the equipment and energy from more distant areas (e.g., Amory Lovins)	Section will be re-written to provide a better assessment of impacts on employment opportunities.
Denis Aelbrecht (EDF)	9	21	-	-	-	-	-	9.2	Gender equity - hydro : why is that "partially relevant for women"?	Table will be removed.
Denis Aelbrecht (EDF)	9	21	-	-	-	-	-	9.2	Hydropower benefits (Income and Livelihoods) : Not clear why there is another occurrence of distinction of small vs. large hydropower. Large schemes provide opportunities for irrigation, downstream flow support (irrigation, transportation), flood control, reservoir fisheries, tourism. This should be stated here.	Table will be removed.
Denis Aelbrecht (EDF)	9	21	-	-	-	-	-	9.2	Nuclear and Fossil Fuel benefits (Supply cost) : both technologies are said to be subsidized : what is that statement based on? What are the peer-reviewed references for this statement ? Bio-energy, solar and wind are also certainely subsidized (feed-in tariffs, etc.), why doesn't it appear in this table?	Table will be removed.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Oluf Ulseth (Statkraft AS)	9	21	-	-	-	-	-	9.2	In order to provide a balanced overview, the table's column on hydropower requires additions which will have also to be replicated into the relating text passages on pages 19 and 20. Proposals: a- (Income and Livelihood: 1) delete "especially hilly regions" to save space, as it does not add critical information compared to remote areas - 2) continue after (...) areas, "while larger-scale schemes provide energy supply security for industrialised or densly populated urban areas. Storage hydro can in addition provide multipurpose benefits, such as as providing water for irrigation, industrial and residential use, flood and drought control, navigation, fisheries and enhances recreational opportunities." / b- (Energy supply costs) should read: "Often best life-cycle costs due to longevity of plant components and low O&M costs; highest energy conversion efficiency and very favorable energy payback ratio." / c- (Investment) delete on the positive side "for still expanding large and small hydro projects" as the rest is clear enough ; errors in the wording of downsides: should read "high initial costs; long planning and construction times" / d- (Employement) addition required. for more details see attachment . Proposal: > 2 million permanent jobs worldwide (operation), + > 0,8 million direct jobs for a temporary period of at least 5 years (construction), high pourcentage of local workforce especially valuable for remote areas / e- (Gender equity) this section should read: "Hydropower is generally gender neutral, in some regions small hydro has proven partially relevant for women."	Table will be removed.
Oluf Ulseth (Statkraft AS)	9	21	-	-	-	-	-	9.2	The reference to transmission costs applies also to wind energy, especially for off-shore settings. Therefore this horizontal box should be modified, so that it includes the wind energy rubric too.	Table will be removed.
Oyvind Christophersen (Climate and Pollution Agency)	9	21	-	-	-	-	-	9.2	The use of the term 'eco-tourism' is wrong. What is meant here (line 5, 20) is marine tourism or nature-based tourism. There may even be a new kind of tourism focusing on renewable energy sources ('technotourism'); the term eco-tourism refers specificially to tourism that is not environmentally harmful and fulfills a range of other criteria. I suggest the use of the generic term 'tourism'.	Table will be removed.
Oyvind Christophersen (Climate and Pollution Agency)	9	21	-	-	-	-	-	9.2	Transmission costs is highly relevant also for wind energy, especially when more and more projects are developed further away from poplation centras and going more and more for off-shore settings. The horizontal box should therefore be modified to also include the wind energy rubric too.	Table will be removed.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Richard Taylor (International Hydropower Association)	9	21	-	21	-	-	-	9.2	Delete references to ""small hydro"" and replace with ""off-grid hydro"". Note the classification of hydropower by scale is out of step with the SRREN SOD Hydropower Chapter (5).	Table will be removed.
Greece (National Observatory of Athens)	9	22	-	-	-	-	-	9.2	Same comment as with Table 9.1. Not easy to read and realize differences between technologies.	Table will be removed.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	22	2	21	7	-	-	-	The tradeoff with respect to land and bioenergy perhaps need to be more detailed.	Section will be re-written.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	22	43	21	44	-	-	-	What does 'solar disinfection' this have to do with the larger land use implications of the use of solar energy?	Section will be re-written.
Brazil (Ministry of Science and Technology)	9	22	35	22	42	-	-	-	The paper supposes people has (or will have) access to technology, which is correct for developed countries. In developing countries bioenergy crops can bring together technology that improves food crops as well.	Noted.
David Clubb (European Environment Agency)	9	22	0	-	-	-	-	-	Unfocused text: this page would benefit from rewriting. The narrative does not deliniate clearly between energy types and is therefore somewhat confusing to the reader	Section will be re-written.
David Clubb (European Environment Agency)	9	22	43	22	43	-	-	-	Unneccessary heading: Solar does not justify its own heading here.	Section will be re-written.
Denis Aelbrecht (EDF)	9	22	27	22	29	-	-	-	this paragraph associates Hydropower with social impacts that are not systematic. It is true that impoverishment has occured on some projects due to improperly managed communities relocation, but very significant progresse have been made over the last decades on how to anticipate and manage these issues. IIn addition, there has been a great variety in the past on how these issues were addressed, country by country. The paragraph does not account for these progresses. It should not focuse only on failed past experiences. As the report relates to potential for renewable development, current good practices (and not only past ones) should equally be reflected here.	Section will be re-written to address these problems.
Geoffrey Heal (Columbia University)	9	22	1	22	6	-	-	-	Afn important reference here is recent work by Wolfram Schhlenker which studies the impact of the US's bioethanol mandate on world food prices, finding this responsbile for a 30% increase in world food prices.	Noted.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	9	22	12	-	-	-	-	-	"small land" should be changed to "small amount of land"	Section will be re-written.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	9	22	12	22	13	-	-	-	the amount of land required by ocean energy stations is marginal and needs not be addressed separately	Section will be re-written.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	9	22	3	-	-	-	-	-	The phrase "larg scale land uses" is not clear - is "large scale land use change" meant here?	Section will be re-written.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	9	22	27	-	-	-	-	-	this should be mentioned in table 9.2	Table will be removed.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	9	22	43	22	46	-	-	-	What is the benefit of using solar energy for soil disinfection?	Section will be re-written.
Oyvind Christophersen (Climate and Pollution Agency)	9	22	1	23	22	-	-	-	Highlighting of relevant RE-sources should be used systematically throughout the text (now only "solar" is highlighted.	Section will be re-written.
Oyvind Christophersen (Climate and Pollution Agency)	9	22	43	-	46	-	-	-	It appears somewhat confusing that only the rather specific topic of soil disinfection is mention under "solar". Why is not land issues associated with truly large scale solar projects not dealt with in any detail?	Section will be re-written.
Stephan Klasen (University of Göttingen)	9	22	1	-	-	-	-	-	No motivation is provided why suddenly land, air, etc is discussed. What is the purpose of this and how does it fit into the general discussion? The section on air is highly repetitive and restates things said earlier. It can safely be cut. Generally, not much new is in these sections.	Section will be re-written.
Susanne Kadner (Technical Support Unit)	9	22	12	-	-	-	-	-	However, the area occupied as indiacted in the Appendix table is in the same range as PV (Evans and Strezow, 2009). Also, there is no information on the OTEC technology in the Appendix table.	Section will be re-written and appendix removed.
Susanne Kadner (Technical Support Unit)	9	22	43	22	46	-	-	-	Soil disinfection is not mentioned in Chapter 3. This needs to be clarified and adapated accordingly.	Section will be re-written.
Susanne Kadner (Technical Support Unit)	9	22	1	22	6	-	-	-	The cause for land subsidence cited here is not the same as stated in the relevant section in Chapter 5 (page 23, lines 25-30). Also the causes for earthquakes (injections vs extractions) need to be checked and updated!	Section will be re-written. New chapter will contain section on accidents and risks that will assess these aspects.
Susanne Kadner (Technical Support Unit)	9	22	27	22	34	-	-	-	This impact is mainly related to the creation of reservoirs and should be clearly stated. Also, the example given seems to be fairly specific for a certain type of project in developing countries - could this assessment be supported by other references for other regions as well?	Section will be re-written to address these problems.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Susanne Kadner (Technical Support Unit)	9	22	35	22	42	-	-	-	This is an interesting statement but again supported by too few references! Should this be a general challenge and problem, there will certainly be other scientific papers available for a proper assessment.	Section will be re-written.
United States (U.S. Department of State)	9	22	43	22	46	-	-	-	How often is this actually used -- no one I know has ever even heard of it.	Section will be re-written.
United States (U.S. Department of State)	9	22	35	22	42	-	-	-	This paragraph is a very poor description of this issue -- especially one which led to major UN announcements about food and bioenergy.	Section will be re-written.
Richard Taylor (International Hydropower Association)	9	22	28	22	28	9.3.2	-	-	Delete ""Dams"" and replace with ""Reservoir hydropower"". Of the world's estimated 45,000 large dams, only 20-25% are used for hydropower - reservoir hydropower is therefore a more accurate term and aligns with the classification of hydro	Section will be re-written.
Richard Taylor (International Hydropower Association)	9	22	16	22	16	9.3.2	-	-	Delete ""dams"" and replace with ""reservoir hydropower"". Of the world's estimated large 45,000 dams, only 20-25% are used for hydropower - reservoir hydropower is therefore a more accurate term and aligns with the classification of hydro in SRREN SOD Chapter 5 (Hydropower)	Section will be re-written.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	23	2	23	3	-	-	-	How relevant or significant is this is in general? Any experience of subsidence from iceland (or other regions)?	Section will be re-written.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	23	9	-	-	-	-	-	How will 'technology transfer for conventional agriculture activities' happen?	Section will be re-written.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	23	25	-	-	-	-	-	It should be carbon neutral instead of Green House Gas free.	Section will be re-written. New LCA data for electricity generation and transport fuels will adequately deal with this aspect.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	23	14	23	19	-	-	-	References needed.	Section will be re-written.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	23	43	-	-	-	-	-	References required.	Section will be re-written.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
David Clubb (European Environment Agency)	9	23	24	23	29	-	-	-	Inaccurate and/or incomplete: the assertion that bioenergy resources are GHG free is simply incorrect. At the point of combustion, there are (broadly speaking) the same emissions as for using fossil fuel. The uptake of carbon dioxide by replanted material can decrease the net effect, but the timescales are ambiguous; one recent study (http://www.birdlife.org/eu/pdfs/Bioenergy_Joanneum_Research.pdf) suggests that there are 250 years of net emissions from large-scale biomass use	Section will be re-written. New LCA data for electricity generation and transport fuels will adequately deal with this aspect.
David Clubb (European Environment Agency)	9	23	7	23	23	-	-	-	Incomplete: this section understates or trivialises the impact of bioenergy production and use on Indirect Land Use Change. There are very significant SD impacts through increasing use of biofuels (in particular) in the West, not least that food prices are affected, which makes a material difference to food availability and price in developing nations. The final section on hydro also trivialises the issues of resettlement, which has an extremely poor track record in practice. This would benefit greatly from a more balanced view	Section will be re-written. LUC issues will be discussed in new draft in connection with LCAs; food security will be covered in chapter on bioenergy; re-settlement aspect of hydropower will be discussed as barrier in new section 9.5.
Denis Aelbrecht (EDF)	9	23	45	23	47	-	-	-	this may not be true if one consider the entire life cycle.	Section will be re-written. New LCA data for electricity generation will adequately address this.
Greece (National Observatory of Athens)	9	23	-	31	-	-	-	-	Subsections 9.3.2 -9.3.7 focus only on oneway implications of RE technologies with SD. Avoided impacts due to substituting or avoiding fossil fuels is the most apparent implication and is not adequately illustrated in this section and in the whole chapter,	Noted. The re-drafted chapter will address this by comparing - where possible - the impacts of RE, fossil and nuclear.
Gregory Keoleian (University of Michigan)	9	23	47	-	-	-	-	-	add additional references: e.g., Keoleian and Lewis 2003; Keoleian, G.A., and G.McD. Lewis. "Modeling the Life Cycle Energy and Environmental Performance of Amorphous Silicon BIPV Roofing in the US", Renewable Energy (2003) 28: 271-293.	Noted. References will be considered in LCA review.
Gustavo Nadal (Fundacion Bariloche)	9	23	15	23	17	-	-	-	Again, the concept of degraded land and grazing land for biofuel production should not be a general statement or recommended without case by case assessment	Section will be re-written.
Gustavo Nadal (Fundacion Bariloche)	9	23	38	23	44	-	-	-	Emissions form biofuels could be mentioned here and also the existence of potential conflicting targets when reducing air pollutants emissions (e.g. CO2 and aldehydes emissions from the uso of bioethanol in transport)	Section will be re-written. New LCA data for electricity generation and transport fuels will adequately deal with this aspect. New section on air pollution will specifically address aldehyde emissions from bioethanol.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Gustavo Nadal (Fundacion Bariloche)	9	23	35	23	37	-	-	-	Idem above.	Section will be re-written. New LCA data for electricity generation and transport fuels will adequately deal with this aspect.
Gustavo Nadal (Fundacion Bariloche)	9	23	7	23	12	-	-	-	Include land use planning as a key option to reduce impacts. Marginal and idle lands concepts should be trated carefully, as stated above.	Section will be re-written.
Jyri Seppälä (Finnish Environment Institute)	9	23	24	44	-	-	-	-	Particulate matters are missing in the case of biomass	Section will be re-written and PM will be specifically discussed on new section on air pollution.
Ladislaus Rybach (Geowatt AG Zurich (company))	9	23	1	-	6	-	-	-	The statements in this paragraph need to be revised. First, the low land use for geothermal power plants (generally much lower than for solar, wind and hydropower installations) needs to be mentioned. Then, significant land subsidence occurred (over more than 100 years of geothermal power generation) only at the mentioned location (Wairakei, New Zealand). Finally, the issue of induced seismicity belongs to section 9.3.7 'Built environment'. In the cited paper Domenico Giardini emphasizes that risk assessment can avoid or mitigate the seismic risk. In addition, Chapter 4 (page 23) states that 'during 100 years of development, although turbines have been tripped off-line, no buildings or structures within a geothermal operation or local community have been significantly damaged (more than superficial cracks) by shallow earthquakes originating from either geothermal production or injection activities.'	Section will be re-written.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	9	23	25	-	-	-	-	-	on a life-cycle basis, bioenergy is not a GHG free energy source, as it is correctly mentioned later in the paragr.	Section will be re-written. New LCA data for electricity generation and transport fuels will adequately deal with this aspect.
Oyvind Christophersen (Climate and Pollution Agency)	9	23	17	-	-	-	-	-	Possible social conflicts arising from targeting grazing land for bio-energy development should also be described.	Section will be re-written. However, this aspect will be addressed in chapter on bioenergy.
Oyvind Christophersen (Climate and Pollution Agency)	9	23	1	23	6	-	-	-	This section should be updated based on section 4.5.4 in Chapter 4.	Section will be re-written.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Oyvind Christophersen (Climate and Pollution Agency)	9	23	26	-	28	-	-	-	We do not see many fundamental advantages from fuels derived from biological sources compared to similar fossil fuels as regards local air quality, and propose that the reference to air quality is either deleted or described in more detail taking at technology neutral and fuel specific approach.	Section will be re-written. New LCA data for electricity generation and transport fuels (GHG emissions) will outline differences between fossil and renewable energy sources in a more comprehensive manner. New section on air pollution will specifically address the impacts from different range of feul types.
Oyvind Christophersen (Climate and Pollution Agency)	9	23	38	-	44	-	-	-	We think that the main message from this chapter is somewhat misleading, since it deals mainly with biogas. Emissions of particulates and NOx from solid and liquid bio-energy should also be dealt with.	Section will be re-written.
Oyvind Christophersen (Climate and Pollution Agency)	9	23	25	-	26	-	-	-	We think that this description is too general and we would prefer a description based on a life-cycle approach. For example something along this line "Bio energy has the potential for greenhouse gas neutrality, provided that…. "	Section will be re-written. New LCA data for electricity generation and transport fuels will adequately deal with this aspect.
Oyvind Christophersen (Climate and Pollution Agency)	9	23	45	-	47	-	-	-	We would prefer that a more descriptive approach was used in this short paragraph on solar. For example: "Solar energy implies direct conversation of radiation energy to heat- or electric energy and consequently does not result in any fuel related emissions of greenhouse gases or other pollutants. Significant indirect emissions can, however be attributed to the production and decommissioning of equipment.... "	Section will be re-written and appendix removed. New LCA data for electricity generation will adequately address this.
Susanne Kadner (Technical Support Unit)	9	23	25	-	-	-	-	-	Bioenergy is not GHG free - CO2 is liberated during combustion and N2O may be released during production (as stated in line 32 of the same paragraph)! It has a large mitigation potential provided resources are developed sustainably and provided the right bioenergy systems are applied!	Section will be re-written. New LCA data for electricity generation and transport fuels will adequately deal with this aspect.
Susanne Kadner (Technical Support Unit)	9	23	35	23	37	-	-	-	Careful cross-check with Chapter 2 regarding range of options to reduce emissions from biomass cultivation needs to be made!	Section will be re-written. New LCA data for electricity generation and transport fuels will adequately deal with this aspect.
Susanne Kadner (Technical Support Unit)	9	23	29	23	37	-	-	-	Here, a clear reference to Chapter 2 and the entire discussion on LCAs needs to be provided.	Section will be re-written. New LCA data for electricity generation and transport fuels will adequately deal with this aspect.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Susanne Kadner (Technical Support Unit)	9	23	45	23	47	-	-	-	Instead of such a general and misleading comment, reference to Appendix table should be made and appropriate numbers be discussed. Also, compare with LCA data provided in Chapter section 3.6.1.	Section will be re-written and appendix removed. New LCA data for electricity generation will adequately address this.
Susanne Kadner (Technical Support Unit)	9	23	43	23	44	-	-	-	Remove sentence - does not fit with context.	Section will be re-written.
Susanne Kadner (Technical Support Unit)	9	23	7	23	22	-	-	-	There is nothing about hydropower in this paragraph. The information provided is redundant to other parts in this chapter (see comment no. 113 concerning page 16, lines 3 -13) and redundant within the paragraph itself. No references are provided to support any of the statements - paragraph should be removed entirely!	Section will be re-written.
United States (U.S. Department of State)	9	23	24	23	44	-	-	-	Cite the literature and cross reference to the technical chapter on biofuels. Applicable approach to all technologies.	Section will be re-written. New LCA section for electricity generation and transport fuels will provide extensive reference list; data sources to be used are similar for this chapter and bioenergy chapter to ensure cross-chapter consistency and comparability.
United States (U.S. Department of State)	9	23	0	-	-	-	-	-	Page 23, bioenergy: How does this support the technical conclusions of the bioenergy chapter? For the discussion of this and other technologies is it useful to consider trends in the human development index?	Section will be re-written.
United States (U.S. Department of State)	9	23	1	23	6	-	-	-	This type of examples should be used throughout.	Noted.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	24	10	24	13	-	-	-	Editorial attention needed.	Section will be re-written.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	24	41	-	-	-	-	-	Explain the new term " blue water"	Section will be re-written.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	24	9	-	-	-	-	-	Incomplete reference	Section will be re-written.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	24	25	-	-	-	-	-	Not negligible or negligible?	Section will be re-written and comprehensive LCA review for broad set of RE technologies will be included.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Atle Harby (SINTEF Energy Research)	9	24	46	25	4	-	-	-	Only storage hydro leads to "impoundment of water of large quantities", not run-of-the-river hydro plants.	Section will be re-written.
Atle Harby (SINTEF Energy Research)	9	24	1	24	9	-	-	-	This section on hydropower is not at all updated with the content of Chapter 5 and must be revised. Hydro reservoirs may emit or take up GHG and this is very site specific. However, the main problem is very seldom like written in this text. The build-up and realease of methane due to flooding and decay of vegetation the first years after impoundment is not the major problem. Methane may be emitted from certain reservoirs due to inflow of organic matter and the biological processes within the reservoir. If this is combined with low oxygen levels and unfavourable power intake conditions, methane may be emitted. See Chapter 5.6 for more details.	Section will be re-written and content better linked to what is covered in chapter on hydropower (where the aspect of methane emissions from reservoirs will be discussed).
Atul Raturi (The University of the South Pacific)	9	24	9	-	-	-	-	-	Reference not complete.	Section will be re-written.
Atul Raturi (The University of the South Pacific)	9	24	27	-	28	-	-	-	Rephrase	Section will be re-written.
Brazil (Ministry of Science and Technology)	9	24	9	24	9	-	-	-	Improve the reference ""Government of Canada"" (Incompleted reference)	Section will be re-written.
Canada (Environment Canada)	9	24	6	24	9	-	-	-	The Government of Canada is cited as validating that "Despite this [reservoir emissions of methane] however, hydropower is still considered a green and clean technology and can be a significant contributor to address air pollution and climate change as it offsets greenhouse gas emissions and emission and air pollutants from fossil fuel power plants". Please consider revising to: "Despite this [reservoir emissions of methane] however, hydropower is still considered an non-emitting technology and can be a significant contributor to address air pollution and climate change as it offsets greenhouse gas emissions and emission and air pollutants from fossil fuel power plants". Reference cited is a 2007 publication and can be accessed here to acquire full reference: http://publications.gc.ca/site/eng/318814/publication.html.	Section will be re-written and content better linked to what is covered in chapter on hydropower (where the aspect of methane emissions from reservoirs will be discussed).
David Clubb (European Environment Agency)	9	24	32	24	34	-	-	-	Contradictory statement: This sentence contradicts the earlier statement that wind (p15 line 22) can amortize strong winds	Section will be re-written and detailed impacts will be covered in wind chapter.
David Clubb (European Environment Agency)	9	24	46	24	47	-	-	-	Incorrect assertion: hydropower does not necessarily require impoundment of large volumes of water	Section will be re-written.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
David Clubb (European Environment Agency)	9	24	10	24	17	-	-	-	Poor editing; this section on solar should be moved to the earlier paragraph on solar. Likewise for the hydropower component	Section will be re-written.
Denis Aelbrecht (EDF)	9	24	5	-	-	-	-	-	replace "release of methane" by "release of CO2 and possibly methane"	Section will be re-written and content better linked to what is covered in chapter on hydropower (where the aspect of methane emissions from reservoirs will be discussed).
Denis Aelbrecht (EDF)	9	24	38	24	41	-	-	-	this sentence is not clear : km3 of what? To do what? Compensating what? Please re-phrase.	Section will be re-written.
Denis Aelbrecht (EDF)	9	24	27	24	28	-	-	-	this statement is not specific to ocean energy, and is actually true for all renewable technologies in this report!	Section will be re-written and comprehensive LCA review for broad set of RE technologies will be included.
Denis Aelbrecht (EDF)	9	24	43	-	-	-	-	-	typo : "required FROM time to time"	Section will be re-written.
Denis Aelbrecht (EDF)	9	24	47	-	-	-	-	-	typo : "water IN (OF) large quantities"	Section will be re-written.
Denis Aelbrecht (EDF)	9	24	43	-	-	-	-	-	typos : "for cleaning (OF) them after installation(S)"	Section will be re-written.
Denis Aelbrecht (EDF)	9	24	41	-	-	-	-	-	what is "blue water" (definition?)	Section will be re-written.
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	9	24	10	24	14	-	-	-	The comments on solar do not fit well into these two paragraphs and should better added to the paragraph on solar energy on the anterior page.	Section will be re-written.
Geoffrey Heal (Columbia University)	9	24	44	-	-	-	-	-	CSP systems are now being built using air cooling rather than water cooling, avoiding the strain on water resources in arid areas.	Section will be re-written; this will include an assessment of the water consumption of thermal and non-thermal electricity generating technologies.
Gregory Keoleian (University of Michigan)	9	24	27	28	-	-	-	-	unclear statement	Section will be re-written.
Jyri Seppälä (Finnish Environment Institute)	9	24	30	24	34	-	-	-	It is worth to metion that the manufacturing stage of wind power causes air emissions (iron is the main raw-material)	Section will be re-written and comprehensive LCA review for broad set of RE technologies will be included.
Jyri Seppälä (Finnish Environment Institute)	9	24	10	17	-	-	-	-	The text should be moved after solar energy	Section will be re-written.
Modesto Fernandez Diaz-Silveira (Ministry of Science, Technology and Environment)	9	24	42	-	-	-	-	-	To include text, after per year: "Those amounts of water required may hamper other uses of water, like other crops produced for food and feeding in agriculture, industrial uses and domestic water supplies."	Section will be re-written.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	9	24	27	24	28	-	-	-	unnecesarty repetition of the obvious	Section will be re-written and comprehensive LCA review for broad set of RE technologies will be included.
Oyvind Christophersen (Climate and Pollution Agency)	9	24	25	-	26	-	-	-	The statement that carbon dioxide emission is not negligible should be elaborated on further.	Section will be re-written and comprehensive LCA review for broad set of RE technologies will be included.
Oyvind Christophersen (Climate and Pollution Agency)	9	24	10	-	17	-	-	-	We propose that the information in this paragraph is moved forward to follow immediately after the other information on solar and hydropower in this chapter.	Section will be re-written.
Oyvind Christophersen (Climate and Pollution Agency)	9	24	10	-	-	-	-	-	We think that the energy carrier - not the energy source - is the most significant factor as regards indoor air qualities. If the sentence refers to only direct solar energy (not PV) it should be mentioned specifically.	Noted. Section will be re-written.
Oyvind Christophersen (Climate and Pollution Agency)	9	24	13	-	-	-	-	-	We think that the fact that the majority of components are recyclable is not itself sufficient to conclude that the burden to the environment is minor. Reference should be made to some sort of life-cycle analyses on greenhouse gas emissions and other pollution.	Agreed. Chapter will be re-written to include a comprehensive LCA review so that such statements are more differentiated and backed by the scientific literature.
Steve Sawyer (Global Wind Energy Council)	9	24	36	24	36	-	-	-	It should be pointed out at the outset of this section, that ALL conventional sources require large quantities of water, and many renewables (wind, solar pv and solar heat) require little or none.	Noted. The re-drafted chapter will address this by comparing - where possible - the impacts of renewable, fossil and nuclear based energy generation.
Susanne Kadner (Technical Support Unit)	9	24	30	24	34	-	-	-	Again, why make a statement and then contradict it? Also, statement is too undifferentiated. These sentences are unacceptable for an IPCC report and this paragraph needs extensive work to provide a proper scientific assessment!	Section will be re-written and comprehensive LCA review for broad set of RE technologies will be included.
Susanne Kadner (Technical Support Unit)	9	24	46	24	47	-	-	-	Hydropower generation does not necessarily require the impoundment of large quantities of water - only when reservoirs are created. This is a particular type of hydropower project and clear disctinctions need to be made!	Section will be re-written.
Susanne Kadner (Technical Support Unit)	9	24	18	24	26	-	-	-	It is unclear why these paragraphs are opened with general statements that are then contradicted within the same paragraph! Instead concise and clear statements for the different geothermal technologies should be provided! Also, there have been numbers collated in the Appendix table that need to be evaluated somewhere!	Agreed. Appendix will be removed and chapter will be re-written to include a comprehensive LCA review so that such statements are more differentiated and backed by the scientific literature.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Susanne Kadner (Technical Support Unit)	9	24	37	24	42	-	-	-	Please reword sentence related to Lundqvist reference - the argument to be made is not clear. Also, blue water should be defined briefly. The section on bioenergy and water demand would benefit from being expanded including the use of additional scientific references. Also, reference to Appendix table and a discussion of the data provided would be interesting.	Section will be re-written. The impacts of bioenergy feedstock production on water consumption will be discussed in detail. Appendix table will be removed.
Susanne Kadner (Technical Support Unit)	9	24	14	24	17	-	-	-	Rather general statements that should also be moved to the paragraph on hydropwer. Use of more scientific references is required to provide a proper assessment!	Agreed. Chapter will be re-written to include a comprehensive LCA review so that such statements are more differentiated and backed by the scientific literature.
Susanne Kadner (Technical Support Unit)	9	24	27	24	29	-	-	-	These sentences are unacceptable for an IPCC report and this paragraph needs extensive work to provide a proper scientific assessment!	Section will be re-written and comprehensive LCA review for broad set of RE technologies will be included.
United States (U.S. Department of State)	9	24	26	-	-	-	-	-	Section 9.3.3 page 24, line 26, CO2 emissions are negligible in binary power production and are significantly lower than fossil fuel generation for flashed steam geothermal plants.	Section will be re-written and comprehensive LCA review for broad set of RE technologies will be included.
Richard Taylor (International Hydropower Association)	9	24	4	24	7	9.3.3	-	-	Delete sentence and replace with summary text conforming to and referencing section 5.6.3 of SRREN SOD Chapter 5 (Hydropower)	Section will be re-written and content better linked to what is covered in chapter on hydropower (where the aspect of methane emissions from reservoirs will be discussed).
Emmanuel Branche (Electricité de France)	9	24	46	25	2	9.3.4	-	-	It is not the case for run-of-the-river hydropower plants which represents an important part of the generation (for instance, 20% of the hydro generation in France)	Section will be re-written.
Atul Raturi (The University of the South Pacific)	9	25	11	-	-	-	-	-	..used in to... (delete ' in')	Section will be re-written.
David Clubb (European Environment Agency)	9	25	1	25	8	-	-	-	Confused: A conflation of hydro and solar impacts confuses this paragraph, particluarly when discussing desalination	Section will be re-written.
David Clubb (European Environment Agency)	9	25	1	26	23	-	-	-	Poor editing: this section is really confusing to read, with frequent changes between renewable energy technology type with little or no justification or warning.	Section will be re-written.
Denis Aelbrecht (EDF)	9	25	6	25	8	-	-	-	this is a nice example, but relates to a small market. It would be interesting to have a similr information for developing countries instead.	Noted.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Greece (National Observatory of Athens)	9	25	35	-	37	-	-	-	Misleading. Not all RE technologies have the same quantitative or qualitative implications.	Section will be re-written.
Ladislaus Rybach (Geowatt AG Zurich (company))	9	25	45	26	6	-	-	-	Also this paragraph needs to be revised. Again here the cited example is the only one with problems. In most countries the releases of geothermal installations are strongly monitored by water protection authorities, based on environmental regulation. In addition, geothermal production systems mostly use reinjection (closed circuit, no releases to surface waters).	Section will be re-written.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	9	25	7	25	8	-	-	-	The location of cost-effective application is not relevant, the conditions are, so they should be added.	Noted.
Susanne Kadner (Technical Support Unit)	9	25	9	-	-	-	-	-	Liaise with Chapter 3 as chlorination has not been included in the list of solar energy applications (page 22, lines 3-46); if disussed in Chapter 9 the technological application should also be briefly mentioned in Chapter 3.	Section will be re-written.
United States (U.S. Department of State)	9	25	8	-	-	-	-	-	Add more example with clarified content.	Section will be re-written.
United States (U.S. Department of State)	9	25	45	-	-	-	-	-	Section 9.3.4, page 25, line 45, Citing release of water into the Waikato river is true but highlights old field operation and something that should not be done for both environmental reasons and reservoir sustainability. I believe that this should be mentioned because it is an environmental concern that can and should be easily mitigated in any future geothermal development.	Section will be re-written. Mitigation of possible environmental impacts will be discussed in the geothermal energy chapter.
China (China Meteorological Administration)	9	25	20	25	20	9.3.4	-	-	Construction of Hydropower: it should start as a new paragraph.	Section will be re-written.
Emmanuel Branche (Electricité de France)	9	25	2	25	4	9.3.4	-	-	Why introducing desalination in this chapter ?	Section will be re-written.
Richard Taylor (International Hydropower Association)	9	25	20	25	20	9.3.4	-	-	Delete ""dams and"" and ""especially the large ones"". Of the world's estimated 45,000 large dams, only 20-25% are used for hydropower - reservoir hydropower is therefore a more accurate term and aligns with the classification. Note also that the classification of hydropower by scale is out of step with the SRREN SOD Hydropower Chapter (5).	Noted. Section will be re-written; classification to be used will be in accordance with chapter 5 on hydropower.
Richard Taylor (International Hydropower Association)	9	25	27	25	27	9.3.4	-	-	Delete ""dams and"". Of the world's estimated 45,000 large dams, only 20-25% are used for hydropower - reservoir hydropower is therefore a more accurate term and aligns with the classification of hydro in SRREN SOD Chapter 5 (Hydropower)	Noted. Section will be re-written; classification to be used will be in accordance with chapter 5 on hydropower.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Richard Taylor (International Hydropower Association)	9	25	31	25	31	9.3.4	-	-	Delete ""dams and"". Of the world's estimated 45,000 large dams, only 20-25% are used for hydropower - reservoir hydropower reservoir hydropower is therefore a more accurate term and aligns with the classification of hydro in SRREN SOD Chapter 5 (Hydropower).	Noted. Section will be re-written; classification to be used will be in accordance with chapter 5 on hydropower.
David Clubb (European Environment Agency)	9	26	30	26	40	-	-	-	Omission: the lack of reference to ILUC is a serious omission; this is probably a bigger issue than direct effects	Noted. Section will be re-written.
Denis Aelbrecht (EDF)	9	26	19	26	23	-	-	-	this para could be moved to the previous page (25), after line 44, for more consistency	Section will be re-written.
Gregory Keoleian (University of Michigan)	9	26	35	-	-	-	-	-	change "occurs" to "can occur" not always the case	Section will be re-written.
Modesto Fernandez Diaz-Silveira (Ministry of Science, Technology and Environment)	9	26	28	-	-	-	-	-	To include text, after citation in brackets: "Those changes are very much dependent on the scale that biofuel crops are produced, because of monoculture and the consequences of this practice to biodiversity".	Noted. Section will be re-written.
Modesto Fernandez Diaz-Silveira (Ministry of Science, Technology and Environment)	9	26	38	-	-	-	-	-	TO include text, after citation in brackets: There is also a risk of promoting a massive invasion of pests and pathogens to those large areas of monoculture, taking advantage of the destruction of natural enemies because of modifications of the agroecosystem."	Noted. Section will be re-written; reference to introduction on invasive specieswill be made.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	9	26	43	26	44	-	-	-	This sentence belongs at the beginning of this section.	Section will be re-written.
Susanne Kadner (Technical Support Unit)	9	26	7	-	-	-	-	-	Include the word "estuarine" to be specific.	Section will be re-written.
Susanne Kadner (Technical Support Unit)	9	26	8	-	-	-	-	-	Note that Chapter 6 does not mention the use of polyethylene in membranes - check and update accordingly.	Section will be re-written.
United States (U.S. Department of State)	9	26	13	26	15	-	-	-	Cross-reference to technical chapter.	Section will be re-written.
United States (U.S. Department of State)	9	26	25	26	40	-	-	-	The sentence on lines 28 and 29 makes the very questionable claim that biofuels are good because they benefit biodiversity by mitigating climate change. This comes across as simply silly -- Every renewable and nuclear mitigate climate change. The entire section (lines 25 to 40) comes across as propaganda. Within the develop. context these aren't really reasonable arguments. It sounds like it is just speaking to biofuels in the US -- even then I'm not sure this is a complete argument.	Agreed. Section will be re-written.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	27	36	-	-	-	-	-	Provide expansion of the term "SGE"	Section will be re-written.
Atle Harby (SINTEF Energy Research)	9	27	6	27	6	-	-	-	Please add the sentence "However, in most cases it is possible to mitigate ecosystem damage and biodiversity losses, and the last decades have shown many good examples of this when sufficient resources are invested". See chapter 5 for more details.	Section will be re-written. Mitigation of possible environmental impacts will be discussed in the hydropower chapter.
Denis Aelbrecht (EDF)	9	27	6	-	-	-	-	-	In addition to these impacts of Hydropower, one could mention that reservoir create new lacustrine ecosystems, and most of the time fish boom; reservoir margins may also represent new habitats for birds.	Section will be re-written. Beneficial environmental impacts will be discussed in the hydropower chapter.
Denis Aelbrecht (EDF)	9	27	45	-	-	-	-	-	spell out OTEC (Ocean Thermic Energy Conversion?)	Section will be re-written.
Denis Aelbrecht (EDF)	9	27	36	-	-	-	-	-	spell out SGE (Salinity Gradient Energy?)	Section will be re-written.
Ladislaus Rybach (Geowatt AG Zurich (company))	9	27	7	-	9	-	-	-	This paragraph can be omitted: geothermal power plants do not have one loop heat pump systems.	Section will be re-written.
Susanne Kadner (Technical Support Unit)	9	27	27	27	30	-	-	-	These sentences do not fit here and should be moved.	Section will be re-written.
Susanne Kadner (Technical Support Unit)	9	27	7	27	9	-	-	-	Use of reference to support statements is required.	Section will be re-written.
Emmanuel Branche (Electricité de France)	9	27	1	27	6	9.3.5	-	-	Impacts for hydropower are quoted but not mitigation measures. Therefore there is a lack of coherence with page 28 line 17-25 for hydropower	Section will be re-written. Mitigation of possible environmental impacts will be discussed in the hydropower chapter.
Richard Taylor (International Hydropower Association)	9	27	3	28	4	Executive Summary	-	-	Reword after ""co-benefits"" as follows: ""for example, reducing local pollution, improving health benefits and managing water""	ES will be re-written based on re-drafted chapter.
Atle Harby (SINTEF Energy Research)	9	28	41	28	46	-	-	-	In many cases, the creation of reservoirs enhances the fish production and improves the food security and the health situation.	Noted. Section will be re-written. Beneficial impacts of hydropower will be covered in hydropower chapter.
Brazil (Ministry of Science and Technology)	9	28	45	-	-	-	-	-	Correct the number of the table 3 (see page 29 (table 9.3))	Tables will be removed.
Gustavo Nadal (Fundacion Bariloche)	9	28	30	28	33	-	-	-	Sugar cane burning is being phased out in Sao Pablo State, hand in hand with the introduction of mechanized harvest and the reduction in labour accidents (and rural unskilled employment)	Noted.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Jan Steckel (PIK)	9	28	45	-	46	-	-	-	what about impacts away from the actual hydropower plant?	Noted. Chapter 5 will provide extensive discussion of possible environmental and social impacts of hydropower plants.
Michael Hübler (Potsdam Institute for Climate Impact Research)	9	28	28	28	28	-	-	-	"health-harming substances" is very general; more specific substances and their dangers.	Section will be re-written.
Oyvind Christophersen (Climate and Pollution Agency)	9	28	27	-	28	-	-	-	On the end-user/fuel side, we think that the similarities between fossil fuel and the corresponding biomass fuel are more pronounced than the differences (the main exception being sulphur emissions from solid fuels). Consequently we think that the statement that biomass fuels produces lower emissions than fossil fuels is somewhat misleading and possible refers more to the technology employed (which generally can be used for both biomass and fossil fuels) than the origin of the fuel.	Noted. Will be addressed in new section on air pollution and health impacts.
Oyvind Christophersen (Climate and Pollution Agency)	9	28	35	-	-	-	-	-	We think that greenhouse gas emissions from solar energy (electricity) should be assessed by a life cycle approach, which also takes emission from production into account.	Section will be re-written to include comprehensive LCA of air pollutants for differente technologies.
Susanne Kadner (Technical Support Unit)	9	28	17	28	21	-	-	-	In accordance to the Oslo-Oxford Accord, it would make sense to discuss technical measures, that aim to reduce impacts and can thus contribute to "minimise social and environmental concerns", in the respective technology chapter, i.e. Chapter 7.6.2.	Accepted and section will be re-written. Mitigation of possible environmental impacts will be discussed in the hydropower chapter.
United States (U.S. Department of State)	9	28	8	28	16	-	-	-	Need to back up statements with more data	Section will be re-written.
China (China Meteorological Administration)	9	28	34	28	40	9.3.6	-	-	Life cycle analysis should be applied here: in the production process of PV cells, adverse health impacts do arise due to pollution. Such impacts should be included in the analysis herewith.	Section will be re-written to include comprehensive LCA of air pollutants for differente technologies.
China (China Meteorological Administration)	9	28	27	28	33	9.3.6	-	-	Please note: commercial use of biomass can also have adverse health impacts in the harvest and transport process.	Noted. Will be included in new section on health impacts.
Denis Aelbrecht (EDF)	9	29	-	-	-	-	-	9.3	Construction activities : these potential impacts are real, but they are not specific to hydropower, and can occur on any large construction site, even for renewables powerplants!	Table will be removed.
Denis Aelbrecht (EDF)	9	29	-	-	-	-	-	9.3	Irrigation areas : "changes in food security" may very well be improvement, as the flows are regulated, and there is more water for irrigation in the downstream areas during the dry season, as well as along the reservoir banks	Table will be removed.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Denis Aelbrecht (EDF)	9	29	-	-	-	-	-	9.3	title column 2 should read : "POTENTIAL health impact" as in table title	Table will be removed.
Denis Aelbrecht (EDF)	9	29	-	-	-	-	-	9.3	Upstream catchment and river : the reservoir may actually facilitate access to health facilities, as flooded rapids render the rivers passable, and therefore the watershed easier to access - this has been noted for instance in Nam Theun 2.	Table will be removed.
Japan (the Japanese Ministry of Foreign Affairs)	9	29	20	-	22	-	-	-	This sentence stating that infrasounds have no impact on human health is buried in this chapter and is not discussed at all in Chapter 7 (Section 7.6.3.3). The view that low frequency noise does not affect human health is not widely supported and requires further evidence. It should also be made clear, what the authors mean when they say "human health" - are annoyance and psychological damage not included?	Section will be re-written and better linked to information provided in technology chapters.
Ladislaus Rybach (Geowatt AG Zurich (company))	9	29	7	-	9	-	-	-	Sentence should read: 'With environmental regulation, established monitoring...'	Section will be re-written.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	9	29	3	-	-	-	-	-	"...are clean in terms of human health" is not an appropriate phrase for a scientific report	Section will be re-written.
Oyvind Christophersen (Climate and Pollution Agency)	9	29	16	-	-	-	-	-	What is "non-harmful level" - does it only refer to direct injuries or does it also include effects related to well-being/disturbance?	Section will be re-written.
Susanne Kadner (Technical Support Unit)	9	29	6	-	-	-	-	-	Age of reference? Assessment should reflect latest research results - newer reference should be used.	Section will be re-written.
Susanne Kadner (Technical Support Unit)	9	29	10	-	-	-	-	-	Estuarine tidal rise and fall systems, for example, are near the coast - check contents of chapter 4!	Section will be re-written.
Susanne Kadner (Technical Support Unit)	9	29	17	29	20	-	-	-	In accordance to the Oslo-Oxford Accord, it would make sense to discuss technical measures, that aim to reduce impacts and can thus contribute to "minimise social and environmental concerns", in the respective technology chapter, i.e. Chapter 7.6.2.	Section will be re-written. Mitigation of possible environmental impacts will be discussed in the hydropower chapter.
Susanne Kadner (Technical Support Unit)	9	29	7	29	9	-	-	-	Reference missing to support statement.	Section will be re-written.
Richard Taylor (International Hydropower Association)	9	29	2	29	2	9.3.6	-	-	Insert ""Most of these potential health impacts can be avoided or mitigated provided a hydropower project is well planned and managed"" after line 2.	Section will be re-written. Mitigation of possible environmental impacts will be discussed in the hydropower chapter.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	30	-	-	-	9.4	-	-	Renewable energy scenarios do not appear anywhere in the PAO for this chapter. Much of the section 9.4 might be repetitive with other chapters of SRREN(especially 9.4.3 and 9.4.4). Also see comment on 9.4.2	Section will be re-written and comprehensive assessment of current energy scenarios included.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	30	43	-	-	-	-	-	As a general statement this proposition is simply incorrect. Over the years there is a whole array of regulations and other measures to limit the environmental impacts of energy.	Section will be re-written.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	30	6	30	9	-	-	-	Building integrated solar PVs and passive solar are perhaps the most important issues when considering RET's and the built environment. I would have expected more extensive coverage of this issue in this chapter.	These different technologies are covered in detail in chapter on solar energy.
Atle Harby (SINTEF Energy Research)	9	30	10	30	19	-	-	-	Hydropower projects creates reservoir that help flood protection for a large range of the built environment and is generally beneficial to protect downstream settlements, buildings, roads and other infrastructure. In fact, most reservoirs are multi-purpose reservoirs giving multple benefits but also adverse effects.	Noted. Section will be removed.
Daniel Bouille (Bariloche Foundation)	9	30	44	31	2	-	-	-	I do not see the contradiction or the alternatives. Providing energy services you avoid the neccessity of increase capacity of supply? Why?	Section will be re-written.
Daniel Bouille (Bariloche Foundation)	9	30	40	-	-	-	-	-	The content of the section does not address properly the relation sustainability and Renewable. Which are the relations between energy system and sustainable development? Which are the most importantr dimensions? Are there indicators? Why renewable are going to be impact by development pathways? In which way? What have to change? Where are the key problems? It is not only an energy issue (to make a bridge from fossil to renewable), culture, values, social objectives, among other issues, need to be considered.	Accepted. These are key questions for the chapter, some of which can be answered in the rewritten text, some of which can't. Re-drafting of chapter will concentrate on 4 topics to allow a focused analysis of the relevant issues in connection with RE and SD: economic development, energy access, energy security and environmental and health impacts. Also, an analysis of how SD aspects are represented in current integrated models will examine possible impacts of RE on development. In addition, more qualitiative assessments of barriers and opportunities of RE in the context of SD will address the role values, social objectives etc. can play for implementing REs.
Denis Aelbrecht (EDF)	9	30	12	-	-	-	-	-	flooding PCR is far from being the rule : replace "usually occur" by "may occur".	Section will be removed.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Denis Aelbrecht (EDF)	9	30	12	30	17	-	-	-	why do we focus on these 2 examples, one of them being more than 40 years old?	Section will be removed.
Gregory Keoleian (University of Michigan)	9	30	10	-	19	-	-	-	should site large population displacement from Three Gorges dam project	Section will be removed.
Jan Steckel (PIK)	9	30	43	-	45	-	-	-	Avoid normative statements	Section will be re-written.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	9	30	9	-	-	-	-	-	"central PV" should be "centralized PV"; the same land requirements can also be attributed to concentrated solar power	Section will be removed.
Oyvind Christophersen (Climate and Pollution Agency)	9	30	10	-	19	-	-	-	We think that this paragraph focuses to much on specific examples and propose that the text is generalised and that the examples are included as a box. Transmission lines should be included as an effect.	Section will be removed.
Susanne Kadner (Technical Support Unit)	9	30	24	30	29	-	-	-	A single reference from 1999 will probably not provide the latest scientific insights into impacts of ocean energy technologies!	Section will be removed.
Susanne Kadner (Technical Support Unit)	9	30	30	30	39	-	-	-	In accordance to the Oslo-Oxford Accord, it would make sense to discuss technical measures, that aim to reduce impacts and can thus contribute to "minimise social and environmental concerns", in the respective technology chapter, i.e. Chapter 7.6.2.	Section will be removed. Mitigation of possible environmental impacts will be discussed in the hydropower chapter.
Susanne Kadner (Technical Support Unit)	9	30	11	30	12	-	-	-	Undifferentiated and therefore wrong statement - inundation only occurs when reservoirs or dams are built. Also, this does not necessarily imply that all the infrastructure cited are "usually" inundated! Chapter 5 needs to be checked.	Section will be removed.
Susanne Kadner (Technical Support Unit)	9	30	9	-	-	-	-	-	What about CSP?	Section will be removed.
United States (U.S. Department of State)	9	30	23	-	-	-	-	-	Section 9.3.7, page 30, line 23 To make this paragraph consistent with Table 9.1, mention should be made that geothermal systems in some built environments do cause visual pollution and that induced seismicity from development or operation in populated areas may be a concern.	Section and table will be removed.
Richard Taylor (International Hydropower Association)	9	30	15	30	15	9.3.7	-	-	Delete ""dam"" and replace with ""reservoir"". Of the world's estimated 45,000 large dams, only 20-25% are used for hydropower - reservoir hydropower reservoir hydropower is therefore a more accurate term and aligns with the classification of hydro in SRREN SOD Chapter 5 (Hydropower).	Section will be removed.
Richard Taylor (International Hydropower Association)	9	30	10	30	10	9.3.7	-	-	Delete ""that"" and replace with ""can"". Erroneously implies inundation has these impacts in all cases.	Section will be removed.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Richard Taylor (International Hydropower Association)	9	30	11	30	11	9.3.7	-	-	Delete ""usually occur"". Erroneously implies inundation has these impacts in all cases.	Section will be removed.
Greece (National Observatory of Athens)	9	31	40	-	-	9.4	-	-	Delete the word "implications" from the new title. This is not another section for impacts or implications. As clearly stated in page 32, line 42, "the aim of this subchapter is to consider future scenarios for RE development ..."	Noted, but this title was Plenary approved.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	31	19	31	20	-	-	-	Recycle or replenish? For which renewable energy is this likely?	Section will be re-written.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	31	1	-	-	-	-	-	This is a conclusion not an assessment of the literature.	Section will be re-written.
Daniel Bouille (Bariloche Foundation)	9	31	40	32	40	-	-	-	This section give the opportunity to present which the potential variables, issues, tendencies or parameters that influence or put conditions on the future role of renewable. It is not only and issue of wished future but which are the aspects that influence in the wished future (not only barriers).	Accepted. The assessment of different integrated models in the re-written section of this chapter should evaluate how RE may influence the 4 criteria (economic development, energy access, energy security and environmental and health impacts) in future development pathways and how these may in turn consequently influence the deployment of RE.
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	9	31	30	31	31	-	-	-	Nuclear energy technology is one necessary bridge technology.	Section will be re-written.
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	9	31	36	31	39	-	-	-	The cited criteria for a sustainable energy future are partly competing and thus have to be weighted very carefully.	Section will be re-written.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Jean-Yves CANEILL (EDF SA)	9	31	41	32	40	-	-	-	I am suggesting to quote this study in a short sentence (given the fact that the length of the chapter is at stake) : at page 32, line 28 could be followed by: "...another study (FONDDRI, 2009), has considered a 'non mimetic' scenario in the context of reaching 450 ppmv concentrations in 2050 where more renewable energies coexist with classic form of energies... Reference to be quoted: FONDDRI (Fondation pour le développement durable et les relations Internationales), May 2009, Joint Research Project « Carbon-constrained scenarios », pages 61 to 82 (ENERDATA, CIRED, and LEPII jointly with IDDRI and EPE). Site: http://www.iddri.org/L'iddri/Fondation/Programme-de-recherche-Scenarios-sous-contrainte-carbone	Noted.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	9	31	28	-	-	-	-	-	"...how quickly can a renewable energy platform BE BUILT..." not "how quickly can be built a RE platform..."	Section will be re-written.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	9	31	21	-	-	-	-	-	this does not hold for all renewable resources, so the word "some" should be added to "availability of SOME renewable resources..."	Section will be re-written.
Peter Johnston (Environmental & Energy Consultants, Ltd)	9	31	41	32	4	-	-	-	Estimates of global RE production are and projected growth (from a 2002 report) are dated. See more recent assessments such as in "Renewables 2010 Global Status Report" (REN21) and UNEP "Global Trends in Sustainable Energy Investment 2010" (UNEP)	Section will be re-written.
Stephan Klasen (University of Göttingen)	9	31	40	-	-	-	-	-	Is it the intention of this chapter to discuss future scenarios of RE? This is already discussed in other chapters and this discussion does not appear to add much to it. It would be much better to stick more closely to the aim of examining the link to SD and poverty, rather than map scenarios. I would therefore drop this discussion.	The assessment of different integrated models in the re-written section of this chapter should evaluate how RE may influence the 4 criteria (economic development, energy access, energy security and environmental and health impacts) in future development pathways and how these may in turn consequently influence the deployment of RE.
Susanne Kadner (Technical Support Unit)	9	31	46	-	-	-	-	-	As mentioned in the comments to the FOD, liaise with Chapter 5 on the usage of small and large hydro.	Section will be re-written and better linked to information provided in the hydropower chapter.
Susanne Kadner (Technical Support Unit)	9	31	36	31	39	-	-	-	How do these criteria match with the 3 dimensions mentioned in section 9.1.1?	Section will be re-written.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Susanne Kadner (Technical Support Unit)	9	31	44	32	4	-	-	-	Is Martinot et al., 2002 the only reference available to back these numbers?	Section will be re-written.
Susanne Kadner (Technical Support Unit)	9	31	19	31	22	-	-	-	Is this comment related to biomass or geothermal? Statement should be more specific!	Section will be re-written.
Susanne Kadner (Technical Support Unit)	9	31	8	31	10	-	-	-	This means that the barriers listed in Chapter 1 need to be overcome - this link should be made here.	Section will be re-written.
United States (U.S. Department of State)	9	31	24	31	39	-	-	-	Could have spend much more time on this section But the sentence begin. on line 30 seems to totally misunderstand the previous sentence -- which is unfortunate, since that sentence on progress measurement was so critical and needed to discussed in depth.	Section will be re-written.
United States (U.S. Department of State)	9	31	44	-	-	-	-	-	Provide citation and define terms.	Section will be re-written.
United States (U.S. Department of State)	9	31	16	-	-	-	-	-	What is meant by wider innovation system -- unclear from passage.	Section will be re-written.
Youba SOKONA (Sahara and Sahel Observatory)	9	31	19	31	23	-	-	-	This is not clear and is in contraction with the definition you have given for renewable energies. We are here dealing with flows and not stocks	Section will be re-written.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	31	-	-	-	9.4.1	-	-	What is the logic for this subsection? As it stands it is quite inadequate as an assessment of the energy scenario literature.	Section will be re-written.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	32	20	32	21	-	-	-	Where does this goal come from?	Section will be re-written.
Daniel Bouille (Bariloche Foundation)	9	32	46	33	3	-	-	-	How is considered in Diesendorf definition the National Circunstances and the overall objectives of the society? Why only (Renewable Energy)?	Section will be re-written.
Denis Aelbrecht (EDF)	9	32	1	32	4	-	-	-	OK on the annual growth rates (in %), but it would be interesting to see what is the actual additional installed capacity, or additional MWh, produced by these new developments, for EACH technology : the fastest increasing technology may not be the major contributor to the generation increase of renewable MWh.	Section will be re-written. These growth rates are better discussed in Chapter 1 of the SRREN.
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	9	32	39	32	40	-	-	-	Beside CCS, nuclear energy also builds an important bridging technology.	Section will be re-written.
Greece (National Observatory of Athens)	9	32	15	-	-	-	-	-	Delete the words "These interactions" and insert "and" as a link with the previous sentence.	Section will be re-written.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Greece (National Observatory of Athens)	9	32	41	-	42	-	-	-	Subchapter 9.2 was not about environmental impacts, but about interactions of RE and SD. Environmental impacts have been presented in 9.3 together with economic and social impacts.	Section will be re-written.
Jan Steckel (PIK)	9	32	9	-	-	-	-	-	Cite properly	Section will be re-written.
Jan Steckel (PIK)	9	32	24	-	32	-	-	-	The selection of literature is arbitrary and not covering the most recent proceedings (see also comment on the whole section)	Section will be re-written.
Ladislaus Rybach (Geowatt AG Zurich (company))	9	32	41	36	47	-	-	-	9.4.2 Global and Regional development pathways for renewable energy: It must be stressed also here that new installations of renewable energy systems do not reduce CO2 emissions; only additional emission can be avoided ('saving'). Real CO2 emission reduction (the goal of the Kyoto Protocol and of other international endeavors) is achieved only when conventional systems with combustible fuel get replaced simultaneously.	Accepted. Section will be re-written.
Michael Hübler (Potsdam Institute for Climate Impact Research)	9	32	6	32	6	-	-	-	Definition of RET.	Section will be re-written.
Michael Hübler (Potsdam Institute for Climate Impact Research)	9	32	19	32	24	-	-	-	It ist not clear to me how backcasting can be used regarding the 2° target.	Section will be re-written.
Oyvind Christophersen (Climate and Pollution Agency)	9	32	8	-	9	-	-	-	What is meant by '', but also all sources of CO2 and non-CO2 emissions have to be considered''? Will wording in the way of ''direct and indirect effects on emissions of CO2 and other greenhouse gases in the longer-term'' make the message clearer?	Section will be re-written.
Susanne Kadner (Technical Support Unit)	9	32	46	33	3	-	-	-	Another definition of what a sustainable energy system needs to consist of: check sections 9.1.1 and 9.4 (p.31 lines 36-39) and harmonise.	Section will be re-written.
Susanne Kadner (Technical Support Unit)	9	32	20	32	22	-	-	-	In which case is ''the overarching vision to keep the level of CO2 at or below 450ppm '.. global temperature increase at or below 2°C''? The Europeans? This has to be clearly stated otherwise it is policy prescriptive!	Section will be re-written.
Susanne Kadner (Technical Support Unit)	9	32	24	32	32	-	-	-	It would be interesting to expand on exactly these sections much more: this chapter section is titled ''Future Scenarios of Renewables'' - what are the results of these studies? Also, there are surely other metastudies and country studies available that can be presented here.	Section will be re-written.
Susanne Kadner (Technical Support Unit)	9	32	34	32	36	-	-	-	Note that section 9.1.3 needs to be updated to include the barrier definitions introduced in Chapter 1.	Section will be re-written.
Susanne Kadner (Technical Support Unit)	9	32	9	-	-	-	-	-	Reference needs to be corrected.	Section will be re-written.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Youba SOKONA (Sahara and Sahel Observatory)	9	32	20	32	23	-	-	-	Why do you single this option of 450 ppm in term of CO2 and 2°C?	Section will be re-written.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	32	-	-	-	9.4.2	-	-	This section needs to be shortened and tightened. There are many general motherhood statements. A more critical appraisal of investment & financing issues would be warranted.	Section will be re-written.
Denis Aelbrecht (EDF)	9	33	23	-	-	-	-	-	GVEP, and not GEVP	Section will be re-written.
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	9	33	16	33	20	-	-	-	Utilities will also play a growing role as investors in RE.	Noted.
Geoffrey Heal (Columbia University)	9	33	4	33	5	-	-	-	There is a political judgment implicit in these two lines. I agree with it but not everyone will. Should an IPCC report be making such statements?	Section will be re-written.
Gustavo Nadal (Fundacion Bariloche)	9	33	1	33	3	-	-	-	No reference is made here to the role of user behaviour in shaping energy requirements as part of the mentioned energy system.	Section will be re-written.
Jan Steckel (PIK)	9	33	9	-	32	-	-	-	This could be included in a section on barriers and opportunities, however be careful with sources (CanREA et al)	Noted.
Japan (the Japanese Ministry of Foreign Affairs)	9	33	9	33	14	-	-	-	In order to achieve drastic CO2 reductions on the energy supply side by 2050, we should invest in renewable energy, CCS and energy efficiency throughout the world.So, it's not appropriate to take up only Japanese investment in renewables. We suggest that you refer to emission reduction costs for the global energy system, 2050. For example, according to Energy Technology Perspective2008 published by IEA, additional investment needs in the BLUE Map scenario are USD45 trillion over the period up to 2050.	Noted.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	9	33	9	33	20	-	-	-	An additional relevant reference could be UNFCCC (2009): Recommendations on future financing options for enhancing the development, deployment, diffusion and transfer of technologies under the Convention, which presents estimates of overall additional costs for development, deployment and diffusion of CC mitigation technologies	Noted.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	9	33	30	33	31	-	-	-	This is stating the obvious; any investment icreases GDP.	Section will be re-written.
Susanne Kadner (Technical Support Unit)	9	33	40	34	24	-	-	-	For a more detailed discussion, reference to Chapter section 11.5.3 should be made.	Section will be re-written.
Susanne Kadner (Technical Support Unit)	9	33	27	33	32	-	-	-	Sentences should be removed and reference to detailed discussion in Chapter 11 should be made.	Section will be re-written.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Susanne Kadner (Technical Support Unit)	9	33	4	33	8	-	-	-	Suggest rewording to avoid being policy prescriptive.	Section will be re-written.
Susanne Kadner (Technical Support Unit)	9	33	11	33	14	-	-	-	There have been a number of Japanese references and examples in the past paragraphs - assessment needs to present a more diversified set of case studies!	Section will be re-written.
Susanne Kadner (Technical Support Unit)	9	33	33	34	8	-	-	-	This section should be restructured to avoid redundancies - a suggestion on how this could be done is submitted in the addendum (SRREN_Draft2_Review_Kadner_Susanne_addendum.doc).	Section will be re-written.
Youba SOKONA (Sahara and Sahel Observatory)	9	33	23	33	24	-	-	-	Please do check to be sure that GVEP and REEP are funding institutions	Section will be re-written.
Garcia Javier (Garcia Monge Consultant)	9	33	23	33	27	9.4.2	-	-	The Global Environment Facility is cited twice in the paragraph.	Section will be re-written.
Greece (National Observatory of Athens)	9	33	-	-	-	9.4.2	-	-	This subchapter is too long and contains many different aspects. It can be split in two sections (developed and developing countries), in order to better illustrate the different paths to be followed in each case. Eventually needs shortening	Section will be re-written.
Daniel Bouille (Bariloche Foundation)	9	34	34	-	41	-	-	-	It seems to me that this is part of the section 9.3 (Social benefits) and not here	Section will be re-written.
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	9	34	29	34	33	-	-	-	The crucial question for this knowlegde and capacity building concerning RES in developing countries is the access to funding.	Noted.
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	9	34	22	34	24	-	-	-	Very general expressions.	Section will be re-written.
Gustavo Nadal (Fundacion Bariloche)	9	34	34	34	41	-	-	-	RETs for productive activities is a key component to contributing to sustainable development. In this sense, not all RETs are equally prepared to contribute towards this aim, depending on the size of the systems, the requirements they satisfy, the compatibility with the users needs, etc. SHS are mentioned many times but their usefulness could be lower than other technologies (e.g. those aimed at pumping water or supply of mechanic power)	Noted. New section on energy access will provide more differentiated information on what energy service SHS can contribute to and what other technologies may cover.
Gustavo Nadal (Fundacion Bariloche)	9	34	39	34	40	-	-	-	Special policies are required for this to happen, as is shown by the problems that faces Brazil´s Social Biodiesel programme.	Section will be re-written.
Inmaculada Martínez-Zarzoso (Georg-August Universitaet Goettingen and Universitat Jaume I)	9	34	1	-	-	-	-	-	Apart from listing some references, to my view an explanation about how CDMs should be modified is needed here.	Noted.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Jan Steckel (PIK)	9	34	25	-	33	-	-	-	I would expect such a general statement about sustainability and renewable energy in section 9.2	Section will be re-written.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	9	34	34	34	41	-	-	-	This whole paragraph can be skipped as these arguments have already been presented several times in this section. And anyway it contributes nothing to the discussion on "global and regional pathways for RE"	Section will be re-written.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	9	34	5	-	-	-	-	-	Unnecessary repetition of phrase "The development pathway..." Can easy be replaced by "It also has to be compatible..."	Section will be re-written.
Rainer Walz (Fraunhofer Systems and Innovation Research)	9	34	42	35	1	-	-	-	The point raised is of uttermost importance for the potential of renewable energies to reduce carbon emissions. Thus, the prerequisities of leapfrogging should be dealt with in more detail. This is also highly related to the build up of absorptive capacities, which are addressed in section 9.5.4. There are also references availabe for the concepts of leapfrogging which are published in reviewed journals, e.g.: Perkins R (2003) Environmental leapfrogging in developing countries: a critical assessment and reconstruction, Natural Resources Forum 27: 177-188. Gallagher KS (2006) Limits to leapfrogging in energy technologies: Evidence from the Chinese automobile industry. Energy Policy 34: 383-394. Walz R (2010) Competences for Green Development and Leapfrogging in Newly Industrializing Countries. International Economics and Economic Policy 7: 245-265	Noted. In re-drafted chapter, a specific box on leapfrogging will be included.
China (China Meteorological Administration)	9	34	9	34	9	9.4.2	-	-	It is suggested that "a recent initiative" be changed into "an initiative" as it is not a recent one since it is launched in 2001.	Section will be re-written.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	35	6	-	-	-	-	-	What is meant by a 'capillary type' of distributed energy generation?	Section will be re-written.
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	9	35	44	36	10	-	-	-	Additional information about DII as lighthouse initiative for cooperation between European states and those from North Africa and the Middle East could be added.	Section will be re-written.
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	9	35	18	35	24	-	-	-	The aspect of grid development is essencial for the successful integration of RE (due to its partly high volatility) into the energy systems of developed countries and should be described in more detail (e.g. promissing perspectives of grid management, etc.).	Section will be re-written. Grid development aspects will be discussed in detail in chapter on integration.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Geoffrey Heal (Columbia University)	9	35	19	35	20	-	-	-	What is the authority for the statement that many grids are reaching the ends of their lives? I doubt that this is in fact true, though it is true that many grids need to be improved. But this is a different statement.	Section will be re-written.
Michael Hübler (Potsdam Institute for Climate Impact Research)	9	35	10	35	12	-	-	-	Developing countries cannot afford to be dependent...Instead capacity building... may be re-formulated. If dependence of developing countries through technology transfer is seen as a danger, this may be explained.	Section will be re-written.
Michael Hübler (Potsdam Institute for Climate Impact Research)	9	35	37	35	43	-	-	-	The enumeration of aspects according to PEER (2009) is very general; policy recommendations shall be more concrete.	Section will be re-written.
Susanne Kadner (Technical Support Unit)	9	35	33	35	43	-	-	-	An entire chapter is dedicted to the subject of financing and policies in the SRREN - hence reference to Chapter 11 should be provided rather than to one single literature source.	Section will be re-written.
Susanne Kadner (Technical Support Unit)	9	35	6	35	17	-	-	-	For a more detailed discussion, reference to sections in Chapter 11.6 needs to be made.	Section will be re-written.
Susanne Kadner (Technical Support Unit)	9	35	25	35	28	-	-	-	Is this very general statement also substantiated through corresponding statements and references in Chapter 8? Also, the statement should be more specific - does it refer to autonomous system? Paragraph needs to be more precise or be removed.	Section will be re-written.
Susanne Kadner (Technical Support Unit)	9	35	37	36	21	-	-	-	It is not clear why this discussion is covered in Chapter 9. Either the specific link to SD issues and challenges can be made more clear or these paragraphs should be removed.	Section will be re-written.
Susanne Kadner (Technical Support Unit)	9	35	29	35	32	-	-	-	It should be made clear that the DESERTEC initiative is introduced here - also reference to appropriate sections in Chapter 8 (8.2.1.6.4) needs to be made.	Section will be re-written.
Susanne Kadner (Technical Support Unit)	9	35	44	36	10	-	-	-	Reference to appropriate sections in Chapter 8 (8.2.1.6.4) needs to be made.	Section will be re-written.
United States (U.S. Department of State)	9	35	29	35	32	-	-	-	Provide citation and define terms.	Section will be re-written.
Susanne Kadner (Technical Support Unit)	9	36	22	36	47	-	-	-	The introduction of Japanese mitigation targets alone does not provide for a discussion of regional development pathways for renewable energies (as indicated in the subsection titile) - this sections needs to be more diverse, with respect to regional examples, and more specific regarding the consequences for the introduction of renewables.	Section will be re-written.
Brazil (Ministry of Science and Technology)	9	37	39	-	-	-	-	-	Incompleted reference	Section will be re-written.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Geoffrey Heal (Columbia University)	9	37	30	37	31	-	-	-	Passive houses were constructed in the US well before 2009. I recall passive houses being built in the 1980s around Little Rock, Arkansas.	Noted.
Greece (National Observatory of Athens)	9	37	1	40	12	-	-	-	Very useful. Recommended to better highlight differences in sectoral pathways in developed and developing countries (e.g. in built environment, land uses)	Noted.
Gregory Keoleian (University of Michigan)	9	37	32	-	-	-	-	-	This section should also highlight the potential for smart charging of electrified vehicles to facilitate integration of intermitent renewable resources such as wind	Section will be re-written. These aspects will be discussed in detail in chapter on integration.
Gregory Keoleian (University of Michigan)	9	37	11	-	12	-	-	-	transition from sentences is needs to be fixed	Section will be re-written.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	9	37	19	-	-	-	-	-	also know as passive houses	Section will be re-written.
Peter Johnston (Environmental & Energy Consultants, Ltd)	9	37	30	37	31	-	-	-	No. The first US passive house was built considerably earlier than 2009. Reportedly, the first house in the US designed according to Passivhaus principles -- a strict European specification for energy-efficient buildings -- was built in Urbana, Illinois in 2003 See: http://www.passivehouse.us/passiveHouse/Articles_files/EDU%20May2007%20Postable.PDF	Noted.
Peter Johnston (Environmental & Energy Consultants, Ltd)	9	37	36	37	37	-	-	-	"Biomass is also widely used in countries like Brazil to produce energy as a by-product from sugarcane." Not just larger countries. You could add Fiji, Mauritious, Cuba.	Section will be re-written.
Peter Johnston (Environmental & Energy Consultants, Ltd)	9	37	23	37	25	-	-	-	EU Commission? Shouldn't it be simply European Commission (EC), as in line 30 ?	Section will be re-written.
Susanne Kadner (Technical Support Unit)	9	37	8	37	12	-	-	-	Argument moves from energy consumption, to direct and indirect emissions in building sector, to energy efficiency to unspecified projections in energy demand - hence argument is entirely unstructured and needs to be rewritten.	Section will be re-written.
Susanne Kadner (Technical Support Unit)	9	37	13	37	18	-	-	-	References to all technology chapters are missing!	Section will be re-written.
Susanne Kadner (Technical Support Unit)	9	37	35	-	-	-	-	-	The timeframe given is wrong: reference refers to period 1970-2004. Also, correct reference needs to be given - link provided in reference list does not work and the corresponding chapter (i.e. Chapter 1 in the AR4) needs to be referenced instead!	Section will be re-written.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
China (China Meteorological Administration)	9	37	9	34	9	9.4.3.1	-	-	Please renew the data: 1990 is too early a date for understanding recent development.	Section will be re-written.
Brazil (Ministry of Science and Technology)	9	38	35	38	36	-	-	-	Incompleted reference	Section will be re-written.
Brazil (Ministry of Science and Technology)	9	38	8	38	9	-	-	-	Verify the text ""extent battery cars1"" (see footnote 1 - page 38)	Section will be re-written.
Daniel Bouille (Bariloche Foundation)	9	38	13	-	27	-	-	-	This section should be consistent with section 9.3.1.1. and 9.3.2.	Section will be re-written.
Emanuela Menichetti (Observatoire Méditerranéen de l'Energie)	9	38	39	38	42	-	-	-	The IEA presented a roadmap for CSP in June (not: is presenting). I would suggest referencing also the other technology roadmaps issued by the IEA (wind, PV, etc.)	Section will be re-written.
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	9	38	7	38	10	-	-	-	In this context, one idea is using electric cars as storage for volatile wind power generation.	Section will be re-written. This aspect will be discussed in detail in chapter on integration.
Geoffrey Heal (Columbia University)	9	38	16	38	17	-	-	-	Note that the use of land for wind power is consistent with other uses - much of the land used for wind power in the US is also used for farming. And land could remain savannah or desert, without changes in the ecosystems, while being used for wind power.	Section will be re-written and include multiple use of land.
Jan Steckel (PIK)	9	38	8	-	-	-	-	-	Footnote: No adequate source; in general the issue of batteries for energy storage should be discussed in more detail, also regarding the sustainability aspects that are related to them	Section will be re-written. This aspect will be discussed in detail in chapter on integration.
Japan (the Japanese Ministry of Foreign Affairs)	9	38	8	-	-	-	-	-	"cars1" does not make sense.	Section will be re-written.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	9	38	37	38	42	-	-	-	CSP is not and end use sector, why is it mentioned here?	Section will be re-written.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	9	38	5	38	6	-	-	-	Non-edible crops can also conflict with food security if they are grown on land which would otherwise have been used for growing food crops.	Noted. The issue of food security will be covered in Chapter 2 on bioenergy.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Oyvind Christophersen (Climate and Pollution Agency)	9	38	-	-	-	-	-	-	Footnote: We general think that the mentioning of brand name products should be avoided in this report.	Section will be re-written.
Oyvind Christophersen (Climate and Pollution Agency)	9	38	29	-	-	-	-	-	The statement the industry is (particularly) vulnerable to climate change is not obvious and should be explained.	Section will be re-written.
Oyvind Christophersen (Climate and Pollution Agency)	9	38	5	-	6	-	-	-	We think that this sentence should be modified, since production of fuel from non-edible crops is in itself no guarantee against conflict with food security.	Agreed. The issue of food security will be covered in Chapter 2 on bioenergy.
Susanne Kadner (Technical Support Unit)	9	38	42	-	-	-	-	-	Appropriate IEA reference should be provided!	Section will be re-written.
Susanne Kadner (Technical Support Unit)	9	38	14	-	-	-	-	-	Environmentalist' is probably not the kind of language appropriate for the report.	Section will be re-written.
Susanne Kadner (Technical Support Unit)	9	38	39	-	-	-	-	-	Outdated - needs to be updated! Reference to Chaper 3 is missing!	Section will be re-written.
Susanne Kadner (Technical Support Unit)	9	38	33	38	37	-	-	-	Reference to Chaper 2 is missing!	Section will be re-written.
Susanne Kadner (Technical Support Unit)	9	38	4	38	12	-	-	-	References, case studies and detailed descriptions of possible development pathways are missing - the paragraph needs more work!	Section will be re-written.
Susanne Kadner (Technical Support Unit)	9	38	29	38	30	-	-	-	Sectoral sections 9.4.3.1 - 9.4.3.2 were all introduced with a reference to GHG emissions growth provided in the AR4 - why not this section? The numbers for industry are available (65% 1970-2004; AR4 Chapter 1, page 104)!	Section will be re-written.
Susanne Kadner (Technical Support Unit)	9	38	17	38	19	-	-	-	This sentence should be used as the introductory sentence as done in the other sections on 'built environment' and 'transport'	Section will be re-written.
Brazil (Ministry of Science and Technology)	9	39	11	39	12	-	-	-	Verify the text ""(1 EJ = 1 × 1018 J)""	Section will be re-written.
Daniel Bouille (Bariloche Foundation)	9	39	16	-	17	-	-	-	Is it only an issue of research finacing?	Section will be re-written.
Emanuela Menichetti (Observatoire Méditerranéen de l'Energie)	9	39	14	-	15	-	-	-	Add references	Section will be re-written.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Emanuela Menichetti (Observatoire Méditerranéen de l'Energie)	9	39	11	-	-	-	-	-	spacing problems	Section will be re-written.
Geoffrey Heal (Columbia University)	9	39	9	39	12	-	-	-	The quoted statement is wildly iconsistent with many other studies of the potential for biofuels. It should not be quoted so uncritically.	Section will be re-written.
Gregory Keoleian (University of Michigan)	9	39	4	-	-	-	-	-	can cite ORNL 2005 study http://feedstockreview.ornl.gov/pdf/billion_ton_vision.pdf;	Noted.
Japan (the Japanese Ministry of Foreign Affairs)	9	39	31	-	32	-	-	-	It is not clear why biomass is the "most important" primary energy source. Does this sentence mean to imply that biomass is the "most important" because it has a nearly 10% share?	Section will be re-written.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	9	39	21	-	-	-	-	-	Is a university website an appropriate reference for an IPCC report?!	No! Section will be re-written.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	9	39	13	-	-	-	-	-	RE FROM different enery sources (not IN different energy sources)	Section will be re-written.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	9	39	24	39	25	-	-	-	The issue is not only deforestation, conversion of any high carbon stock land type (e.g. peatland) can ruin the positive GHG balance of bioenergy	Agreed. The possible impacts of (indirect and direct) LUC will be covered through LCA review that will be included in re-drafted chapter.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	9	39	7	39	8	-	-	-	These are estimates of technical potential, which needs to be made explicit and compared to an economically realizable potential, otherwise is just a figure out of context.	Section will be re-written. Figures for technical potential will be included in Chapter 1.
Oyvind Christophersen (Climate and Pollution Agency)	9	39	13	41	16	-	-	-	In this chapter (9.4.4) reference is frequently made to chapter 9.3.1. for more detailed information. We generally find that the information in 9.3.1 is not significantly more detailed than the information in chapter 9.4.4 - it is more our impression that the information is different. we think that the text would be improved if these two chapters are reviewed together for coherence. We would also remark that reference to chapter 9.3.1 for more detail appears somewhat inappropriate since 9.3.1 is headlined an introductory chapter.	Section will be re-written.
Oyvind Christophersen (Climate and Pollution Agency)	9	39	6	-	7	-	-	-	We think that few readers can relate to the denomination EJ/yr and propose that percentage is used - or alternatively that the explanation of yearly consumption in line 12 is moved forward in the text.	Section will be re-written.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Susanne Kadner (Technical Support Unit)	9	39	1	39	3	-	-	-	Clarify statement and supplement with references and links to technology chapters - or remove altogether!	Section will be re-written.
Susanne Kadner (Technical Support Unit)	9	39	7	39	8	-	-	-	If reference to this statement is made it should be reworded and not put in quotations.	Section will be re-written.
Susanne Kadner (Technical Support Unit)	9	39	9	39	12	-	-	-	Surely there must exist more references and values to support this argument - provide more references so this can be an assessment of the existing literature!	Section will be re-written.
United States (U.S. Department of State)	9	39	14	39	17	-	-	-	Section needs to be rewritten using examples that use real data.	Section will be re-written.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	40	-	-	-	-	-	-	Box 9.2: While the case study is interesting, what is the point? What are the lessons with regard to sustainable development? Many examples of niche applications may be given, but without a theoretical framework through which they may be examined, they remain as examples - interesting, but unclear in terms of policy implications	Section will be re-written and box removed.
Denis Aelbrecht (EDF)	9	40	16	-	-	-	-	-	replace the line by "...reservoirs may release methane in their early years, and CO2 for sometimes longer periods, and...". Emissions of the construction phase are usually negligible compared to the emissions of the reservoir	Section will be re-written. Comprehensive LCA review regarding GHG emissions of range of energy technologies will include many more references to back such statements.
Greece (National Observatory of Athens)	9	40	13	-	-	-	-	-	Change subtitle to: "Development pathways to different renewable energy technologies"	Section will be re-written.
Gregory Keoleian (University of Michigan)	9	40	4	-	-	-	-	-	add Keoleian and Lewis 2003; Keoleian, G.A., and G.McD. Lewis. "Modeling the Life Cycle Energy and Environmental Performance of Amorphous Silicon BIPV Roofing in the US", Renewable Energy (2003) 28: 271-293. and fix ref: change "Hyung" to "Kim" Hyung Chul Kim (my former doctoral student)	Noted. Comprehensive LCA review of range of energy technologies will include much more references to back such statements.
Gustavo Nadal (Fundacion Bariloche)	9	40	1	41	13	-	-	-	Repeats what was already mentioned in section 9.3	Section will be re-written.
Ladislaus Rybach (Geowatt AG Zurich (company))	9	40	13	-	14	-	-	-	The statement that geothermal capital costs are high while variable costs low, the reference to 9.3.1 is wrong (nothing can be found there in this respect; [4.7] should be mentioned instead.	Section will be re-written.
Oyvind Christophersen (Climate and Pollution Agency)	9	40	6	-	7	-	-	-	The environmental effect of change in albedo should also be reflected in chapter 9.3.1.	Noted.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Oyvind Christophersen (Climate and Pollution Agency)	9	40	16	-	-	-	-	-	The remark on high lifecycle emissions should be elaborated on further. What kind of emissions? Why are lifecycle emissions high when emissions are mainly during construction? how long is a "lifecycle"?	Section will be re-written and comprehensive LCA review regarding GHG emissions of range of energy technologies will be included.
United States (U.S. Department of State)	9	40	1	41	13	-	-	-	This is a repetition of the earlier discussion in section 9.3. The reviewers do not think that it needs to be included again, but perhaps can just refer the reader to the earlier section.	Section will be re-written.
Richard Taylor (International Hydropower Association)	9	40	15	40	16	9.4.4	-	-	Delete ""large"" and replace with reservoir"". Delete ""dams"". Insert ""net"" in front of ""methane"". Delete ""methane"" and replace with ""GHG"". Insert ""in limited cases may "" in front of ""have high lifecycle emissions""	Section will be re-written.
Oluf Ulseth (Statkraft AS)	9	41	7	41	8	0	-	-	It is stated "Wind power is the most cost-effective renewable energy technology producing electricity (except for large hydropower)" . Description should be correct. Wind power is the second most cost-efficient etc.	Section will be re-written.
Anand Patwardhan (Indian Institute of Technology-Bombay)	9	41	-	-	-	9.5	-	-	Over all referencing needs to be improved substantially. There are very few citations in 9.5.3 for example.	Accepted. Section will be re-written.
Supachai Panitchpakdi (United Nations Conference on Trade and Development)	9	41	21	41	28	9.5	-	-	The following part should be amended as suggested: (Line 21) "International Organizations like the United Nations, Economic and Social Council, Commission on Science and Technology for Development, the UN Framework Convention on Climate Change" As an example of the activities of the international organizations, the following example is more up to date. (Line 26) "For example, the Economic and Social Council of the United Nations, Commission on Science and Technology for Development, published a report that seeks to identify ways to overcome the challenges associated with the deployment and scaling-up of new and emerging renewable energy technologies in developing countries." See. United Nations, Economic and Social Council (E/CN.16/2010/4), Commission on Science and Technology for Development, Report of the Secretary-General (available at http://www.umic.pt/images/stories/publicacoes3/ecn162010d4_en.pdf)	Noted. Section will be re-written.
Emanuela Menichetti (Observatoire Méditerranéen de l'Energie)	9	41	21	-	22	-	-	-	Please remove "Clean Development Mechanisms",as they are a tool, not an international organisation	Noted. Section will be re-written.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Emanuela Menichetti (Observatoire Méditerranéen de l'Energie)	9	41	27	-	28	-	-	-	we are approaching COP 16, I would not say "at the recently held COP14 in Poland"	Section will be re-written.
Emanuela Menichetti (Observatoire Méditerranéen de l'Energie)	9	41	23	-	-	-	-	-	what is "Energy and Environment"?	Section will be re-written.
Ladislaus Rybach (Geowatt AG Zurich (company))	9	41	14	42	38	-	-	-	9.5 Policy framework for renewable energy in the context of sustainable development: many organizations are mentioned here except one: the REN Alliance (=International Renewable Energy Alliance). REN Alliance assembles the leading international renewable energy associations: International Geothermal Association, International Hydropower Association, International Solar Energy Association, International Bioenergy Association, and World Wind Energy Association (details under www.ren-alliance.org).	Noted.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	9	41	18	41	44	-	-	-	Nothing mentioned in these first 5 paragraphs of the section are policy frameworks - either the title needs to be changed to reflect that the section is presenting international institutions promoting renewable energy or they need to be all left out.	Accepted. Section will be re-written.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	9	41	18	42	38	-	-	-	The only relevant mention in this section is of the EU's single liberalized energy market, everything else has nothing to do with policy framework for RE and has to either be deleted or completely re-worked.	Accepted. Section will be re-written.
Oyvind Christophersen (Climate and Pollution Agency)	9	41	27	-	-	-	-	-	We think that this wording should be changed, since COP 14 might not still be considered to be held "recently".	Section will be re-written.
Peter Johnston (Environmental & Energy Consultants, Ltd)	9	41	3	-	-	-	-	-	"Ocean power, particularly wave and tidal power has potential to provide base load energy " Why particularly wave & tidal? Surely at least as true for OTEC.	Section will be re-written.
Peter Johnston (Environmental & Energy Consultants, Ltd)	9	41	37	-	-	-	-	-	IRENA is a relative newcomer? Not "relative." It only became official in mid 2010 after endorsement by the required number of countries.	Noted. Section will be re-written.
Susanne Kadner (Technical Support Unit)	9	41	15	41	34	-	-	-	Analysis of usefulness of different policies and incentives should be provided by Chapter 11 where an in-depth review of the available literature is performed. Remove paragraph.	Accepted. Section will be re-written.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Susanne Kadner (Technical Support Unit)	9	41	29	41	33	-	-	-	Argument is presented unclear and wording is not acceptable for IPCC report - both language needs to be changed and examples for statement should be introduced to clarify matters.	Section will be re-written.
Susanne Kadner (Technical Support Unit)	9	41	34	41	38	-	-	-	General and unsubstantiated comment - should be removed.	Section will be re-written.
Susanne Kadner (Technical Support Unit)	9	41	9	41	11	-	-	-	Give reference and mention that this is part of the EU climate and energy package.	Section will be re-written.
Susanne Kadner (Technical Support Unit)	9	41	27	-	-	-	-	-	remove the word "recently" - outdated!	Section will be re-written.
Susanne Kadner (Technical Support Unit)	9	41	6	41	8	-	-	-	Re-word sentences.	Section will be re-written.
Susanne Kadner (Technical Support Unit)	9	41	12	41	14	-	-	-	This general statement has no added value and should be removed or expanded to provide really detailed information.	Section will be re-written.
Susanne Kadner (Technical Support Unit)	9	41	42	41	44	-	-	-	Would be interesting to receive more information on what "promote renewable energy" means in more detail.	Section will be re-written.
Youba SOKONA (Sahara and Sahel Observatory)	9	41	21	41	21	-	-	-	UNFCCC is not an organisation	Noted. Section will be re-written.
Garcia Javier (Garcia Monge Consultant)	9	41	3	41	3	9.4.4	-	-	It is stated that ocean energy cna provide base load energy. This is not true. Tidal energy depends on tidal cycles of around 6 hours each with high and low flows. According to a personal communication with Joao Cruz, he told me an average capacity factor of 33% for wave energy.	Accepted. Section will be re-written.
Australia (0)	9	42	10	-	-	-	-	-	Recommend inserting an example from the Asia Pacific region, of which there is a lack throughout this chapter. Such as - "Another successful example is the Asia Pacific Partnership on Clean Development and Climate (APP) - a technology cooperation initiative that comprises Australia, Canada, China, India, Japan, South Korea and the United States. The APP brings the public and private sectors together to accelerate the development, deployment and transfer of cleaner, more efficient technologies. This includes cooperative projects to deploy renewable energy technologies to support rural and peri-urban economic development and poverty alleviation."	Noted.
Daniel Bouille (Bariloche Foundation)	9	42	44	43	5	-	-	-	Flexibility mechanisms are an instrument of the Convention but not sufficient to ""create the conditions"" for a renewable pathways.	Section will be re-written.
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	9	42	44	43	5	-	-	-	These instruments need to be further developed in order to foster RE deployment.	Section will be re-written.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Greece (National Observatory of Athens)	9	42	19	-	-	-	-	-	Change to: "in both developing and developed countries". Undermining the role of developed countries in RE development and neglecting the imperative to completely restructure their development paths in order to achieve SD at the global level is a major shortcoming of the chapter.	Section will be re-written.
Oyvind Christophersen (Climate and Pollution Agency)	9	42	33	-	-	-	-	-	"Traditional technology" might, in this context, be substituted by "traditional approaches to satisfy energy needs".	Section will be re-written.
Peter Johnston (Environmental & Energy Consultants, Ltd)	9	42	27	-	-	-	-	-	2000 is not recent for a market survey on RE installers' accreditation	Section will be re-written.
Stephan Klasen (University of Göttingen)	9	42	39	-	-	-	-	-	This section just summarizes what players there are in the field and what they are advocating. There is little link to the SD discussion earlier nor is there a clear discussion of why certain instruments and RE strategies might be better for promoting SD than others.	Accepted. Section will be re-written.
Switzerland (Swiss Federal Office for the Environment)	9	42	33	-	-	-	-	-	It should be noted that renewable energy policy is interlinked with non-renewable energy policy. A carbon tax which includes external costs can be as supportive as specific RE R&D support. Moreover, the context of energy consumption should be discussed: not only the type of technologies (modern or traditional) matters, but also the context wherein it is used, in particular regarding the needs for energy services, i.e. consumption patterns. Thus, policies should not aim at duplicating western consumption patterns. In contrast, they should aim at changing those in western countries towards less energy intensive consumption.	Noted.
Richard Taylor (International Hydropower Association)	9	42	31	40	33	9.5.	-	-	Rephrase. Tone issues	Section will be re-written.
Daniel Bouille (Bariloche Foundation)	9	43	6	-	8	-	-	-	The issue of subsidies (in several parts of the chapter mentioned) should be analysed more in depth. The paragraph,in particular, is not very clear. In which way Nuclear is receiving subsidies? An oil price that it is far away and over the costs (including exploration and development) is including an important rent. Could not be considered that a portion of such rent is the internalization of environmental externalities? Volatility of oil prices is an issue talking on subsidies.	Accepted. A discussion of subsidies for conventional energy sources will be included in new chapter. Subsidies for RE will be assessed in Chapter 11.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Emanuela Menichetti (Observatoire Méditerranéen de l'Energie)	9	43	6	-	8	-	-	-	The use of subsidies includes the gradual phase out of subsidies... can you reformulate this sentence?	Section will be re-written. A discussion of subsidies for conventional energy sources will be included in new chapter. Subsidies for RE will be assessed in Chapter 11.
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	9	43	30	43	34	-	-	-	Currently, the EU is considering encouragement of shifts in labour taxation towards brackets related to harmful behaviours to the environment (integrating potentially beneficial aspects of environmental taxation). There might be coming up a directive on energy taxation.	Section will be removed. The assessment regarding the efficiency of different policy measures will be covered in Chapter 11.
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	9	43	9	43	11	-	-	-	There is the possibility/offer of the EU setting more ambitious RE targets if other international partners are willing to raise their own respective targets.	Noted. Section will be re-written.
Gregory Keoleian (University of Michigan)	9	43	32	-	-	-	-	-	Production Tax Credit is another important incentive for wind turbine deployment in US	Section will be removed. The assessment regarding the efficiency of different policy measures will be covered in Chapter 11.
Gustavo Nadal (Fundacion Bariloche)	9	43	9	43	11	-	-	-	EU target for transport is 10% but has been modified to include all forms of renewable energy (and electricity as well).	Noted. Section will be re-written.
Gustavo Nadal (Fundacion Bariloche)	9	43	30	43	34	-	-	-	The key role of financing to complement feed-in could be mentioned here. An example is the success of PROINFA in Brazil, where the financial support of BNDES to project investment has been extremely important to achieve the high level of RE penetration in the power sector	Section will be removed. The assessment regarding the efficiency of different policy measures will be covered in Chapter 11.
Ladislaus Rybach (Geowatt AG Zurich (company))	9	43	21	-	26	-	-	-	Feed-in tariffs are implemented not only in Germany and South Africa but also in most countries in Europe.	Section will be removed. The assessment regarding the efficiency of different policy measures will be covered in Chapter 11.
Mark Fulton (Deutsche Asset Management, Deutsche Bank)	9	43	29	-	-	-	-	-	DBCCA's GET FiT Program (Global Energy Transfer Feed-in Tariffs for Developing Countries) approach could be applied here. For further information on this concept and program, see SRREN_Draft2_Review_Fulton_Mark_Material_04.pdf.	Section will be removed. The assessment regarding the efficiency of different policy measures will be covered in Chapter 11.
Oyvind Christophersen (Climate and Pollution Agency)	9	43	46	44	2	-	-	-	This conclusion should be explained further with respect to energy sources and environmental impacts on kWh by kWh basis.	Section will be removed. New comprehensive review regarding GHG emissions and air pollutants of different energy technologies will be included.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Oyvind Christophersen (Climate and Pollution Agency)	9	43	24	-	26	-	-	-	This example from South Africa might be supplemented as regards recent development with respect to new investments in coal fired power plants.	Section will be removed. The assessment regarding the efficiency of different policy measures will be covered in Chapter 11.
Oyvind Christophersen (Climate and Pollution Agency)	9	43	39	-	41	-	-	-	We think that the statement on "very little impact on the environment in terms of emission of pollutive substances" is an oversimplification. We think that for non-climate emissions the impact from bio-energy are comparable to fossil fuels and life-cycle emissions are generally not necessarily "very little".	Agreed. Section will be removed. New comprehensive review regarding GHG emissions and air pollutants of different energy technologies will be included.
Oyvind Christophersen (Climate and Pollution Agency)	9	43	35	44	27	-	-	-	We think that the topics in this chapter should be better reflected in the introduction in chapter 9.3.1.	Section will be removed. The assessment regarding the efficiency of different policy measures will be covered in Chapter 11.
Peter Johnston (Environmental & Energy Consultants, Ltd)	9	43	12	43	14	-	-	-	No source & not much content. And anyway, this is recoginzed globally, not just in the Asia-Pacific region.	Noted. Section will be re-written.
Switzerland (Swiss Federal Office for the Environment)	9	43	34	-	-	-	-	-	The role of taxation on nonrenewable energy should be discussed; Problems of the presented instruments should be discussed, e.g. a) that too ambitious targets might lead to the promotion of inefficient or unsustainable RE generation (e.g. of biofuels) just to meet these targets, or b) that feed-in tariffs - if not designed with care - might remain inefficient, because high payments for RE might keep the price level in the whole sector elevated and thus constrain further price reduction in modules and installation costs (as has happened e.g. in Spain with PV)	Section will be removed. The assessment regarding the efficiency of different policy measures will be covered in Chapter 11.
United States (U.S. Department of State)	9	43	15	43	29	-	-	-	Paragraph should be cross referenced with the policy section. Find ways to make the section more relevant by providing more citations and examples. Page 43 line 15-16 "command and control" is problematic, as well as the term "required". Reflect reality and discuss what is in place.	Section will be removed. The assessment regarding the efficiency of different policy measures will be covered in Chapter 11.
United States (U.S. Department of State)	9	43	27	-	-	-	-	-	Reference is made to RPS, but RPS is not explained until later, at page 53, Line 35. Also, at this point, reference should be made to the U.S. RFS, which currently is not mention until page 51, Line 25.	Section will be removed. The assessment regarding the efficiency of different policy measures will be covered in Chapter 11.
United States (U.S. Department of State)	9	43	6	43	8	-	-	-	Section 9.5.1 lines 6-8: better to stick to the facts and data. No opinions or judgments should be mentioned.	Section will be re-written.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Greece (National Observatory of Athens)	9	43	-	44	-	9.5.1	-	-	The discussion on policy instruments should be revised/extended. To better distinguish effectiveness (short- and long-term), suitability to different RETs, advantages and disadvantages, success stories etc.	Section will be removed. The assessment regarding the efficiency and effectiveness of different policy measures will be covered in Chapter 11.
Brazil (Ministry of Science and Technology)	9	44	21	-	-	-	-	-	Verify the text ""m^2/MW""	Section will be removed.
Gregory Keoleian (University of Michigan)	9	44	13	-	-	-	-	-	change "creating" to "production, use and retirement"	Section will be removed.
Gregory Keoleian (University of Michigan)	9	44	1	-	-	-	-	-	depends on what impact is being compared and what conventional technology is the point of reference	Section will be removed. New comprehensive review regarding GHG emissions and air pollutants of different energy technologies will be included.
Jyri Seppälä (Finnish Environment Institute)	9	44	22	27	-	-	-	-	Why is carbon footprint not metioned instead of ecological footprint?	Section will be removed.
Ladislaus Rybach (Geowatt AG Zurich (company))	9	44	18	-	21	-	-	-	The numerical results of the mentioned comparative analysis indicating the different capacity factors (e.g. global average values for solar PV: 14 %, wind: 21 %, geothermal 71 %) should be given here.	Section will be removed.
Oyvind Christophersen (Climate and Pollution Agency)	9	44	22	-	27	-	-	-	This "definition" should be followed by some kind of conclusions. It should also be remembered that the topic of water use is mainly only relevant in areas where water is considered a limited resource.	Section will be re-written and better linked to information provided in the hydropower chapter.
Oyvind Christophersen (Climate and Pollution Agency)	9	44	18	-	21	-	-	-	This paragraph is somewhat unclear, but if the main message is that energy should be measured in kWh and not kW installed, we think that this is rather obvious and that the paragraph could be deleted.	Section will be removed.
Susanne Kadner (Technical Support Unit)	9	44	30	-	-	-	-	-	As mentioned in the comments to the FOD, liaise with Chapter 5 on the usage of small and large hydro.	Section will be re-written and better linked to information provided in the hydropower chapter.
Susanne Kadner (Technical Support Unit)	9	44	34	-	-	-	-	-	Reference available to substantiate this statement?	Section will be re-written.
Susanne Kadner (Technical Support Unit)	9	44	44	44	46	-	-	-	Reference should be provided at the end of this sentence.	Section will be re-written.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Emmanuel Branche (Electricité de France)	9	44	22	44	27	9.5.2	-	-	Waterfootprint does not take into account a life-cycle assessment methodology and notably does not integrate the quality of the water.	Section will be removed and re-drafted text will include assessment of water consumption of thermal and non-thermal electricity-generating technologies and impacts on water quality.
Greece (National Observatory of Athens)	9	44	-	45	-	9.5.2	-	-	To be removed or eventually to be shifted in 9.2.	Section will be re-written.
Richard Taylor (International Hydropower Association)	9	44	30	44	30	9.5.3	-	-	Delete ""large hydro dams"" and replace with ""reservoir hydropower"". Of the world's estimated 45,000 large dams, only 20-25% are used for hydropower - reservoir hydropower reservoir hydropower is therefore a more accurate term and aligns with the classification of hydro in SRREN SOD Chapter 5 (Hydropower). The classification of hydropower by scale is also out of step with that chapter.	Section will be re-written and better linked to information provided in the hydropower chapter.
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	9	45	17	45	21	-	-	-	Continuous political support is a crucial key element for large-scale RE projects to gain the needed public awareness and support.	Noted.
Greece (National Observatory of Athens)	9	45	28	50	39	-	-	-	Needs shortening. Institutional and technical capacity to appear as subsections of a common section 9.5.4 entitled "Capacity building" with 9.5.4.1 "Institutional capacity", 9.5.4.2 "Technical capacity".	Section will be re-written.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	9	45	6	-	-	-	-	-	the word "energy" is missing after renewable	Section will be re-written.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	9	45	6	45	14	-	-	-	unnecessary repetition of benefits of RE	Section will be re-written.
Susanne Kadner (Technical Support Unit)	9	45	42	45	44	-	-	-	Is this statement part of a scientifc assessment - if so, reference should be provided, if not sentence should be removed.	Section will be re-written.
Susanne Kadner (Technical Support Unit)	9	45	18	45	23	-	-	-	Redundant with page 41 lines 37-41.	Section will be re-written.
Susanne Kadner (Technical Support Unit)	9	45	25	45	38	-	-	-	What is specific link of these communication channels to promore REs - aren't these used for everything. Instead of listing the whole set of well know communication means, it would be more interesting to learn about specific examples where these have been applied successfully.	Section will be re-written.
Ladislaus Rybach (Geowatt AG Zurich (company))	9	46	11	-	23	-	-	-	The REN Alliance (=International Renewable Energy Alliance) should be mentioned here also.	Section will be re-written.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Susanne Kadner (Technical Support Unit)	9	46	41	46	46	-	-	-	Reference to barrieres defined in Chapter 1 should be provided.	Section will be re-written.
Susanne Kadner (Technical Support Unit)	9	46	30	46	34	-	-	-	Reference to Chapter 11 should be provided.	Section will be re-written.
Garcia Javier (Garcia Monge Consultant)	9	46	28	46	28	9.5.3	-	-	May I suggest to add: Renewable Energy centers (for different purposes such as clearing house; information center; analysis; technology transfer, etc.) in national levels, specially in developing countries, supported by succesful experiencies from developed ones can improve significatively the capabilities to promote RE.	Noted.
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	9	47	36	47	37	-	-	-	This process from regulation towards economic policy tools is also influenced by advancing state of the art of RE.	Section will be re-written.
Gustavo Nadal (Fundacion Bariloche)	9	47	43	47	45	-	-	-	Regulatory approaches still have a key role to play in many developing countries, where economies with many examples of market ""imperfections"" are not uncommon (e.g. barriers to entry, etc.)	Noted.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	9	47	33	47	42	-	-	-	completely irrelevant for a section on institutional capacity, can be left out	Section will be re-written.
Roberto Acosta Moreno (CITMA)	9	47	10	-	-	-	-	-	I suggest to add after the words "" to be built in"": ""countries,"" Comment: the building up of institutional capacities is even more important to be done in countries than in the relevant agencies and organizations. Other option is to keep the sentence as it stands, and add at the end: "" at international, regional, national and sub-national levels"".	Section will be re-written.
Susanne Kadner (Technical Support Unit)	9	47	15	-	-	-	-	-	Add reference to Chapter 1 and barriers section.	Section will be re-written.
Susanne Kadner (Technical Support Unit)	9	47	18	47	20	-	-	-	Reference needs to be provided.	Section will be re-written.
Brazil (Ministry of Science and Technology)	9	48	2	-	-	-	-	-	Correct the number of the table 4	Table will be removed.
Emanuela Menichetti (Observatoire Méditerranéen de l'Energie)	9	48	21	-	-	-	-	-	important factors	Noted. More detailed discussion on capacity building will be provided in Chapter 11.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Rainer Walz (Fraunhofer Systems and Innovation Research)	9	48	21	48	30	-	-	-	It should be added that the conditions for building capacity in latecomer economies are changing, as explained by Nelson RR (2007) The changing institutional requirements for technological and institutional catch up. International Journal of Technological Learning. Innovation and Development 1: 4-12. Furthermore, it would add to the report if existing empirical evidence about the level of absorptive capacity in renewable energy technologies in latecomer countries would be referred to (e.g. Walz et al. (2008): Technological Competences for Sustainable Development in the BRICS countries, IRB publishers, Stuttgart, with sections on renewable energy for China, India, Brazil, and South Africa).	Noted. More detailed discussion on capacity building will be provided in Chapter 11.
Rainer Walz (Fraunhofer Systems and Innovation Research)	9	48	36	-	-	-	-	-	the name of the author in the reference is not correct: it must read Jacobsson, S; the reference to systems of innovation is important; here a reference to chapter 11 should be made, where an up to date review of these concept with its application to renewable energy should be made. The reference to Jacobsson and Johnson is only the starting point of an important development of this string of literature, which has been evolving during the last 10 years.	Noted. More detailed discussion on capacity building will be provided in Chapter 11.
Susanne Kadner (Technical Support Unit)	9	48	6	49	2	-	-	-	Well written and well referenced paragraphs!	Noted.
Australia (0)	9	48	3	48	4	-	-	9.4.	This table best fits into Chapter 11, 'Policy and financing', and it should refer to both developing and developed countries because it is relevant to both.	Table will be removed.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	9	48	-	-	-	-	-	9.4.	not relevant for this section, can be left out	Noted. More detailed discussion on capacity building will be provided in Chapter 11.
Canada (Environment Canada)	9	49	29	49	29	-	-	-	"new dedicated efforts" is unclear. Please be more specific.	Section will be re-written.
Canada (Environment Canada)	9	49	38	49	39	-	-	-	Item V is not correct: Development of international energy management standards is not discussed during negotiations about technology transfer under the AWG-LCA of the UNFCCC. If there is a need to replace this example by another one, this section could mention the discussions on capacity-building in developing countries to enable technology absorption and integration over the long term.	Section will be re-written.
Canada (Environment Canada)	9	49	31	49	31	-	-	-	Suggest adding "and enabling environments" after "effective policy frameworks".	Section will be re-written.
Canada (Environment Canada)	9	49	28	49	28	-	-	-	Suggest changing "permanent" to "ongoing"	Section will be re-written.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Canada (Environment Canada)	9	49	28	49	39	-	-	-	Suggest that this paragraph would fit better in Chapter 11.	Section will be re-written.
Canada (Environment Canada)	9	49	36	49	36	-	-	-	The word "assessments" is missing after technology needs. The concept that is discussed here is really "technology needs assessments" (a tool that has been used by the EGTT under the UNFCCC), not "technology needs".	Section will be re-written.
Roberto Acosta Moreno (CITMA)	9	49	30	49	39	-	-	-	"A more acceptable option could be to substitute the current list contained in lines 30 to 39 by the list related to technology of the Bali Action Plan (Decision 1/CP.13) that was adopted by all Parties to the UNFCCC. Namely, the sentence that starts in line 30 could be modified as follows: " It is expected that the enhanced action on technology development and transfer to support action on mitigation and adaptation, focus on: (i) Effective mechanisms and enhanced means for the removal of obstacles to, and provision of financial and other incentives for, scaling up of the developmentand transfer of technology to developing country Parties in order to promote access to affordable environmentally sound technologies; (ii) Ways to accelerate deployment, diffusion and transfer of affordableenvironmentally sound technologies;(iii) Cooperation on research and development of current, new and innovative technology, including win-win solutions;(iv) The effectiveness of mechanisms and tools for technology cooperation inspecific sectors;(e) Enhanced action on the provision of financial resources and investment. "	Section will be re-written.
Roberto Acosta Moreno (CITMA)	9	49	30	49	39	-	-	-	There is not indication of the bibliographic source of the list of issues contained in (i) to (v). This may be sensitive because these issues are under UNFCCC negotiations, but an agreement has not been reached yet. This list is not contained in the last version of the negotiation text prepared by the Chair of the LCA for consideration by Parties that still is under negotiation. I would suggest to indicate the source of the list if this list was part of an official UNFCCC document. However, if the list was part of a bracketed text not approved yet by Parties it would be better not to include the list and delete the whole sentence that starts in line 30.	Section will be re-written.
Susanne Kadner (Technical Support Unit)	9	49	3	49	39	-	-	-	There are numerous statements made in these paragraphs that have not been supported by references - both concerning the scientific literature and cross-references to other chapters such as Chapter 11. This needs to be done!	Noted.
United States (U.S. Department of State)	9	49	23	-	-	-	-	-	Data are cited for 2005. These should be updated, to 2009 if possible.	Section will be re-written.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Garcia Javier (Garcia Monge Consultant)	9	49	43	49	44	9.6.1	-	-	May I suggest the following phrasing: "...and the fact that they are environmentally more friendly compared to fossil fuels." instead "environmentally relatively benign"	Section will be re-written.
Garcia Javier (Garcia Monge Consultant)	9	49	43	49	44	9.6.1	-	-	May I suggest to add as an attraction: ""very low O&M costs and energy price stabilization in the long term.""	Section will be re-written.
Daniel Bouille (Bariloche Foundation)	9	50	1	-	10	-	-	-	Renewable is not equal to sustainable. This is an important issue that was not developed in the chapter and appears in the synthesis. The incorporation of the conditions for a renewable to be sustainable should be part of a section. Renewable is an inherent condtion of the source, sustainability is related with the management of a renewable source and other related conditions.	Section will be re-written and provide a synthesis based on the assessment carried out in the re-drafted chapter. This new assessment should provide more insights how the deployment of REs may also contribute to SD.
Denis Aelbrecht (EDF)	9	50	37	-	-	-	-	-	"The environmental AND SOCIAL impacts associated with..."	Section will be re-written.
Denis Aelbrecht (EDF)	9	50	38	50	39	-	-	-	This sentence refers to the "tools for environmental impact (???) and sustainability"; actually the "tools" listed here are, in line with the title of the section 9.6.2, to "assesment tools". "Tools for sustainability " would actually comprise "impact assesment" and associated "management plans" to properly address identified issues. These "tools" or methods exixt, are evolving and improving, and sustainability of project depends on a large part of their correct use. Monitoring and measuring is only one component of the impact management.	Section will be re-written.
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	9	50	14	50	16	-	-	-	Additional cost advantages of RE might be detected by a wholistic assessment including positive and negative externalities of RES and conventional fossil fuel-based energy technologies.	Noted. Section will be re-written.
Greece (National Observatory of Athens)	9	50	45	-	-	-	-	-	Replace "or" with "are"	Section will be re-written.
Gregory Keoleian (University of Michigan)	9	50	2	-	3	-	-	-	fix sentence	Section will be re-written.
Gregory Keoleian (University of Michigan)	9	50	23	-	-	-	-	-	punctuation	Section will be re-written.
Gregory Keoleian (University of Michigan)	9	50	11	-	16	-	-	-	straightforward implementation, not always the case; also "In this sense,... " this statement doesn't necessary follow - low operating costs of RE more favorable than fossil	Section will be re-written.
Japan (the Japanese Ministry of Foreign Affairs)	9	50	24	-	35	-	-	-	Perhaps, the social consequences of a develop-and-import scheme, including the acceration of poverty in the case that local workers fall victims of cheap labor, should also be mentioned.	Section will be re-written.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Susanne Kadner (Technical Support Unit)	9	50	30	50	32	-	-	-	Again, reference to section 9.3.1 should be provided here.	Section will be re-written.
Susanne Kadner (Technical Support Unit)	9	50	21	50	24	-	-	-	Reference to Chapter 5 should be included here.	Section will be re-written.
Susanne Kadner (Technical Support Unit)	9	50	18	-	-	-	-	-	Reference to section 9.3.1 should be provided here.	Section will be re-written.
Susanne Kadner (Technical Support Unit)	9	50	11	-	-	-	-	-	Straightforward implementation is not a general attribute of RETs - this statement needs to be carefully cross-checked with information provided in Chapter 8!	Section will be re-written.
Richard Taylor (International Hydropower Association)	9	50	2	50	4	9.6.1	-	-	Strongly support. Lobbying often distorts the original meanings of ""renewable"" and ""sustainable""	Section will be re-written.
China (China Meteorological Administration)	9	50	37	50	47	9.6.2	-	-	The list of tools is all environmentally oriented. They are important and necessary. But one cannot be missing: CBA, cost-benefit analysis and/or cost effectiveness analysis. Policies have to be based on economic viabilities.	Noted. Section will be re-written.
Richard Taylor (International Hydropower Association)	9	50	-	-	-	9.6.2	-	-	Comment: This section misses out other assessment tools such as sector guidelines (e.g. IHA Sustainability Guidelines 2004) and protocols (e.g. IHA Sustainability Assessment Protocol 2006), and financial sector sustainability performance standards (e.g. IFC and Equator Banks).	Section will be re-written and provide a synthesis based on the assessment carried out in the re-drafted chapter, which will include a section mentioning these guidelines and protocols.
Greece (National Observatory of Athens)	9	51	21	-	35	-	-	-	Remove paragraph. Not recommended to list examples in a concluding synthesis section.	Section will be re-written.
Greece (National Observatory of Athens)	9	51	37	53	9	-	-	-	Significantly shorten. Remove details about assessment tools (or shift to previous chapters if not already presnted).	Section will be re-written.
Susanne Kadner (Technical Support Unit)	9	51	42	52	9	-	-	-	Paragraphs need to be supplemented with scientific references!	Section will be re-written.
Susanne Kadner (Technical Support Unit)	9	51	10	51	11	-	-	-	Sentence not clear - what does "proper assessments and comparisons of such types" refer to? Also conclusion is not clear - after having introduced the number of tools in the previous paragraphs, why is the LCA approach required? Reword, explain and provide comparison with respect to the type of quantitative information (i.e. SD indicators vs LCA numbers) given in Appendix table.	Section will be re-written.
Susanne Kadner (Technical Support Unit)	9	51	2	51	9	-	-	-	This paragraph does not seem to match with the rest of the section focusing mainly on environmental impact assessment tools and should be removed.	Section will be re-written.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Richard Taylor (International Hydropower Association)	9	51	42	52	2	9.6.2	-	-	Comment: Strongly support this paragraph. There are fundamental methodological challenges with LCA. In the hydropower context this particularly concerns how to apply LCA to hydropower facilities of long or indefinite lifespans, and the unrepresentative nature of water and landuse ""footprints"" at the global level (since these are typically derived from a limited number of sites in a given region or country).	Noted. Section will be re-written. Review on LCAs for GHG emissions will discuss problems associated with this methodology.
Australia (0)	9	52	28	52	31	-	-	-	The text re "energy for sustainable development has three major pillars" - this statement seems a bit mixed up - as all three pillars are also true of the developed world. Sustainable energy is about the production of energy with minimal waste and the use of that energy efficiently. These pillars therefore require clarification.	Section will be re-written.
Daniel Bouille (Bariloche Foundation)	9	52	11	-	-	-	-	-	It is not clear for me why the previous phase to the seventies should not be called Energy Policy. The main change was not in the role of the state as responsible of the energy policy, but the inclusion of consumption as part of the energy policy with the introduction of the concept of Energy System and, of course many other objectives of the policy considering the changes in the global energy world produced by the creation of OPEP in the sixties..	Noted. Section will be re-written.
Gregory Keoleian (University of Michigan)	9	52	28	-	-	-	-	-	energy conservation should also be highlighted; this is distinct from efficiency	Noted. Section will be re-written.
Gustavo Nadal (Fundacion Bariloche)	9	52	28	52	30	-	-	-	Rational use of energy could be mentioned here since it focuses more on consumption and user behaviour than on technology, as is the case with energy efficiency.	Section will be re-written.
Jan Steckel (PIK)	9	52	28	-	31	-	-	-	The article that backs this statement argues in a very specific, i.e. European context. Going beyond the developed country perspective, energy for SD has more pillars, e.g. energy access.	Section will be re-written.
Oyvind Christophersen (Climate and Pollution Agency)	9	52	3	-	4	-	-	-	Some of the important insights should be listed here or reference should be given to the relevant chapters.	Section will be re-written.
Peter Johnston (Environmental & Energy Consultants, Ltd)	9	52	28	52	31	-	-	-	Repeats earlier text. Is it necessary or useful?	Section will be re-written.
Susanne Kadner (Technical Support Unit)	9	52	3	52	4	-	-	-	If such a statement is given, reference to the appropriate chapter sections (as it is probably not just Chapter 2 that is being referred to) should be provided.	Section will be re-written.
Susanne Kadner (Technical Support Unit)	9	52	11	53	3	-	-	-	Interesting sections that should be moved to section 9.1 to provide a proper introduction to the chapter.	Section will be re-written.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Switzerland (Swiss Federal Office for the Environment)	9	52	48	52	50	-	-	-	consumption reduction' should be added as additional point; a possible phase-out of not necessary energy services should be considered on the same level as how to most efficiently meet the current level of energy services	Section will be re-written.
Daniel Bouille (Bariloche Foundation)	9	53	4	-	7	-	-	-	How important was the impact on renewable from CDM? Is it possible to put some figures? Future CDM is going to be different	Section will be re-written. New text will include brief assessment of CDMs and how they have promoted SD and RE projects.
Greece (National Observatory of Athens)	9	53	28	-	31	-	-	-	See comment No 3.	Section will be re-written.
Greece (National Observatory of Athens)	9	53	10	55	40	-	-	-	Significantly shorten. Avoid iterations. Synthetic conclusions	Section will be re-written.
Gregory Keoleian (University of Michigan)	9	53	23	-	25	-	-	-	need a reference here for these statistics	Section will be re-written.
Peter Johnston (Environmental & Energy Consultants, Ltd)	9	53	46	-	-	-	-	-	This may well constitute an "energy crisis' but the text doesn't demonstrate this.	Section will be re-written.
Susanne Kadner (Technical Support Unit)	9	53	4	53	18	-	-	-	CDM is a complex topic - should it really be introduced here, then a more specific and proper scientific assessment (references!) regarding ist benefits and problems, in particular with respect to SD and RE, needs to be provided. Also, cross-reference to Chapter 11 needs to given.	Section will be re-written. New text will include brief assessment of CDMs and how they have promoted SD and RE projects.
Susanne Kadner (Technical Support Unit)	9	53	25	-	-	-	-	-	Reference?	Section will be re-written.
Susanne Kadner (Technical Support Unit)	9	53	45	54	8	-	-	-	This paragraph should not be found in a synthesis section but rather be moved into appropriate other chapter sections (such as 9.4.2 or 9.5) and be expanded to provide an interesting, scientifically based (references!!) assessment of relevant initiatives in developing countries.	Section will be re-written.
United States (U.S. Department of State)	9	53	23	-	-	-	-	-	Data are given for 1995-98,. These should be updated. Also, the end of this sentence runs into the beginning of the next sentence. The structure of that next sentence must be revised, both at its beginning, and also near the end: "but is hidden..." ("is" does not seem to be congruent with the plural "subsidies").	Section will be re-written.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Garcia Javier (Garcia Monge Consultant)	9	53	4	53	5	9.6.3	-	-	It should important to highlight that in practice, CDM has not been so efective to promote RE projects. Problems related to the high CO2 conversion rates for methane, nitrous oxides and man-made gazes make less atractive to invest on RE than on projects with less investment requirements and higher CO2 eq reductions. Additionally, the high transaction costs and the stringent conditions to demonstrate additionality make very difficult to some RE projects, specially the smallest ones, to get help from de CDM.	Section will be re-written. New text will include brief assessment of CDMs and how they have promoted SD and RE projects.
Brazil (Ministry of Science and Technology)	9	54	25	-	-	-	-	-	Verify the text ""...and Jochem, 2005)3"" (see footnote 3 - page 54)	Section will be re-written.
Gregory Keoleian (University of Michigan)	9	54	25	-	-	-	-	-	3	Section will be re-written.
Gustavo Nadal (Fundacion Bariloche)	9	54	33	54	34	-	-	-	The Biofuels promotion law in Argentina requires EIA only to biodiesel production facilities. The law does not cover the sustainability assessment of the rest of the biodiesel energy chain, where most of the impacts occur. These are partially covered by other general laws of Argentina. However, weak law enforcement is a serious limitation.	Noted.
IBRAHIM ABDEL GELIL (Arabian Gulf University)	9	54	26	-	-	-	-	-	This OECD reference seems not to have an exhaustive list of policies and countries, this should be mentioned in the text as some other countries, which were not mentioned in the text have similar policy instruments.	Section will be re-written.
Oyvind Christophersen (Climate and Pollution Agency)	9	54	26	-	40	-	-	-	We think that the use of bullet points o.a. would enhance the readability of this paragraph.	Section will be re-written.
Susanne Kadner (Technical Support Unit)	9	54	26	54	40	-	-	-	The purpose of this section is not clear - it is provided at the end of the chapter section without any further explanations. If this is indeed a collection of RE policies that were specifically analysed with respect to SD then this should have been introduced in section 9.5 and deserves an extensive discussion.	Section will be re-written.
Brazil (Ministry of Science and Technology)	9	55	20	55	21	-	-	-	Correct the number of the ""tables 1 and 2"" (see pages 18 (table 9.1) and 21(table 9.2))	Section will be re-written. Tables will be removed.
Germany (Federal Ministry for the Environment, Nature Conservation and Nuclear Safety)	9	55	14	55	15	-	-	-	The current text says that global emissions need to peak within the next decade. This could be misunderstood. AR4 actually specifies until 2015 in its table and if at all, the text should read "within this decade, likely by 2015". See lowest stabilisation category in IPCC AR4 SYR Table 5.1.	Section will be re-written.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Gustavo Nadal (Fundacion Bariloche)	9	55	1	55	4	-	-	-	Many rural areas of developing countries present unmet energy requirements combined with poor end use efficiency, due to technology constraints and availability of energy sources. Development will hopefully bring higher end use energy intensities in order to cover these unmet energy requirements as well as higher efficiencies. Thus, in overall terms energy supply would have to rise in these cases, be it from RE or conventional sources.	Noted.
Roberto Acosta Moreno (CITMA)	9	55	14	-	-	-	-	-	I suggest to add at the end of the sentence that finishes with to 2 degrees C "" or below"". A large group of Parties to the Convention are requesting to limit the temperature increase to 1, 5 and 1 degree C.	Section will be re-written.
Richard Taylor (International Hydropower Association)	9	55	20	55	23	9.7.	-	-	Insert ""There are fundamental methodological challenges with the LCA approach which limits the utility of Tables 1 and 2 (And Appendix A from which they are derived) after ""energy."" and before ""The"".	Section will be re-written. Tables will be removed.
Rainer Walz (Fraunhofer Systems and Innovation Research)	9	61	15	-	-	-	-	-	the name of the author in the list of references is not correct: it must read Jacobsson, S	Noted.
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	9	69	1	86	3	-	-	-	Design of tables in Appendix A should be reconsidered in order to make them more reader-friendly (e.g. not having the upper table-row(s) on one and the rest on the next page). Units should be consistent within the tables (e.g. not the case table on pp. 71/72 (Lt/MWh; m3/MWh; m3/GJ;...)), as it makes comparisons between the RES concerning one aspect more difficult. Appendix does not give an answer to the general but nonetheless crucial question how the different environmental and/or social economic questions should to be ranked from an SD point of view as they might often be competing.	Appendix will be removed.
Babacar Sarr (ENERTEC-SARL)	9	69	-	86	-	-	-	Appendix A	Should be reformated so table header will not stand alone in one page.	Appendix will be removed.
Emanuela Menichetti (Observatoire Méditerranéen de l'Energie)	9	69	-	76	-	-	-	Appendix A	What are the "minor emissions during operations" referred to solar technologies? Why are there "minor emissions" for PV, and no emissions for ocean and wind? Since the operation phase is part of the lifecyle, you should better say: full lifecycle emissions are more important. Such huge range of variation in the selected references (e.g. 9.4-300 gCO2eq/kWh) should be explained	Appendix will be removed.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Gregory Keoleian (University of Michigan)	9	69	-	-	-	-	-	Appendix A	can add several relevant references on willow biomass energy - a DOE program to foster rural economic development in the US; following references highlight provide key data on economics, jobs, life cycle energy and emissions, land requirements: Keoleian, G.A. and T.A. Volk. "Renewable Energy from Willow Biomass Crops: Life Cycle Energy, Environmental and Economic Performance", Critical Reviews in Plant Sciences, (2005) 24:385¿406. Heller, M.C., G.A. Keoleian, T.A. Volk, and M.K. Mann "Life cycle assessment of a willow agriculture and biomass energy conversion system", Biomass and Bioenergy (2003) 25: 147-165. Heller, M. and G. Keoleian "Assessing the sustainability of the U. S. food system: A life cycle perspective", Agricultural Systems (2003) 76: 1007-1041.	Appendix will be removed.
Steve Sawyer (Global Wind Energy Council)	9	69	-	69	-	-	-	Appendix A	for each technology, it should be clearly delineated which emissions are due to operation, and which are due to life cycle analyses, for both RE and conventional technologies	Appendix will be removed.
Denis Aelbrecht (EDF)	9	70	-	-	-	-	-	Appendix A	Hydro column : meaning of sentence "few reservoirs of global total" unclear	Appendix will be removed.
Emanuela Menichetti (Observatoire Méditerranéen de l'Energie)	9	70	-	-	-	-	-	Appendix A	Ocean energy: what does "neutral" mean?	Appendix will be removed.
Greece (National Observatory of Athens)	9	70	-	86	-	-	-	Appendix A	Change legend in left upper cell in all pages from "selected environmental SD" to "selected SD aspect". The Table includes aspects of all SD dimensions. Not only of the environmental one.	Appendix will be removed.
Jyri Seppälä (Finnish Environment Institute)	9	70	-	-	-	-	-	Appendix A	In Appendixes it is important to show same values and sources used in the previous Chapters. For example, in Appendix A there are no same sources compared to the sources used in Table 7.3.	Appendix will be removed.
Jyri Seppälä (Finnish Environment Institute)	9	70	-	-	-	-	-	Appendix A	It is unclear if CO2 eq values include life cycle effects or not. See life cycle GHG emissions for different RE sources from Manfred Lentzen (2008, Energy Conversion and Management 49).	Appendix will be removed.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	9	70	-	-	-	-	-	Appendix A	Under "Emissions and Air Quality" of bioenergy: What are sustainable GHG emission?!	Appendix will be removed.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Richard Taylor (International Hydropower Association)	9	70	-	-	-	-	-	Appendix A	Table ""Emissions and Air Quality"" Reword as follows: ""Currently no scientific consensus on how to ascertain the GHG status of reservoirs - consideration of net GHG emissions is required. Site specific gross GHG emissions of some reservoirs, few out of the global total, is as follows: 3-27 in Europe (Dones, Heck and Hirschberg, 2003)"". Comment: Figures and sources should state their geographic limitations or be deleted. Note that Evans et al's figure is for LCA not gross GHG emissions of reservoirs.	Appendix will be removed.
Richard Taylor (International Hydropower Association)	9	70	-	-	-	-	-	Appendix A	Table ""Emissions and Air Quality"" Reword as follows: ""Lifecycle emissions problematic to calculate for hydro due to the technology's longevity, multiple functions and reliability of supply. An indicative LCA for hydro are as follows: 41 (Evans, Strezov, and Evans, 2009)"". Comment: Figures and sources should state their geographic limitations (if applicable) or be deleted. Note Varun's have been deleted as they only refer to a small handful of sites, mainly in India.	Appendix will be removed.
Emmanuel Branche (Electricité de France)	9	71	-	-	-	-	-	Appendix A	Column hydropower: the water footprint figure 22 m3/GJ is a wrong number not representative of hydro (based on DHI figures from a semi-arid example in US). The average in french reservoirs is around 1.3 m3/GJ, the same as the Three-Gorges plant in China. The water footprint of hydropower is substantial. This value is mainly caused by evaporation of water from reservoirs required to generate electricity. However regarding the whole water cycle, there is no losses due to evaporation! Such values are not consistent with current statements (IEEE, 2010 : IEEE Spectrum Special Report on Water vs. Energy) and (World Bank, 2009 : WB "We must take account of how our water footprint is impacting on the rest of the world,.... says the World Bank increased funding for large hydropower projects in 2009. ...)	Appendix will be removed.
Emmanuel Branche (Electricité de France)	9	71	-	-	-	-	-	Appendix A	It is difficult to understand and to compare values, units are different, "definition of concept" are not defined and for instance water footprint is a today controversial concept amoung scientists and sources should be carefully used (cf. comment: Column hydropower: the water footprint figure 22 m3/GJ is a wrong number not representative of hydro (based on DHI figures from a semi-arid example in US). The average in french reservoirs is around 1.3 m3/GJ, the same as the Three-Gorges plant in China.)	Appendix will be removed.
Emanuela Menichetti (Observatoire Méditerranéen de l'Energie)	9	72	-	-	-	-	-	Appendix A	The water consumption should be expressed always in the same unit in order to allow for a better comparison. Please express everything in m3/MWh as indicated in the title	Appendix will be removed.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Richard Taylor (International Hydropower Association)	9	72	-	-	-	-	-	Appendix A	Table ""Water Quantity and Quality"" Comment: Figures and sources should state their geographic limitations or be deleted. Rio Carillo's only relate to Spain. It is unclear which geographies Gerbens-Leenes et al's figures apply to. The water footprinting of hydropower is problematic for the following reasons: (1) Evaporation should not be seen as a ¿use¿ of water. Any evaporated water will be returned to the hydrological cycle in form of rainfall (2) The importance of net evaporation: Any calculation done simply by measuring the gross evaporation of a hydropower reservoir without deducting the quantity of water evaporating from the same area prior to the reservoir construction, neglects the fact that evaporation occurs in any water body or vegetation. If the effect of a reservoir on the hydrological budget of an area is to be measured correctly, it is essential to consider net evaporation: evaporation from the surface of the reservoir minus evaporation and evapotranspiration before impoundment or, if no longer measureable, in climatically similar settings. (3) Contr	Appendix will be removed.
Richard Taylor (International Hydropower Association)	9	72	-	-	-	-	-	Appendix A	Table ""Water Quantity and Quality"" Delete ""Release of sediment from water sometime may cause downstream erosion 0.036 m3/kWh (Evans, Strezov, and Evans, 2009)"". Comment: Evans et al does not contain any references to this matter.	Appendix will be removed.
Denis Aelbrecht (EDF)	9	74	-	-	-	-	-	Appendix A	all column : units need to be homogeneized accross and within all columns, the current use of various units make comparisons impossible. Tha fact that in several instances both "energy/area" and "energy/area/year" and "Power/area" are used tend to show that this indicator is not appropriate for cross technology comparisons. The problem is that some sources have a clear annual production (biomass), in which case the "area/energy produced" makes sense, while all the others are better qualified by an "energy density", or "power/area" e.g. power density. The "energy produced/area" greatly depends on the life expectancy of the scheme, which is often unknown (hydropower, nuclear, wind...). We suggest adding explanations on the meaning of this(these) indicator(s), and how it should be used.	Appendix will be removed.
Emanuela Menichetti (Observatoire Méditerranéen de l'Energie)	9	74	-	-	-	-	-	Appendix A	Land occupation: Please, use always the same reference unit (here you express land occupation per kW installed or GWh produced)	Appendix will be removed.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Richard Taylor (International Hydropower Association)	9	74	-	-	-	-	-	Appendix A	Land and Soil: Comment: Figures and sources should state their geographic limitations or be deleted. Evans et al relate to Turkey specific and North America specific sources. Tampier relates to North America and expressly states at p. 187 ""Average of a random sample of 50 large hydropower Hydro reservoirs in the US, ranging from 482 ha to 763,000 ha. The amount of land flooded depends on the particular topography of the region"". Fthenakis relates to North America-specific sources.	Appendix will be removed.
Denis Aelbrecht (EDF)	9	75	-	-	-	-	-	Appendix A	Hydro : these possible hazardous wastes are not generated by the reservoir itself, they are coming from the watershed and stored in the sediments. They would have transited further downstream anyway in absence of a dam.	Appendix will be removed.
Emanuela Menichetti (Observatoire Méditerranéen de l'Energie)	9	77	-	-	-	-	-	Appendix A	Change of albedo: you should compare to the radiative forcing avoided by substituting fossil fuels	Appendix will be removed.
Emanuela Menichetti (Observatoire Méditerranéen de l'Energie)	9	77	-	-	-	-	-	Appendix A	Large areas occupied by installations; this contradicts what you have written before (see also page 74)	Appendix will be removed.
Steve Sawyer (Global Wind Energy Council)	9	77	-	77	-	-	-	Appendix A	Column "wind" - visual impacts (exist for all power plants); there is nothing in the literature to indicate that infrasound from wind turbines has any health effects.	Appendix will be removed.
Denis Aelbrecht (EDF)	9	78	-	-	-	-	-	Appendix A	What are the assumptions that lead to local NOx, and SOx emissions for RE such as wind, solar and hydro ? For consistency and comparison, values should be provided for conventional fossil fuel technologies (I assume that ranges are available for those technologies)	Appendix will be removed.
Richard Taylor (International Hydropower Association)	9	78	-	-	-	-	-	Appendix A	Local Emissions: Comment: Figures and sources should state their geographic limitations or be deleted. Pehnt's relates specifically to Germany.	Appendix will be removed.
Steve Sawyer (Global Wind Energy Council)	9	78	-	78	-	-	-	Appendix A	I don't know where the 'local' emissions of SO2, NOX, CH4, etc from wind or pv comes from, as there are none. These should be treated the same as nuclear, i.e., 'no emissions during operation'. Or, if we're doing LCA, then do it for all technologies.	Appendix will be removed.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	9	79	-	80	-	-	-	Appendix A	Refer the comment on Chapter9, table9.3	Appendix will be removed.
Denis Aelbrecht (EDF)	9	81	-	-	-	-	-	Appendix A	Unit in the left column should read "US$/MWh", not "US/MWh". Why these values are printed in this appendix? All costs should be consistent with the other costs presented in each technology chapter of this special report, and in particular chapter 10	Appendix will be removed.
Denis Aelbrecht (EDF)	9	81	-	-	-	-	-	Appendix A	Why is nuclear considered as "subsidized"? Same for Gaz and coal. Isn't that the same for the other RE sources in this table, although not mentioned? What are the peer-reviewed references for those statements ?	Appendix will be removed.
Denis Aelbrecht (EDF)	9	83	-	-	-	-	-	Appendix A	price of installed kW seems quite high for large hydro. Current large developments are more in the range of 800 to 1300 USD/kW. Otherwise refer to chapter 10 of this special report which provides different investment cost/kW	Appendix will be removed.
United States (U.S. Department of State)	9	97	6	-	-	-	-	-	even what might be called large hydro that is included as part of large irrigation projects have important roles in rural development, directly and indirectly, so inclusion of hydro here is misleading.	Comment refers to Technical Summary which will be re-written based on re-drafted chapter.
Japan (the Japanese Ministry of Foreign Affairs)	9	99	38	-	-	-	-	-	(9.4.8) should be (9.5).	Comment refers to Technical Summary which will be re-written based on re-drafted chapter.
Greece (National Observatory of Athens)	9	101	18	101	21	-	-	-	At which level it is unlikely to reduce emissions, at a specific plant level or at utility / national level? A utility may decide to invest in RE instead of non-RE abatement technologies and the final result could be positive at a more aggregate level (e.	Comment can not be located in Chapter 9 text.
United States (U.S. Department of State)	9	102	15	102	16	-	-	-	It is hard to see from Figure TS 10.1, but it appears that both the ranges and the median for hydropower overlap with both wind and solar in 2050 -- so why relegate it to a lower tier?	Comment can not be located in Chapter 9 text.
United States (U.S. Department of State)	9	102	20	102	21	-	-	-	The statement that growth in hydropower is limited is not justified. Elsewhere in the report, it says that there is technically feasible undeveloped resources to increase existing hydro 5 times. Future development depends on energy policies and competin	Comment can not be located in Chapter 9 text.
Jan Steckel (PIK)	9	-	-	-	-	9.1	-	-	The introduction is in my view significantly too long and too detailed. It might be beneficial for the general readability and clarity of the report too merge the basic aspects with section 9.2	Introduction will be shortened.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Michael Hübler (Potsdam Institute for Climate Impact Research)	9	-	-	-	-	9.1	-	-	The definition of sustainable development is unnecessarily repeated in the 3rd paragraph.	Noted.
Michael Hübler (Potsdam Institute for Climate Impact Research)	9	-	-	-	-	9.1	-	-	The Executive Summary is a good introduction. It could provide more specific, new and solution oriented information.	The Executive Summary is a stand-alone document and should not serve as a introduction alone. Hence, it will be rewritten, providing better information regarding the key findings of the chapter.
Michael Hübler (Potsdam Institute for Climate Impact Research)	9	-	-	-	-	9.1	-	-	The first paragraphs of the Introduction are a direct repetition of the Executive Summary.	Noted.
Susanne Kadner (Technical Support Unit)	9	-	-	-	-	9.1	-	-	This section needs to be rewritten as there is currently no coherent flow in the text. Some parts seem to have been taken from the introduction to Chapter 12 in the AR4 but were not sufficiently re-worked to fit into the new context. Suggestion is as follows: flow of arguments should start with introducing SD concepts; followed by the diverse range of SD initiatives, and then presenting the development of SD throughout the different IPCC reports including clear and chapter-specific references. A suggestion for how section 9.1 may be restructured can be found in the submitted addendum (SRREN_Draft2_Review_Kadner_Susanne_addendum.doc).	Noted.
Frank Krysiak (University of Basel)	9	-	-	-	-	9.1	-	-	The introduction is rather long. I don't think that this much information on recent history of the SD concept is necessary.	Introduction will be shortened.
Gregory Keoleian (University of Michigan)	9	-	-	-	-	9.1	-	-	World Energy Assessment (2001,2004) is very relevant to this section and should be highlighted. Also, would be useful to cite IEA; for example, World Energy Outlook 2006 ("The world is facing twin energy-related threats: that of not having adequate and secure supplies of energy at affordable prices and that of environmental harm caused by consuming too much of it.") - also is a more correct way of framing the issues (see my comment 2).	Noted.
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	9	-	-	-	-	9.1.1	-	-	Again, there is no precise and felicitous definition of the term "two-way relationship between SD and RE". Nevertheless, this would be useful.	Noted.
Daniel Bouille (Bariloche Foundation)	9	-	-	-	-	9.1.1.	-	-	The dimensions included in section 9.1.1. could be complemented by additional ones like: efficiency, risk of obsolescence, flexibility and coexistence (Viability). In relation to Sustainability: suitability and urgency, effectiveness and efficiency, resilience, diversification, environmental protection. See attached document for explanation.	Noted.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Susanne Kadner (Technical Support Unit)	9	-	-	-	-	9.1.2	-	-	Statements in this section need to be supplemented by references!!	Accepted.
United States (U.S. Department of State)	9	-	-	-	-	9.1.2	-	-	Discussion should focus on measures that exist.	Noted.
IBRAHIM ABDEL GELIL (Arabian Gulf University)	9	-	-	-	-	9.1.3	-	-	again this is redundancy of section 1.4	Noted. Redundancies will be removed.
Susanne Kadner (Technical Support Unit)	9	-	-	-	-	9.1.3	-	-	The section is titled "Barriers and Opportunities" but the latter are not discussed. Particular attention should be paid to avoid redundancies with Chapter 1 (e.g. section 1.4.7)	Noted. Redundancies will be removed.
Susanne Kadner (Technical Support Unit)	9	-	-	-	-	9.1.3	-	-	This section needs to be updated based on the agreement made in the Oslo-Oxford Accord (section 3.2.3). First of all, a reference to Chapter section 1.4 should be made, which introduces a list of general barriers applicable throughout the SRREN and their definitions. It may even help the discussion to briefly list them again. Chapter 9 can then introduce barriers specific to the context of SD, such as governance /institutional, social / distributional, resource use transitions for realizing SD potentials.	Noted.
Frank Krysiak (University of Basel)	9	-	-	-	-	9.2	-	-	This section is strongly focussed on developing countries. However, much of the action on RE takes place in industrialized countries.	Geographical balance will be improved.
Denis Aelbrecht (EDF)	9	-	-	-	-	9.2	-	-	very good section!	Noted.
Greece (National Observatory of Athens)	9	-	-	-	-	9.2	-	-	The whole section refers only to developing countries. In that case this should also be stated in the title. Otherwise, devote 9.2.1 to developing and 9.2.2 to developed countries by accordingly change the subtitles.	Geographical balance will be improved.
Jan Steckel (PIK)	9	-	-	-	-	9.2	-	-	I do not totally understand the choice of the subchapters. I would suggest to start the section with the interrelation of energy and development first, before gradually introducing the role of sustainable development and renewables	Noted. Suggestion will be considered.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
United States (U.S. Department of State)	9	-	-	-	-	9.2	-	-	This is an example of where the section does not flow between the paragraphs and information is presented, but not always with appropriate context, explanation and discussion. Due to this, the major points of this section are very difficult for the reader to come away with. An example of stating information without proper discussion and context is the last sentence on page 10 that states, "Attempts need to be made to address such constraints including those faced with the use of solar water cookers in some parts of Africa." What constraints were faced in this project? Were they overcome? What happened? This is just an example where the point that the author was trying to make did not come through due to lack of context, explanation and/or discussion.	Accepted. Presentation of arguments and evidence will be improved.
Brazil (Ministry of Science and Technology)	9	-	-	-	-	9.2.1	-	-	Section is directed to developing countries, but sustainable development should also be addressed to developed countries. This can be stated at the beginning of the section.	Noted.
Susanne Kadner (Technical Support Unit)	9	-	-	-	-	9.2.1	-	-	The majority of this section discusses issues related to access to energy. Hence, this should be covered under section 9.2.3 "Human Settlement and Energy Access", which currently lacks some of this valuable information.	A whole new section on energy access will be included to discuss this topic more thoroughly.
Thomas Wilbanks (ORNL)	9	-	-	-	-	9.2.1	-	-	are the only important connections through rural development and the roles of women? This illustrates one kind of connection, but it lacks a larger context.	The new text will cover gender aspects and MDGs.
United States (U.S. Department of State)	9	-	-	-	-	9.2.1	-	-	This section needs to deal with the system. For example, speak more about the complexities of maintaining equipment like batteries -- this is a constant problem in the communities in which we work. Even when very little maintenance is required, things like these batteries fall into disrepair almost immediately.	The technical chapters deal with the system-level info. This chapter can't get lost in the details.
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	9	-	-	-	-	9.2.2	-	-	Title of section "Past and present roles of renewable energy for development" does not go with its content because it describes more the patterns of energy use in developing countries in general than the role of RE within these countries.	Re-drafted chapter addresses the role of RE in developed and developing countries.
Susanne Kadner (Technical Support Unit)	9	-	-	-	-	9.2.2	-	-	This section is unfocused and provides only one references for the number of very general statements that are made. It should either provide a clear analyses of what is announced in the title "Past and present roles of renewable energy for development" or be removed altogether.	Chapter will be completely re-drafted to address these problems.
Thomas Wilbanks (ORNL)	9	-	-	-	-	9.2.2	-	-	Not clear what the message is here: that RE is the energy source of the past, displaced as total energy needs multiply with development? -- not clear how this is a contribution to the chapter.	Section will be removed in re-drafted chapter.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Susanne Kadner (Technical Support Unit)	9	-	-	-	-	9.2.3	-	-	Box 9.1. gives a very good and succinct description on the importance of access to energy. However, considering the rest of the information that is presented in section 9.2.3, the box-text should not be provided separately but rather be an integral and essential part of the overall text.	In re-drafted chapter, a whole new section on energy access will be included to discuss this topic more thoroughly.
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	9	-	-	-	-	9.2.4	-	-	Section discusses its main subject only in a shallow manner. Either go into further detail or leave out the entire section.	Accepted. This section will be removed and integrated with other sections.
Susanne Kadner (Technical Support Unit)	9	-	-	-	-	9.2.4	-	-	This could be an interesting section but more case studies need to be presented.	Accepted. This will be dealt with through restructuring.
Susanne Kadner (Technical Support Unit)	9	-	-	-	-	9.2.5	-	-	This section does not adequately address the important topic of energy security and needs to be expanded! Starting point could be the definition provided in Chapter section 12.2.4.1 of the AR4 and develop it then in the context of REs.	Accepted. This is being dealt with in the rewrite (2 separate sections)
United States (U.S. Department of State)	9	-	-	-	-	9.2.5	-	-	Section 9.2.5 needs to be expanded to make manifest the different ways in which energy security can be defined as an aspect of SD.	Accepted. This is being dealt with in the rewrite (2 separate sections)
Denis Aelbrecht (EDF)	9	-	-	-	-	9.3	-	-	this section gives a comprehensive list of potential impacts associated to each technology. It does however not provide systematic information on how common these impacts are. For instance, is the issue of subsidence associated with geothermy almost systematic, or anecdotic and limited to a few cases? How frequent are the birds and noise issues linked to wind farms? Similarly, the text does not reflect the huge diversity of situations for hydropower re. for instance GHG emissions, resettlement issues, habitats changes, etc... The probability of impacts, or their importance, should be somehow reflected in the text.	Technology specific impacts are covered in the respective technology chapters in detail. Chapter 9 will include a more synthesised version of these impacts (LCAs for GHG emissions and air pollutants, water consumption etc.) - however, it is not always possible to quantify these impacts. Where this is the case, they are described in a more qualitative manner.
Greece (National Observatory of Athens)	9	-	-	-	-	9.3	-	-	Problematic structure and organisation of content. Needs restructuring and drastic shortening. 9.3.1 is a huge introduction with two paragraphs, one for environmental and social and one for economic and social. A) Why social dimension is hidden behind the other two? B) the other subsections analyse only environmental impacts (land, air etc) that have already been shortly described in 9.3.1.1 C) why not a similar treatment to economic and social impacts presented in 9.3.1.2? Proposed structure: 9.3.1. Introduction, 9.3.2. Environmental impacts, 9.3.3. Economic impacts 9.3.4. Social impacts. In each subsection to include the corresponding tables and analysis of individual RE technologies.	Chapter will be completely re-drafted to address these problems.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Hiromi Takeuchi (Advanced Industrial Science and Technology)	9	-	-	-	-	9.3	-	-	The description in this part should summarize into a table. This trial may be effective to reduce pages.	Noted.
Jan Steckel (PIK)	9	-	-	-	-	9.3	-	-	Avoid doubling the information from the table(s) in the text	Tables will be removed in the re-drafted chapter.
Jan Steckel (PIK)	9	-	-	-	-	9.3	-	-	In the appendix a set of very detailed information is provided that should better and particularly in a significantly more understanable/accessible way presented in the text, e.g. graphically giving the ranges of LCA results for various technologies in one table.	Accepted. Comprehensive review of LCA literature will show results in a more accessible way!
Jan Steckel (PIK)	9	-	-	-	-	9.3	-	-	The social impacts are basically missing in this chapter	Chapter will be completely re-drafted to address these problems.
Supachai Panitchpakdi (United Nations Conference on Trade and Development)	9	-	-	-	-	9.3	-	-	As a reader, it is difficult to follow the logical flow of this section. This section needs to be re-organized. For example, the section explains Land (9.3.2), Air (9.3.3), and Water (9.3.4) as a source of RE, but it suddenly changes the subject to the impact of RE in following subsection Ecosystems (9.3.5), Human Health (9.3.6), and Built Environment (9.3.7).	Chapter will be completely re-drafted to address these problems.
Susanne Kadner (Technical Support Unit)	9	-	-	-	-	9.3	-	-	It appears strange that throughout the entire section no interpretation of the data provided in the Appendix table is attempted.	Accepted. Comprehensive review of LCA data will provide an interpretation of the results shown.
Susanne Kadner (Technical Support Unit)	9	-	-	-	-	9.3.	-	-	After having read the entire section, it is still not clear based on which distinction the impacts are discussed in Chapter 9 and the corresponding sections in the technology chapters. Taking section 9.3.5 as an example, the impacts presented are line with what is presented in the technology chapters, references are provided but the detail of the discussion is of course far less detailed compared to what the technology chapters can provide. This problem has already been commented on in previous drafts of Chapter 9 but no solution has been found yet. Liaising with the technology chapters is therefore of paramount importance to agree on a useful strategy.	Accepted - redundancies need to be removed.
Susanne Kadner (Technical Support Unit)	9	-	-	-	-	9.3.1	-	-	This section needs to be merged with the sections 9.3.2 - 9.3.7 to avoid redundancies. Also, Tables 9.1. and 9.2 should complement the issues discussed in sections 9.3.2 - 9.3.7.	Accepted - redundancies need to be removed.
Michael Hübler (Potsdam Institute for Climate Impact Research)	9	-	-	-	-	9.3.1.1	-	-	This section may be improved concerning contents and their order and style (not telegram style).	Accepted.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	9	-	-	-	-	9.3.1.1	-	-	The description of evironmental and social effects suddenly turns into a descriptionof impacts per energy type; a sentence to introduce this chage of focus would greatly improve the flow of the text.	Chapter will be completely re-drafted to address these problems.
Supachai Panitchpakdi (United Nations Conference on Trade and Development)	9	-	-	-	-	9.3.1.1	-	-	The subtitles (in Bold and Italic) between pages 14 and 17 should not be cited one after another. It should be explained which ones are RE, from which the impacts come from, and which ones are the impacts that RE create. Currently, the text does not explain which categories the titled topics belong to. The readers, therefore, do not understand the meaning of subtitles until they see the Table 9.1. (page 18).	Chapter will be completely re-drafted to address these problems.
Thomas Wilbanks (ORNL)	9	-	-	-	-	9.3.1.1	-	-	there is some literature on environmental impacts of materials production for such materials-intensive RE technologies as OTEC and solar thermal energy; note also issues related to the expected use of genetically modified organisms for bioenergy (I didn't see this issue, although I might have missed it) and the fact that ocean systems have impacts at the point of power supply linkage with land energy distribution systems.	Noted.
Ichiro Maeda (Federation of Electric Power Companies, Japan)	9	-	-	-	-	9.3.1.2	-	-	Suggest mentioning the necessity of subsidies and their potential economic impacts (employment, over-cost, etc.) of RE. Reference file: SRREN_Draft2_Review_Maeda_Ichiro_VanErp091006GabrielCalzadaReport_02.pdf	Accepted. Subsidies discussion will be included in re-drafted chapter.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	9	-	-	-	-	9.3.1.2	-	-	This whole section focuses too much on RE generation costs and their reduction potential (which is addressed in other chapters in much more detail anyway) and too little on the economic and social impacts (positive and negative) that wide deployment of renewables might have on society. e.g. the potential increase of power prices or the pressure on public budgets trying to balance out the costs etc.	Chapter will be completely re-drafted to address these problems.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	9	-	-	-	-	9.3.2	-	-	All effects from one type of energy source should be addressed together - why is part of the issues around bioenergy addressed in the first, fourth and last paragraph of this section?	Chapter will be completely re-drafted to address these problems.
Susanne Kadner (Technical Support Unit)	9	-	-	-	-	9.3.2	-	-	This entire section needs a clear structure - land use, quality of land, land contamination, subsidence of land. All these aspects needs to be clearly introduced and then disucssed according to technology.	Chapter will be completely re-drafted to address these problems.
United States (U.S. Department of State)	9	-	-	-	-	9.3.2	-	-	The use of bolding the technologies is not consistent throughout this sections and is distracting. I would remove the bolding.	Accepted.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	9	-	-	-	-	9.3.2-9.3.7	-	-	As these sections discuss in more detail aspects/categories of social and environmental impacts of RE as referred to in table 9.1 (e.g. land, air, water, eco-systems,...), they should better be placed in direct proximity to this table. Perhaps this would also allow to shorten or leave out section 9.3.1.1. The reader might wonder why there are no detailed sections for categories of economic and social impacts of RE - analogue to 9.3.2.-9.3.7 for social and environmental impacts.	Chapter will be completely re-drafted to address these problems.Tables have been removed.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	9	-	-	-	-	9.3.3	-	-	Again, the effects of different energy sources are scattered along the whole section instead of being presented together (e.g. solar is dealt with in paragr 3 and again 5). Also, for all types of RE is repeated that they have a lower GHG footprint. Such a general statement could be made at the beginning of the section and not repeated for each RE type.	Chapter will be completely re-drafted to address these problems.
Susanne Kadner (Technical Support Unit)	9	-	-	-	-	9.3.3	-	-	This entire section needs a clear structure - GHG emissions, other emissions etc. and then list according to technologies.	Chapter will be completely re-drafted to address these problems.
United States (U.S. Department of State)	9	-	-	-	-	9.3.3	-	-	Again, refer to conclusion from technologies chapters consider criteria pollutants not just CO2 (NOX, SOX, PM)	In re-drafted chapter, assessment of GHGs is linked to technology chapters as the underlying databases are the same. Also, a section on air pollutant emissions (LCAs) will be included.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	9	-	-	-	-	9.3.4	-	-	Again, the effects of different energy sources are scattered along the whole section instead of being presented together	Chapter will be completely re-drafted to address these problems.
Susanne Kadner (Technical Support Unit)	9	-	-	-	-	9.3.4	-	-	This entire section needs a clear structure: water quantitiy, water quality (positive and negative impacts), hydrological regime...and then list according to technologies.	Noted.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	9	-	-	-	-	9.3.5	-	-	The potential impacts of ocean technology are being given disproportionate attention in this section - as if ocean energy had more adverse effects on ecosystems then large scale bioenergy feedstock cultivation or large scale hydro, which is obviously not the case. This aspect needs to be balanced out.	Accepted.
Susanne Kadner (Technical Support Unit)	9	-	-	-	-	9.3.5	-	-	This entire section needs a clear structure: loss of habitat, alteration of habitat, direct impacts on fauna and flora and then discuss according to technology	Discussion of different impacts on ecosystems and biodiversity will be structured in clearer way.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
United States (U.S. Department of State)	9	-	-	-	-	9.3.5	-	-	Section 9.3.5, biodiversity. This section needs to pay greater attention to the negative impacts of bioenergy crops on biodiversity. These are mentioned here, but not highlighted. Bioenergy crops may be able to help restore marginal or degraded land; but they also irreversibly degrade primary land. The loss of biodiversity from high quality land is greater than the recovery from marginal land. This needs to be clearly discussed. This section needs also to clearly discriminate between large reservoir and micro hydro; as well as centralized geothermal and ground source heat pumps.	We do not believe the first part of this comment is objectively valid. The existing text is balanced and normal agriculture can result in similar negative impacts as bioenergy production. Difference in impacts regarding hydro and geothermal should be included.
United States (U.S. Department of State)	9	-	-	-	-	9.3.6	-	-	Again use concrete data, for example environmental impacts depend on feedstock. For example burning biomass does emit volatile organic carbon and particulate matter that negatively impacts human health. Biomass is often cleaner than coal, but dirtier than natural gas.	Re-drafted chapter will address this aspect in the section on human health.
United States (U.S. Department of State)	9	-	-	-	-	9.3.7	-	-	Line 18-19 Example of sentence that adds nothing to the purpose of the document.	Accepted.
United States (U.S. Department of State)	9	-	-	-	-	9.3.7	-	-	Statement needs to be more data driven, be supported by literature, and do not be redundant	We don't know which statement this comment refers to.
Jan Steckel (PIK)	9	-	-	-	-	9.4	-	-	As the section is called ""implications of [...] pathways [...]"" I would expect the discussion to focus much more on scenario results, and their impacts on SD. A thorough discussion of different model results could significantly improve the section, including the results from EMF22 (Clarke, Böhringer and Rutherford (Eds) 2009, Energy Economics), ADAM (Edenhofer, Knopf, Leimbach, Bauer (Eds) 2010, Energy Journal) and RECIPE (Edenhofer, Carraro, Hourcarde, Neuhoff (Eds.). A link to scenarios calculated in CH10 could be very useful, if applicable.	Accepted. References will be included in re-drafted section.
Susanne Kadner (Technical Support Unit)	9	-	-	-	-	9.4	-	-	Numerous comments that were made to section 9.5 in the FOD and that were accepted have not been incorporated into the new SOD section 9.4!!!	Noted.
Thomas Wilbanks (ORNL)	9	-	-	-	-	9.4	-	-	a very important section, but messages sort of get lost in the details…	Addressed through re-write.
United States (U.S. Department of State)	9	-	-	-	-	9.4	-	-	First paragraph is provocative and inaccurate. Lines 3-5 are good. 15-18 do not add relevant information. 24-39 poorly stated and has value statements not relevant to the purposes of the document.	Addressed through re-write.
Emanuela Menichetti (Observatoire Méditerranéen de l'Energie)	9	-	-	-	-	9.4.1	-	-	Additional future energy scenarios that it would be worth including are: the IEA Blue Map scenario (IEA, ETP 2008 and ETP 2010), Greenpeace and EREC (2008), European Climate Foundation (2010)	Suggestions noted.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Emanuela Menichetti (Observatoire Méditerranéen de l'Energie)	9	-	-	-	-	9.4.1	-	-	I would suggest using a more recent reference than Martinot 2002. The GSR 2010 is available since July 2010 at http://www.ren21.net	These trends are better coverd in Chapter 1 and 11.
Jan Steckel (PIK)	9	-	-	-	-	9.4.1	-	-	The scenario literature is - if at all - only superfically covered	Accepted.
Michael Hübler (Potsdam Institute for Climate Impact Research)	9	-	-	-	-	9.4.1	-	-	Specific examples are given, but different types of scenarios do not become clear to me concerning their basic assumptions and the underlying socio-economic stories and their consequences for future behavior.	Noted. Re-write will change focus of discussion substantially.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	9	-	-	-	-	9.4.1	-	-	This section is not really about "Future scenarios of renewables" but more about consideration of determining future deplyment of renewables. The title should be adjusted to reflect this.	To be corrected in re-write.
United States (U.S. Department of State)	9	-	-	-	-	9.4.1	-	-	Section 9.4.1. Attempts to reduce GHGs must account for strict water limitations. Some RE strategies provide this, some don't. Some decarbonisation strategies provide this. Some don't. It is critically important that 'backcasting' account for the 3 dimensions of carbon, water, and economic development.	Noted.
Gustavo Nadal (Fundacion Bariloche)	9	-	-	-	-	9.4.2	-	-	More reference could be made here to the role and challenges in developed countries	IAM analysis in re-write will not specifically differentiate between developed and developing countries but aim to identify how the different SD criteria (which each have a differerent relevance for developed and developing countries) are represented.
Jan Steckel (PIK)	9	-	-	-	-	9.4.2	-	-	Many different thoughts, not at all well strucutured.	Chapter will be completely re-drafted to address these problems.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	9	-	-	-	-	9.4.2	-	-	Again an inappropriate section title: the discourse here differentiates developed and developing countries as a group, there is very little regional differentiation and where there is it is biased (e.g. most examples presented are from Japan); the title should be adapted to reflect this. Furthermore, no obvious "development pathway" is consistently addressed on this section, which is again a set of issues presented in an incoherent and illogical sequence.	Chapter will be completely re-drafted to address these problems.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
United States (U.S. Department of State)	9	-	-	-	-	9.4.2	-	-	Section 9.4.2, page 33, lines 4-8: Suggest deleting lines 4-8. Entire section is problematic and too long. Example of inappropriate normative interpretation. Stick with data and objective statement of facts. Re-phrase to make report equally applicable to developed and developing countries. It may be useful to compare case studies of Indonesia, China, Brazil and India as well as other nations representative of the spectrum of comparable natural resource capabilities. See UNCSD 14 for best practices and examples. Highlight the diversity of RE integration solutions.	Chapter will be completely re-drafted to address these problems.
Jan Steckel (PIK)	9	-	-	-	-	9.4.3	-	-	This section superficially describes options but no pathways	Accepted. The entire section will be re-written and the replacement text addresses these concerns.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	9	-	-	-	-	9.4.3.1	-	-	The section hardly describes a 'development pathway" for RE in the built environment, but merely presents some examples of low energy buildings, which includes energy efficinecy measures as well, and some countries' plans to reduce the energy use of buildongs.	Accepted. The entire section will be re-written and the replacement text addresses these concerns.
United States (U.S. Department of State)	9	-	-	-	-	9.4.3.2	-	-	Section 9.4.3.2. Line 4-7 page 38: Just because a fuel is made from something non-edible does not mean it does not compete with food. Food competition comes from the economics of land use. Cross-reference to technical biofuels chapter.	Accepted. The entire section will be re-written and the replacement text addresses these concerns.
United States (U.S. Department of State)	9	-	-	-	-	9.4.3.2	-	-	Section 9.4.3.2. The concept of promoting the development of alternative fuels needs to be refined. It is not sufficient to promote alternative fuels. It is important to note that promotion of alternatives fuels needs to focus on fuels that have lower lifecycle carbon and water impacts than what they are replacing. If not, then counterproductive policies can be justified as being an 'alternative fuel'. Alternative is not always better. Cross-reference to technical biofuels chapter.	Accepted. The entire section will be re-written and the replacement text addresses these concerns.
Jan Steckel (PIK)	9	-	-	-	-	9.4.3.3	-	-	Why is the industry sector not made explicit as a sub-section on its own?	Accepted. The entire section will be re-written and the replacement text addresses these concerns.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	9	-	-	-	-	9.4.3.3	-	-	Land use per se is not an end-use sector, this whole sub-section is irrelevant to the content of section 9.4.3; However, development pathways for land-based sectors, such as agriculture and forestry, should be addressed in more detail then they are in sub-section 9.4.3.4.	Accepted. The entire section will be re-written and the replacement text addresses these concerns.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Susanne Kadner (Technical Support Unit)	9	-	-	-	-	9.4.3.3	-	-	This section has a severe lack of references and needs a lot more work - statements are too general, not well referenced and contradict other parts in the report (e.g. with respect to land requirements of wind and the potential for multiple uses)	Accepted. The entire section will be re-written and the replacement text addresses these concerns.
United States (U.S. Department of State)	9	-	-	-	-	9.4.3.3	-	-	Line 20-24 adds nothing to the objective of the document	Accepted. The entire section will be re-written and the replacement text addresses these concerns.
United States (U.S. Department of State)	9	-	-	-	-	9.4.3.4	-	-	Section 9.4.3.4. The section on industry is not well considered. Industry has very few options for RE integration with current technology. Biomass supplies are neither large nor reliable enough to provide a dependable feedstock for process heat in most areas of the world. They are also more expensive to use than coal or natural gas, due to the inherently low energy content of biomass. Wind is not practical for most large scale manufacturing, as is solar. Industry needs water and energy to be co-located near population centers and transportation infrastructure. While there are examples of small-scale use of RE for industry; large scale RE integration is highly problematic ... if not impossible. Define what is meant by "end-use sectors". Line 8 Page 38: Do not cite corporate websites as authoritative resources.	Accepted. The entire section will be re-written and the replacement text addresses these concerns.
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	9	-	-	-	-	9.4.4	-	-	Section repeats many aspects of RES already presented before and, thus, could be shortened considerably.	Accepted. The entire section will be re-written and the replacement text addresses these concerns.
Jan Steckel (PIK)	9	-	-	-	-	9.4.4	-	-	I do not understand the meaning of this subsection. If it is the goal to condense information from the appendix, it should be done in section 9.3.; if it is about pathways I'd expect some scenario results etc.	Accepted. The entire section will be re-written and the replacement text addresses these concerns.
Susanne Kadner (Technical Support Unit)	9	-	-	-	-	9.4.4	-	-	This section is redundant and should be removed - all topics discussed are better covered in other Chapters (Chapter 8 for storage technologies, Chapter 2 for biomass) and section 9.3.1.	Accepted. The entire section will be re-written and the replacement text addresses these concerns.
Jyri Seppälä (Finnish Environment Institute)	9	-	-	-	-	9.5	-	-	It is difficult to understand what are the role of this section in this chapter? It is too long and there is a need to avoid the repetition between 9 and 11 Chapters. This section should be shortened by a total of 3-4 pages.	Accepted and will be addressed.
United States (U.S. Department of State)	9	-	-	-	-	9.5	-	-	Note what other bilateral donors such as USAID are doing in this field	Chapter 11 deals with specific financing aspects.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Jan Steckel (PIK)	9	-	-	-	-	9.5	-	-	The section in its current form shows overlaps with Chapter 11. In my eyes it is questionable to include a whole section on policies. One idea might be to include policies important for fostering SD in a broader section on barriers and opportunities.	Accepted and will be addressed.
Japan (the Japanese Ministry of Foreign Affairs)	9	-	-	-	-	9.5	-	-	The reader can understand that the examples provided are leading initiatives and efforts to promote reneawable energy but have refererence as to how they are significant in the context of "sustainable development."	Accepted and will be addressed.
Thomas Wilbanks (ORNL)	9	-	-	-	-	9.5	-	-	regarding policy frameworks, a fundamental point is that any shift in technology choices and portfolios means both winners and losers. Policy development and application is affected by vested interests of potential losers. To the degree that they can be engaged in the institutional responses rather than being left outside as bitter adversaries, the more likely is rapid progress.	Accepted and will be addressed.
United States (U.S. Department of State)	9	-	-	-	-	9.5	-	-	Section 9.5, introduction. This section is missing something, but it is difficult to say exactly what is missing. Basically, this section reads like a list of what is going on rather than a coherent statement of what objectives are being met (by whom), what objectives still need to be met, and the value of this work to measurable aspects of SD. What needs to be done to make energy more sustainable in both developed and developing nations? Acknowledging that RE is not the sole answer, what specific role does RE need to play? How can government best support technology development, expand education, and increase sustainability through a combination of R&D, education initiatives, and economic policies to support SD and sustainable energy goals? This section needs to provide answers ...or at least clearly define the questions.	Accepted and will be addressed. For example, in the opportunities section, different strategies/measures will be discussed that allow for a better integration or streamlining of these different targets.
United States (U.S. Department of State)	9	-	-	-	-	9.5	-	-	This section could also be improved by really pointing out the differences in policies between developing and developed countries.	Chapter 11 deals with this.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	9	-	-	-	-	9.5.1	-	-	The section lists policy instruments used to support RE but no special attention is given to the SUSTAINABLE DEVELOPMENT PATHWAY of RE. Neither targets, feed-in tariffs or obligation systems ensure per se that implementation of RE is done sustainably. At the same time, sustainability criteria for biomass, as an example of a policy instrument that does just that, are not even mentioned.	Re-write will ensure that SD aspect is clearly highlighted.
Susanne Kadner (Technical Support Unit)	9	-	-	-	-	9.5.1	-	-	Added value of section unclear as statements are too general and no thorough analysis on the topics mentioned is provided. Section should thus be removed or improved significantly!	Accepted.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
United States (U.S. Department of State)	9	-	-	-	-	9.5.1	-	-	Section 9.5.1, page 43, lines 6-8. Highly problematic statement because renewable energy subsidies are not linked to fossil fuel subsidies. Reference G20. Lines 12-14 are extraneous.	Accepted.
United States (U.S. Department of State)	9	-	-	-	-	9.5.1	-	-	Section 9.5.1. better to stick to the facts and data. No opinions or judgments should be mentioned. Page 42 Lines 29-33 are purely ideological.	Accepted.
Jan Steckel (PIK)	9	-	-	-	-	9.5.2	-	-	The section should be relocated to section 9.3	Section will be removed in re-drafted chapter.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	9	-	-	-	-	9.5.2	-	-	This section is more about methods to define and assess the impacts of RE on use of resources, so the title should be adjusted to reflect this or the content should be moved to section 9.6.2	Section will be removed in re-drafted chapter.
United States (U.S. Department of State)	9	-	-	-	-	9.5.2	-	-	9.5.2 is redundant with earlier sections such as 9.3	Section will be removed in re-drafted chapter.
United States (U.S. Department of State)	9	-	-	-	-	9.5.2	-	-	Section 9.5.2. lines 36-41 "very little impact" is a judgment statement. Provide data.	Section will be removed in re-drafted chapter.
Susanne Kadner (Technical Support Unit)	9	-	-	-	-	9.5.2.	-	-	It is not clear why a section on impacts of RE on resources should be covered in chapter subsection on policy frameworks!? Move to section 9.3.1.	Section will be removed in re-drafted chapter.
Jan Steckel (PIK)	9	-	-	-	-	9.5.3	-	-	This section has got a much too prominent role, it is too long and too detailed	Section will be removed in re-drafted chapter.
Susanne Kadner (Technical Support Unit)	9	-	-	-	-	9.5.3	-	-	More references are needed to support statements made in this section!	Section will be removed in re-drafted chapter.
Susanne Kadner (Technical Support Unit)	9	-	-	-	-	9.5.3	-	-	Section should differentiate better between developed and developing countries.	Section will be removed in re-drafted chapter.
Thomas Wilbanks (ORNL)	9	-	-	-	-	9.5.3	-	-	regarding public awareness, the recent experience in the US with 'green power' is an interesting and encouraging case.	Section will be removed in re-drafted chapter.
United States (U.S. Department of State)	9	-	-	-	-	9.5.3	-	-	This section should combine arguments from other pillars of sustainable development, E.g. economics, social and political. Suggest deleting lines 22-41 as it is a deviation from the path.	Section will be removed in re-drafted chapter.
Susanne Kadner (Technical Support Unit)	9	-	-	-	-	9.5.3.1	-	-	This section needs to be carefully cross-checked with chapter section 11.6.2.1 and table 11.1. Analysis should be more clearly focused on SD aspects to avoid redundancies with Chapter 11.	Re-write will ensure that SD aspect is clearly highlighted.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	9	-	-	-	-	9.6.2	-	-	This section is heavily biased toward the LCA; what about other assessment tools?	LCA is one option that allows assessments on a rather general level. Other assessment tools such as EIAs are too case specific to be of much use in such a comparative exercise. Hence, the authors agreed to include a large section on LCAs in the re-written chapter.
United States (U.S. Department of State)	9	-	-	-	-	9.6.2	-	-	Description of tools redundant with Section 9.1.6	Noted.
United States (U.S. Department of State)	9	-	-	-	-	9.6, 9.7	-	-	Remaining sections (9.6, 9.7). In general, this is the best section of the chapter both stylistically and substantively. However, there is the need to revise these sections to account for issues raised in the prior comments (e.g. sections 9.0 - 9.5). Link to clearly defined objectives. The strategies put in place need to optimize how RE works with other technologies to build sustainable systems that meet performance goals/standards.	Noted.
United States (U.S. Department of State)	9	-	-	-	-	9.7.	-	-	Page 54, Line 44: replace "climatic change" with "climate change." Also, on page 55 at Line 12, "mitigation" and "adaptation" appear as terms. Mitigation is covered in Chapter 10. Where is adaptation covered? Page 55, Line 18 just mentions future research. A table of future research needs should be added, as this is a critically important issue. Likewise, a summarizing table of knowledge gaps should be added.	Text will be completely revised in re-write.
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	9	-	-	-	-	-	-	4	Should be named "Table 9.4" for consistency reasons. Poor table design, needs refinement.	Table will be removed.
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	9	-	-	-	-	-	-	9.1	Poor clarity of table, should be made more reader-friendly.	Table will be removed.
Jyri Seppälä (Finnish Environment Institute)	9	-	-	-	-	-	-	9.1	Particulate matters are missing in the case of biomass	Table will be removed.
Ladislaus Rybach (Geowatt AG Zurich (company))	9	-	-	-	-	-	-	9.1	Row 'Air and Water' + / column 'Geothermal': 'no direct atmospheric emissions' is not strictly true: geothermal power generation is accompanied by CO2 emission, with about 100 gCO2/kWhe [4.5.1]. The text should read 'only limited atmospheric emissions'.	Table will be removed.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Michael Hübler (Potsdam Institute for Climate Impact Research)	9	-	-	-	-	-	-	9.1	Many aspects are the same across technologies, some aspect are very general like "socio-economic benefits". Wind energy accordingly creates no "emissions", while the other energy technologies create no "athmospheric emissions"; is there a difference in em	Table will be removed.
United States (U.S. Department of State)	9	-	-	-	-	-	-	9.1.	Idea of the tables is OK. They need improvement (see earlier comment)	Table will be removed.
United States (U.S. Department of State)	9	-	-	-	-	-	-	9.1.	Section 9.3.1.1, page 18, table 9.1 in general the negative impact of geothermal can be controlled through proper management of the fields. In air and water there are no emissions from closed loop production systems associated with binary plants. Flash	Table will be removed.
United States (U.S. Department of State)	9	-	-	-	-	-	-	9.1.	The adverse impacts for hydropower listed here are mostly from large, poorly designed projects and are not necessarily applicable for all types of hydropower. See for example the IEA Hydropower Annex's report on Good Practices.	Table will be removed.
Frank Krysiak (University of Basel)	9	-	-	-	-	-	-	9.1. & 9.2.	How and why where these particular indicators chosen? Some information on this would be useful.	Tables will be removed.
Gregory Keoleian (University of Michigan)	9	-	-	-	-	-	-	9.1. & 9.2.	Distinction between Tables 1 and 2 is unclear	Tables will be removed.
Fritz Vahrenholt (Prof. Dr.) (RWE Innogy GmbH)	9	-	-	-	-	-	-	9.2	Poor clarity of table, should be made more reader-friendly.	Table will be removed.
Gustavo Nadal (Fundacion Bariloche)	9	-	-	-	-	-	-	9.2	Bioenergy: income and livelihood/employment negative impacts of monoculture, trend towards land tenure concentration and displacement of people with precarious land tenure rights. Trend towards large scale agricultural exploitation and increased mechaniza	Table will be removed.
Gustavo Nadal (Fundacion Bariloche)	9	-	-	-	-	-	-	9.2	Large hydro income and livelihood negative impacts: modification of resource base for local communities (fishing resources, forests, etc.) Disruption of traditional lifestyles. Mentioned in page 22 lines 14 to 34, this chapter.	Table will be removed.
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	9	-	-	-	-	-	-	9.2	[Employment] Fossil Fuels "+" <comment> Add "Increased job opportunities" <reason> So many job opportunities are expected in introducing a thermal power station	Table will be removed.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	9	-	-	-	-	-	-	9.2	[Employment] Hydropower "+" <comment> Please add "Increased job opportunities, particularly in large power plant."	Table will be removed.
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	9	-	-	-	-	-	-	9.2	[Employment] Nuclear "+" <comment> Add "Increased job opportunities" <reason> Enormous job opportunities are expected in introducing a nuclear power station. <reference> In case of Tokyo Electric Power Company, number of employees(inc. contractor	Table will be removed.
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	9	-	-	-	-	-	-	9.2	[Employment] Ocean Energy "+" <comment> Please delete "Ocean power station can become a source of eco-tourism providing jobs" <reason> This is only the possibility under the limited circumstances and secondary effect.	Table will be removed.
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	9	-	-	-	-	-	-	9.2	[Employment] Wind Energy "+" <comment> Please delete "Worldwide, direct employment in the wind industry is estimated at approximately 500,000" <reason> In this table, evaluations should be the job oppotunities in the certain areas in case the power p	Table will be removed.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	9	-	-	-	-	-	-	9.2	[Energy Generation / Supply Cost] Direct Solar "+" <comment> Please delete "Becoming more competitive as costs are declining; 2030 costs projected to be 60% lower" <reason> Evaluation should be "at present" in this table.	Table will be removed.
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	9	-	-	-	-	-	-	9.2	[Energy Generation / Supply Cost] Fossil Fuels "-" <reason> Please delete "Risks of high cost for offshore drilling and coal mining accidents" <reason> It is unfair to assume the potential accident in "Fossil Fuels".	Table will be removed.
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	9	-	-	-	-	-	-	9.2	[Energy Generation / Supply Cost] Nuclear "-" <comment> Please delete "Risks of significant costs for accident treatment" <reason> It is unfair to assume the potential accident in "Nuclear".	Table will be removed.
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	9	-	-	-	-	-	-	9.2	[Energy Generation / Supply Cost] Wind Energy "+" <comment> Please delete "Can be competitive with fossil generation; wind energy is produced with near-zero marginal cost" <reason> Considering the power generation efficiency, this description is not	Table will be removed.
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	9	-	-	-	-	-	-	9.2	[Gender Equity] <comment> Please delete the whole items. <reason> Descriptions in the "Gender Equity" are required a certain condition or limited the region. And "Gender Equity" itself is not an appropiate measure to estimate each energy sources.	Table will be removed.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	9	-	-	-	-	-	-	9.2	[Income and Livelihood] <comment> Add the description in the benefits(+) of Wind Energy, "Tax payments, land rents, and use of local services can help revitalize the economy of rural communities", to the benefits(+) of Nuclear and Fossil Fuels.	Table will be removed.
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	9	-	-	-	-	-	-	9.2	[Income and Livelihood] <comment> Add the description in the concerns(-) of Fossil Fuels, "Negative impact on livelihood in selected areas", to the concerns(-) of Bioenergy, Direct Solar, Geothermal, Hydropower and Wind Energy.	Table will be removed.
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	9	-	-	-	-	-	-	9.2	[Income and Livelihood] Bioenergy "-" <comment> Add "rising cost of food caused by competition in the market"	Table will be removed.
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	9	-	-	-	-	-	-	9.2	[Income and Livelihood] Ocean Energy "-" <comment> Add "influence on the coast fishery"	Table will be removed.
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	9	-	-	-	-	-	-	9.2	[Investment] Fossil Fuels "-" <comment> Please delete "Investment risk due to uncertainty in remaining oil and gas reserves" <reason> It is unfair to refer to the risk only in "Fossil Fuels". There are investment risks in other energy sources, just	Table will be removed.
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	9	-	-	-	-	-	-	9.2	[Investment] Geothermal "+" <comment> Please delete "Large investment potential in Asia (Indonesia)" <reason> Evaluation in this table should not be limited to a certain area or country.	Table will be removed.
Michael Hübler (Potsdam Institute for Climate Impact Research)	9	-	-	-	-	-	-	9.2	The table mentions direct solar with short-term opportunities. There can also be large-scale solar projects with substantial longer-term opportunities. Nuclear and fossil subsidies are explicitly mentioned, thus renewables subsidies should also be mention	Table will be removed.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	9	-	-	-	-	-	-	9.2	On negative effects of ocean energy on energy generation: the negative effect or concern is not that the prototype costs do not reflect the market costs, it's that there is still unceratinty on the caex of the technology	Table will be removed.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	9	-	-	-	-	-	-	9.2	Several effects are not to the point or are not even socio-economic benefits or concerns linked to RE but rather again barriers or opprtunities of RE, which is not the same	Table will be removed.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	9	-	-	-	-	-	-	9.2	Under benefit of geothermal on energy generation: why is the variation of O&M costs considered a benefit?	Table will be removed.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	10	-	-	-	-	-	-	9.2	Under hydropower impacts on income and livelihood, the possible negative effect of large scale hydro on community displacement should be mentioned	Table will be removed.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	9	-	-	-	-	-	-	9.2	Under negative effect of bioenergy on energy generation: what are bioenergy products? (or was it meant bioenergy feedstock?)	Table will be removed.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	9	-	-	-	-	-	-	9.2	Under negative impact of bioenergy on income and livelihood potential loss of land rights and displacement of subsistance agriculture by monocoluture plantations could be mentioned.	Table will be removed.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	9	-	-	-	-	-	-	9.2	Under negative impacts of hydropower on water, the impacts of large reservoirs on downstream water quality and availability should be mentioned.	Table will be removed.
Netherlands (KNMI (Royal Dutch Meteorological Institute))	9	-	-	-	-	-	-	9.2	Under positive effect of solar on income and livelihood the text is stating the obvious - the question is how is solar offering income and livelihood opprotunities	Table will be removed.
ICHIRO MAEDA (The Federation of Electric Power Comapanies of Japan)	9	-	-	-	-	-	-	9.3	[SOCIAL ECONOMIC ISSUES : Employment Opportunities] Nuclear <comment> Amend "Small" to "High" <reason> The measure "Jobs-Year/TWh" is not appropriate. In reality, employment opportunities of nuclear power station are enormous. <reference> In case o	Table will be removed.
Steffen Schlömer (IPCC WGIII)	9	-	-	-	-	-	-	Appendix A	Please check statement on comparison of life-cycle emissions of geothermal energy to hydropower and wind in geothermal chapter, p. 22, ll. 36-38.	Appendix will be removed.

Doug Arent (Joint Institute for Strategic Energy Analysis)	9	0	-	-	-	0	-	-	Overall, many sections the authors 'preempt' the reader by describing what will be forthcoming. All that can be eliminated. The text is thorough, but reads more as 'prose' vs 'a scientific assessment'. It could be crisper and more to the point. Lastly, the policy section seems very broad vs focused on examples for sustainable development specifically.	Chapter will be completely re-drafted to address these problems.
Stephan Klasen (University of Göttingen)	9	-	-	-	-	-	-	Appendix A	This table is interesting but far too dense and as such not very useful. Much better to condense the information and summarize it in a table in the text.	Appendix will be removed.
Susanne Kadner (Technical Support Unit)	9	-	-	-	-	-	-	Appendix A	Large range in numbers for land and soil indicator provided for PV should be explained in 9.3.2.	Appendix will be removed.
Jan Steckel (PIK)	9	-	-	-	-	-	-	Box 9.2	What is the example supposed to say about sustainable development? It rather seems to be an example for an application of biomass in general.	Box will be removed in re-drafted chapter.
United States (U.S. Department of State)	9	-	-	-	-	-	-	SPM 4	The estimates from Krewitt for hydropower in this table are problematic and need to be resolved with other estimates of undeveloped potential. Krewitt's projection of only 4% growth from 2020 o 2050 is likely not caused by technical potential but rather	Comment can not be located in Chapter 9 text.