



# INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE



## Special Report on Renewable Energy Sources and Climate Change Mitigation

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Expert Review of the First Order Draft  
Dec 14, 2009 – Feb 8, 2010

### Chapter 9

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<sup>1</sup> 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](http://www.ipcc.ch/meetings/session33/ipcc_p33_decisions_taken_procedures.pdf)>>

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Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table Info	Comments
Gagnon (Hydro-Quebec)	9	0	-	-	-	-	-	-	- Comparison of Energy Systems using life cycle assessment, A special report of the World Energy Council, London, U.K, July 2004
Gagnon (Hydro-Quebec)	9	0	-	-	-	-	-	-	- L. Gagnon, C. Bonger, Y. Uchiyama, Life-cycle assessment of electricity generation options: the status of research in year 2001, p. 1267-78, Energy Policy, vol.30, no. 14, 2002
Gagnon (Hydro-Quebec)	9	0	-	-	-	-	-	-	- Luc Gagnon, Civilisation and energy payback, Energy Policy, vol.36p. 3317-3522, 2008
Dunn (GE Energy)	9	0	-	-	-	-	-	-	"As mentioned during the expert review meeting, it would be valuable to capture in this chapter (with connection to Chapter 1) the growing role of RE in economic/industrial policies in both developed and developing/emerging countries. A prominent recent example is China's RE policy development (see 1/31/10 NYT article ""China Leading Race to Create Clean Energy."")"
Pehnt (Institute for Energy and Environmental Research)	9	0	-	-	-	-	-	-	"Chapter 9 is the only chapter the structure and logic of which is difficult to understand. It is - compared to the respective technology chapter - rather superficial (see comments below). It is redundant to other chapters (e. g. 9.1.3; 9.6 (there is a full policy chapter!); 9.5.1 (see chapter 10!)) and redundant in itself (e. g. LCA is introduced three times; table 2 and table 3 express similar things slightly different). So I recommend a thorough revision and shortening."
Dunn (GE Energy)	9	0	-	-	-	-	-	-	"During the expert review meeting, the CLA mentioned an interest in using more case studies from the private sector in the realm of SD/RE. I am including GE's annual ""ecomagination"" report as a possible source. See SRREN_Draft 1_Review_Dunn_Seth_Material_05.pdf."
Marques (The Plantar Group)	9	0	-	-	-	-	-	-	"General Comment on the whole chapter: 1) The text often refers to ""charcoal"" and ""fuelwood"" without making a clear distinction on their renewability. To avoid confusion, it would be better to always to make a distinction and to refer to ""renewable charcoal/fuelwood/wood"" or ""non-renewable charcoal/fuelwood/wood. Definitions for both could be adopted and referred to in the glossary, in a manner that is also consistent with chapter 2."

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Caneill (Electricite de France (EDF-SA))	9	0	-	-	-	-	-	-	-	<p>"General remarks :</p> <ul style="list-style-type: none"> <li>- It is not worthwhile to discriminate between large vs. hydro (there is a difference between the renewable character and teh sustainable character of the source If attention is paid large hydro can be made sustainable</li> <li>- Information regarding environmental and social impacts of different technologies in this chapter are somewhat oversimplified regarding all technology subchapters. It should be more worthwhile to refer to the relevant subchapters when needed</li> <li>- Most of the hydropower is CO2 zero net emmitter. However CH4 and CO2 may be emitted from some reservoirs under certain conditions, site and climate zone mainly tropical area during the first years after impoudment.</li> </ul>
Menichetti (Observatoire M□terran□ de l'Energie)	9	0	-	-	-	-	-	-	-	<p>"Including a chapter on renewable energy in the context of sustainable development is very relevant. However the current draft would benefit from some restructuring in order to enhance clarity and avoid repetitions. Some references are outdated, therefore the current version of the draft does not fully meet the guiding principle highlighted in the procedures for review (para 4.2.4, i.e.: ""First, the best possible scientific and technical advice should be included so that the IPCC Reports represent the latest scientific, technical and socio-economic findings and are as comprehensive as possible""). More analytical comments are provided below."</p>
Kheshgi (ExxonMobil Research and Engineering Company)	9	0	-	-	-	-	-	-	-	<p>"Suggest that this chapter assess the extent to which each RE source has contributed to the eradication of energy poverty on an absolute and per unit energy basis. Such quantitative information may be a constructive basis for strategies to address sustainable development.</p> <p>"</p>
Bilello (NREL)	9	0	-	-	-	-	-	-	-	<p>"Text largely focuses on electricity generation where some of the greatest benefits will be achieved through access to cleaner cooking and heating energy and motive power; suggest authors include how RE can play a part in the latter two as well."</p>
Dunn (GE Energy)	9	0	-	-	-	-	-	-	-	<p>As discussed in the expert review meeting, a synthesis of literature on the job impacts of RE deployment would be valuable to policymakers (in coordination with Chapter 1). If the literature is lacking or methodologically challenging, that should be highlighted as a knowledge gap or barrier.</p>
Bilello (NREL)	9	0	-	-	-	-	-	-	-	<p>Authors mention that links exist between access to modern energy services and development but the text might benefit from specifically mentioning some of the benefits from access to lighting, cleaner heating and cooking fuels, and motive power.</p>

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Sugiyama (CRIEPI)	9	0	-	-	-	-	-	-	capacity building is essential for successful technology development of renewable in developing countries. Many aided PV facilities are not operating due to lack of maintenance. See (SRREN_Draft1_Review_Sugiyama_Taishi_03 i.e. Lee_Hyunyoung 2010, in Japanese) as attached. (The final version of this literature will be available by March 2010)
Taylor (International Hydropower Association (IHA))	9	0	-	-	-	-	-	-	Comment: This chapter does not adequately tackle the tension between taking an environmental bottom line vs a trade-offs approach to sustainable development. Also it does not reconcile sustainable development against the 'trump cards' of national interest (vs local interest) including national economic development, national energy security, meeting climate change commitments, and implementing MDGs. These 'trumps' can frustrate/overtake traditional approaches to the three dimensions of sustainable development. In addition, this chapter does not adequately tackle the underlying fundamentals that sustainable development is an essentially contested concept in that it is normative and relative according to time and space.
McCormick (International Union for Conservation of Nature (IUCN))	9	0	-	-	-	-	-	-	discussions on SD and Renewable energy appear to be far divorced from the issues that small island nations face. <input type="checkbox"/> <input type="checkbox"/> Island nations are unfortunately grouped with developing countries. <input type="checkbox"/> The characteristics of islands nations are so different from developing countries in the Asian continent, South America and even Africa that there is always the danger of assuming that the impacts of RE on air, water, land, ecosystems and biodiversity, built environment and human health are similar. <input type="checkbox"/> The resource availability in several island nations, especially in the low lying coral atolls are quite restrictive and for them the only option of RE resource is the sun.
Kyte (E.ON AG)	9	0	-	-	-	-	-	-	Early in Chapter 9 on Sustainable development (preferable from the title) it should become clear that RE has other benefits that are not always quantifiable in costs sections.
QUILES (Ministerio de Agricultura, Ganaderia y Pesca)	9	0	-	-	-	-	-	-	Energy regulations, normative and legal framework for Sustainable Development Recommendations: Developing of National Energy Plans with crosscutting recommendations such as legal, policy and institutional framework and governance regarding the social, economic, energy security, technologic and environmental impacts of renewable energies (REs) including bioenergy. Designing of formal mechanisms such as legislations, policies, strategies or protocols at the national and global level to assess, monitor the aspects in social, economic, energy security and the environmental impacts of REs including bioenergy production and/or use. Using modern and powerful tools such as Integrated Energy Planning Package of IAEA United Nations. See: SRREN_Draft1_Review_Ernesto_Quiles_Material_03

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Marques (The Plantar Group)	9	0	-	-	-	-	-	-	General Comment on the whole chapter: The references to charcoal and wood are almost exclusively made in the context of domestic/small scale use, e.g. cooking/heating. There are very few, if any, references to vast potential of increasing the use of renewable fuelwood and renewable charcoal from planted forests or from sustainably managed forests in (i) different stages of several industrial supply chains, including the replacement of fossil fuels in larger scale processes, and (ii) as a renewable source of energy to replace non-renewable wood/charcoal for heating and even cooking. For example, in Brazil the use of charcoal/fuel wood for industrial/large scale purposes (iron/steel and heating) is equivalent to almost 6% of the country's energy matrix. In most countries the constraint for the larger scale use of renewable fuelwood and charcoal is not access to the end-use technology (e.g.charcoal based blast furnaces, boilers, heaters, which are all fairly accessible technologies) but rather the lack of sustainable feedstocks, such as those coming from sustainable forest management of from planted forests.As such, this potential would be applicable to any country capable of sustainably producing wood/charcoal. Also, there may be major contributions to sustainable development, e.g. integrating rural and industrial development. This potential is especially relevant in light of the fact that biomass from wood/charcoal represents 80% of the world's primary bioenergy supply. In short, wood and charcoal are traditional sources of energy that can be modernized (use in large industrial chains, tar recovery, co-generation with the carbonization off-gases, etc.)
McCormick (International Union for Conservation of Nature (IUCN))	9	0	-	-	-	-	-	-	Having said the above, there are many lessons that can be learned from the other sector programmes such as forestry, water, marine and coastal management programmes on the approaches to local management of resources. Building on these strengths, it will be important for these island nations and their development partners to identify what aspects of SD and RE development that can be easily factored into this local capacity. Then only the task to enhancing resource sustainability and livelihoods (SD)might be a reality in some small island nations.
Gagnon (Hydro-Quebec)	9	0	-	-	-	-	-	-	I will be sending these reports/articles to the lead authors of Chapter 9.
Tolmasquim (Empresa de Pesquisa Energetica - EPE)	9	0	-	-	-	-	-	-	In general, this chapter should be compared with Chapter 5 - Hydropower to check if the impacts indicated in both chapters are compatible.
Branche (Electricite de France (EDF))	9	0	-	-	-	-	-	-	It is not appropriate to have a discrimination between large hydro and small hydro (the only important thing is to develop hydro, and other RES, in a sustainable way, and whatever the size of the unit)

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Fulton ( Deutsche Bank)	9	0	-	-	-	-	-	-	-	It would be useful to clearly distinguish the different stages of economic growth developing countries are in and then match that to appropriate technology paths and policy challenges. In particular, energy access is very different from energy scale up at a grid level. Taking a broad context of what energy systems and services need developing and how renewables fit into those would be helpful.
de Haan (Ernst Basler + Partner AG)	9	0	-	-	-	-	-	-	-	No comments from this expert to chapter 9 RE and sust dev
Bilello (NREL)	9	0	-	-	-	-	-	-	-	The chapter does not adequately address the gender aspects of energy access and where RE fits in. Suggest including more discussion on this topic, including how many RE deployment projects have focused on 'productive' uses of energy and therefore benefitted men engaged in the formal economy versus women who's work is in the informal or household sectors.
Rybach (Geowatt AG)	9	0	-	-	-	-	-	-	-	The chapter focuses too strictly on the two-way relationship between SD and Renewables: resource renewability and environmental benignness. Instead, the important role that Renewables could play in harmonizing the three components of sustainable development (economic, environmental, social) could have been addressed.
Gagnon (Hydro-Quebec)	9	0	-	-	-	-	-	-	-	The table are a good tool to compare options. I have been working for many years in trying to find comparative data. I strongly recommend that the following reports or articles be consulted to complete the tables:
McCormick (International Union for Conservation of Nature (IUCN))	9	0	-	-	-	-	-	-	-	There is also a change in the dynamics of demography in small islands nations particularly in Pacific Island Countries. □ There is a huge internal migration within the country □ people who used to live in the rural areas are now flocking in numbers to the main cities and town in the urban centres. □ □ As a result the population concentration has now changed with more people living in urban areas than in rural areas. This change has a great impact on the energy infrastructure and the type of energy options to support SD. □ The options of stand-alone RE systems which are often promoted for the rural population are now becoming less prominent. □ □ There is a greater pressure on the urban energy infrastructure to support the increasing population. □ Fiji, Kiribati, Marshall Islands and to some degree in the Solomon, Vanuatu and Papua New Guinea, there are more people living in urban centres than in the rural areas. □ □ I am sure other island nations in other regions (Caribbean, Indian Ocean, Europe, etc) are facing these challenges. □ My point is for islands nations particularly the small ones, achieving SD with the energy choices available to them might not be a reality and several of them do realise that this is the dilemma that they have live with.

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Gagnon (Hydro-Quebec)	9	0	-	-	-	-	-	-	-	<p>This chapter focuses mostly on the environmental and social impacts of various renewable energy sources and how to improve the performance of renewable sources. In my opinion, this overall approach can be counter-productive, by giving the impression that renewable sources are mainly in competition with each other. If climate change is to be mitigated significantly, future energy supply will have to come mainly from renewables, which mean that there is ample opportunity for many renewable sources to develop simultaneously. I suggest an introduction that will show that this wide development is required to achieve sustainability. Suggested text: In its 2009 World Energy Outlook, the IEA notes that world energy demand will continue to grow in the coming decades and that considerable investments in energy production are required to ensure energy security and prevent energy poverty. It also states that 'continuing on today's energy path, without any change in government policy, would mean rapidly increasing dependence on fossil fuels, with alarming consequences for climate change and energy security.(...) These trends would lead to a rapid increase in the concentration of greenhouse gases in the atmosphere. The rate of growth of fossil-energy consumption projected in the Reference Scenario takes us inexorably towards a long-term concentration of greenhouse gases in the atmosphere in excess of 1 000 ppm CO2-eq. The CO2 concentration implied by the Reference Scenario would result in the global average temperature rising by up to 6°C. This would lead almost certainly to massive climatic change and irreparable damage to the planet.' (2009 World Energy Outlook, page 44, Executive Summary). In summary, the IEA shows clearly that the current energy trends are unsustainable in themselves and incompatible with the sustainable development of human societies. It also shows that the increased development of renewable energy can bring a significant contribution to the reduction of future GHG emissions. In a scenario in which policies would be put in place to limit the atmospheric concentration of CO2 to 450 ppm (a concentration usually believed to be sufficiently low to offer a reasonable chance to avoid dangerous climate change) 'There is a big shift in the mix of fuels and technologies in power generation: coal-based generation is reduced by half, compared with the Reference Scenario in 2030, while nuclear power and renewable make much bigger contributions.'</p>
Cozzi (International Energy Agency)	9	0	-	-	-	-	-	-	-	<p>This chapter is very well structured and reads very well</p>
El-Hinnawi (National Research Centre)	9	0	-	-	-	-	-	-	-	<p>This chapter should be deleted. The contents of section 9.3 on environmental impacts should be integrated un the different sections on environment in previous chapters. Section 9.1, 9.2 , 9.4 to 9.6 should be shortened and integrated in Chapter 1.</p>

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Steckel (Potsdam Institute for Climate Impact Research)	9	0	-	-	-	All	-	-	"A in depth discussion of technology transfer and leap-frogging and related measures and instruments is missing. In my opinion the implementation possibilities/support of renewable energy in developing countries (particularly least developed countries) is not made very explicit. 1) Something is said wrt to technology transfer (section 9.4.3.3) but in my eyes it is still treated marginally, especially when looking at the possible impacts of the different dimensions of techtrans, i.e. foreign direct investment, ODA, CDM etc. ... 2) Financing possibilities of renewable energies in developing are mentioned in some parts (p. 9, l. 35-36; p. 11, l. 42-44, section 9.5.1.1) but are treated superficially from my point of view. An in-depth analysis of different financing possibilities for RETs in different countries (developed, industrialising, least-developed ... ) and differentiated by urban/rural is missing. 3) In my opinion leapfrogging could have been made much more explicit (see also 1, 2), also wrt to 'LDC-tailored' measures/instruments and technologies in rural areas (e.g. micro hydro, solar home systems etc. ... )"
Steckel (Potsdam Institute for Climate Impact Research)	9	0	-	-	-	All	-	-	The chapter suffers from a continuous repetition of some key points, the authors obviously want to make, even though they often do not fit in the context. One example is difficulties to adapt western technologies in developing environments, but there are many others
Steckel (Potsdam Institute for Climate Impact Research)	9	0	-	-	-	All	-	-	The use of (adequate) references should carefully be checked for the whole chapter. The use of regional references for global phenomenons should be avoided, particularly if they refer to (regional) lobby groups (e.g. CanREA, CanWEA etc.) Example: p.43, line 25.
Kammen (University of California, Berkeley)	9	1	-	-	-	-	-	-	"Property Assessed clean energy (PACE) financing can be utilized in developing nations via revolving credit, or through the use of international or federal donor funds. It is an important and new financing mechanism that is growing rapidly in use. A website devoted to this mechanism is <a href="http://rael.berkeley.edu/financing">http://rael.berkeley.edu/financing</a> A set of references on this is: Fuller, M, Portis, S. and Kammen, D. M. (2009) 'Towards a low-carbon economy: municipal financing for energy efficiency and solar power', Environment, 51 (1), 22 □ 32; Fuller, M., Kunkel, C., and Kammen, D. M. (2009) Guide to Energy Efficiency and Renewable Energy Financing Districts for Local Governments (The City of Berkeley, CA and the University of California, Berkeley); Kammen, D. M. (2009) 'Financing energy efficiency', Earth 3.0 (Scientific American), 21. "
Rybach (Geowatt AG)	9	4	14	-	-	-	-	-	□geothermal□ needs to be added. (Also geothermal resources do not stop at country borders).
Bilello (NREL)	9	4	43	-	-	-	-	-	"Authors assert that ""energy services□can halve extreme poverty, reduce hunger□"" There is no clear explanation in the text that links energy services to these outcomes. "

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Garcia (Renewable Energy Center)	9	4	11	4	13	-	-	-	"The statement ""The report recognized that poverty is one of the main causes of environmental degradation (□)"" put in this way and without other context is, at least, misleading and, at most, ideological. It hides that wealthness and the western luxury style of life is one of the main causes of environmental degradation. "
Bilello (NREL)	9	4	30	-	-	-	-	-	"Use of ""renewables mitigation"" is confusing. Do the authors mean emission mitigation through use of renewables?"
Rybach (Geowatt AG)	9	4	-	5	-	-	-	-	Executive Summary: This is rather an introduction than a summary. A summary should contain the main findings of the chapter.
Winkler (Energy Research Centre, University of Cape Town)	9	4	30	-	-	-	-	-	Explain the short-hand of 'renewables mitigation'. Presumably you mean the use of renewable energy technologies to reduce GHG emissions. Perhaps a long definition does not fit into the Exec Sum, if so, you could perhaps do it in the main body and cross-reference or footnote here.
Devernay (Electricity of France - EDF Hydro Engineering Centre)	9	4	14	4	16	-	-	-	Is there a reference to substantiate this statement?
Kruger (South African Weather Service)	9	4	42	4	43	-	-	-	Maybe say something more about the MDG's.
Devernay (Electricity of France - EDF Hydro Engineering Centre)	9	4	35	4	35	-	-	-	Meaning and relevance not clear
Devernay (Electricity of France - EDF Hydro Engineering Centre)	9	4	2	4	13	-	-	-	same as paragraph 9.6.1.
Winkler (Energy Research Centre, University of Cape Town)	9	4	21	-	-	-	-	-	Springer Netherlands sounds like a publisher, not an author. The reference at the end also does not look complete
Bilello (NREL)	9	4	36	4	38	-	-	-	Suggest including transportation in this list of uses for clean, liquid fuels.
Winkler (Energy Research Centre, University of Cape Town)	9	4	36	4	41	-	-	-	The issue of affordability should be raised here, as it is at odds with access, especially for poor communities.
Bilello (NREL)	9	5	5	5	5	-	-	-	""diffuse"" nature of renewables can be viewed as an attribute not just a challenge. Authors may want consider rewording."
Devernay (Electricity of France - EDF Hydro Engineering Centre)	9	5	6	-	-	-	-	-	"after ""regionally variable"" add ""and sometimes not cost competitive""."
Bilello (NREL)	9	5	5	5	6	-	-	-	"More common term of art is ""variable"" rather than intermittent. Authors may want to reword to ""temporally and regionally variable""."

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POUFFARY (ADEME - French Environment and Energy Management Agency)	9	5	7	5	9	-	-	-	"The sentence ""An expedient way..." is not very clear. "
Bilello (NREL)	9	5	7	-	-	-	-	-	Authors make a point here of excluding large hydro as renewable yet they include large hydro in all subsequent discussions and calculations of installed capacity. Coordination with hydropower chapter authors to agree on definition of renewable hydropower suggested and in turn have focus of this chapter on sustainability aspects of technologies in that category.
Akimoto (Research Institute of Innovative Technology for the Earth (RITE))	9	5	13	5	15	-	-	-	Most of renewable energies are also unevenly distributed. This last sentence will be too optimistic as we recognize the uneven distributions of RE.
Sauerbrey (Energy Renewable (ENERSIA))	9	5	13	5	15	-	-	-	recommend that benefits of energy autonomy from other countries and reduction in the balance of payments to purchase for energy fuels be added.
Bilello (NREL)	9	5	8	5	8	-	-	-	Specifically note your assumed definition of small hydro in terms of capacity.
Devernavy (Electricity of France - EDF Hydro Engineering Centre)	9	5	6	5	9	-	-	-	This distinction of large hydro vs. small implies that small has little environmental and social impacts (and therefore deserves subsidies), whereas large has negative impacts and should not get governmental support. This assestion is unfounded and does by no mean reflect the complexity and divestity of situations re. actual impacts. It is recommended either (i) to remove this (and subsequent) uncommented distinction, or at least to (ii) complement this statement by explaining that this distinction is political only and does not reflect the actual impacts of hydro schemes, which are more site and time dependent than related to size (for an equivalent production). The political basis for this distinction is clearly highlighted p 56 (lines 35 to 43), and that should be somehow reflected here.
Schmall (Petrobras S.A.)	9	5	7	5	9	1	-	-	Should add at the end of the sentence: An expedient way out...or other incentive measures, even though large hydropower is also renewable energy
Schmall (Petrobras S.A.)	9	5	12	5	15	1	-	-	The sentence shoul be re written. Energy security we have combining all forms of energy not only one...Security of supply it is not true... We may have dry seasons that affect hydropower and biomass for example. To say that RE are environmentally relatively benign compared with fossil fuels (adding) when proper policies are established to guarantee their potential benefits
Schmall (Petrobras S.A.)	9	5	1	5	2	1	-	-	The sentence should finish in...can help to achieve sustainable use of natural resources. And reduce deforestation should be retired because it is missing a lot of other points like soil, water, etc...

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Taylor (International Hydropower Association (IHA))	9	5	7	5	8	Executive Summary	-	-	-	"Delete ""e.g."" through to ""other incentive measures"". Reason: See reason given for ""5, 5, 16, 5, 16"" above and c.f. comment for ""9, 55, 1, 55, 11, 9.6.3"". The expediency of using 'small hydro' as shorthand for what is renewable hydro clearly a political, unscientific and thus flawed categorisation that has in the long run caused more harm than good to the sustainability of hydro (e.g. the cumulative effect of multiple cascade small hydro projects, the arbitrary nature of 'small/larg' categorisation - 15/20 MW in the EU, up to 50 MW in China, etc.)."
Menichetti (Observatoire M□terran□ de l'Energie)	9	6	14	6	23		-	-	-	"The MDG should be clearly stated, in the same way as you list the five WSSD development components. Alternatively, you can delete the latter and include references for both the MDG and the WSSD development components in a footnote. More in general, it would be helpful to clearly highlight to what extent renewables can contribute to the achievement of the mentioned objectives"
Christophersen (Climate and Pollution Agency)	9	6	-	-	-		-	-	-	"We propose to add after in the end of the sentence ""□ in their report Our Common Furture"". Since this is the most used reference to the report. "
Christophersen (Climate and Pollution Agency)	9	6	24	-	31		-	-	-	This paragraph should also contain some information on the plans for the next Assessment Report (AR5), which we suppose the SRREN will provide valuable input to.
Kruger (South African Weather Service)	9	6	24	6	31	9.1	-	-	-	References to the IPCC reports should be given.
Devernay (Electricity of France - EDF Hydro Engineering Centre)	9	7	25	-	-	-	-	-	-	"reference is actually made to ""Table 2"" , and not ""Table 1"""
Bilello (NREL)	9	7	7	7	10		-	-	-	"Statement that wealth must be shared to ensure sustainability appears redundant with reference to resources and may be politically contentious. Suggest deleting ""wealth"" reference."
Rybach (Geowatt AG)	9	7	25	-	26		-	-	-	"Table 1 is claimed to describe positive and negative impacts of renewables; the table itself covers only the health effects of large hydropower dams."
Devernay (Electricity of France - EDF Hydro Engineering Centre)	9	7	25	-	-	-	-	-	-	"the statement ""describes the positive and negative impacts"" is misleading, as Table 2 focuses essentially on negative impacts. The positive ones and associated opportunities are actually not discussed in the table."
Christophersen (Climate and Pollution Agency)	9	7	28	-	29		-	-	-	"This sentence appears somewhat strange and out of context. Should the message be more in the direction of ""More efficient and environmentally friendly use of bio energy can enhance productivity and promote social harmony and gender equity by reducing strain on humans and the natural environment""."

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Rybach (Geowatt AG)	9	7	-	8	-	-	-	-	9.1.1 The Two-way Relationship between Sustainable Development and Renewables: In the case of geothermal resources the distinction between the definitions Renewable and Sustainable is now generally accepted: Renewable describes the regenerative characteristics of the geothermal resource whereas sustainable refers to the utilization mode through which the energy from the resource is harnessed (see e.g. Axelsson et al, 2009 □ full reference is given in Chapter 4). In fact, forced production from a geothermal resource (for quick return of investment) can endanger the regeneration of the resource whereas limited production levels can guarantee sustainable harnessing.
POUFFARY (ADEME - French Environment and Energy Management Agency)	9	7	18	7	23	-	-	-	Even if from a theoretical point of view, it is true that renewables are difficult to be evaluated through the 3 SD dimensions, it remains that definitely they will have added values with comparison with other energies (fossils and nuclear). This part may be rewritten accordingly.
Menichetti (Observatoire M□terran□ de l'Energie)	9	7	20	7	22	-	-	-	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.
Menichetti (Observatoire M□terran□ de l'Energie)	9	7	3	7	5	-	-	-	The first sentence is not clear. Please, rephrase it
Garcia (Renewable Energy Center)	9	7	25	-	-	-	-	-	There is a reference to Table 1 about positive and negative impacts of RE, fossil and nuclear energy, but Table 1 in page 18 refers to potential health impacts of large dam projects
Kyte (E.ON AG)	9	7	25	-	-	-	-	-	Where is Table 1, looks as though this refers to Table 2?
Devernay (Electricity of France - EDF Hydro Engineering Centre)	9	8	12	-	-	-	-	-	"correct reference is ""Table 3"""
Menichetti (Observatoire M□terran□ de l'Energie)	9	8	27	-	-	-	-	-	"I would suggest deleting the first part of the sentence, i.e. ""to make development more sustainable"", and start directly by ""Indicators can help"". Indeed indicators do not help making development more sustainable, but are a very relevant tool for monitoring and target definition"
Schmall (Petrobras S.A.)	9	8	24	8	25	-	-	-	"Improve the clarity of the text by changing the sentence ""Micro grids using PV technologies for instance can serve as a means of electricity in cyclone shelters"" for ""Micro grids using PV technologies can serve as a electricity generator"""
Sauerbrey (Energ□Renovable (ENERSIA))	9	8	20	8	21	-	-	-	"recommend to be ""The impact on sea level rise, by hydro power sources and biomass is probably□"""

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Sauerbrey (Energy Renewable (ENERSIA))	9	8	24	8	25	-	-	-	"recommend to be""Micro grids using PV technologies for instance can serve as a means of electricity in cyclone shelters and after hurricanes and earthquakes.""
Schmall (Petrobras S.A.)	9	8	17	-	-	-	-	-	"Remove the expression ""sea level rise"", because it's already allocated in the begning of the sentence."
Verbruggen (University of Antwerp)	9	8	42	-	-	-	-	-	"replace ""development"" by ""implementation"""
Christophersen (Climate and Pollution Agency)	9	8	13	-	14	-	-	-	"Since, among others, land degradation and threats to biodiversity are also very serious environmental challenges, we propose that this sentence is changed to ""Climate change is one of the most important"""
Devernay (Electricity of France - EDF Hydro Engineering Centre)	9	8	18	-	-	-	-	-	"the idea of ""subsidies to fossil fuel technologies"" should either be developed ad substantiated, or dropped. It is unclear how, by whom and to what degree these technologies are subsidized. On the other hand, there are support mechanism in place for the development of RE (feed-in tariffs, subsidies, etc...) that are not mentioned here. The opposition of ""subsidized fossil fuel technologies"" and non-supported RE is therefore not relevant."
Bilello (NREL)	9	8	5	-	6	-	-	-	"Unclear what is meant by ""reverse implications."" Suggest rewording."
Bilello (NREL)	9	8	24	8	25	-	-	-	Cyclone shelter example seems random and minor considering the array of roles RETs may play in adaptation strategies. Suggest deleting.
Kyte (E.ON AG)	9	8	14	8	17	-	-	-	Emotive use of extreme
Rosinski (Electric Power Research Institute)	9	8	17	-	-	-	-	-	Sea Level listed twice
Christophersen (Climate and Pollution Agency)	9	8	15	-	-	-	-	-	We propose that a temperature interval (consistent with other parts of the report) is used instead of the SRES maximum increase.
Menichetti (Observatoire M��t��rologique de l'Energie)	9	8	5	-	12	-	-	-	While the positive impact of the use of RE sources on sustainable development is clearly explained in the text, the concept of sustainable development as a driver for RE deployment deserves further attention. Only few lines are dedicated to this aspect, and I am not sure that these lines fully address the issue. Unlike stated in the text, the two-way relationship between sustainable development and renewables is not described in section 9.4.1.
Kruger (South African Weather Service)	9	8	24	8	24	9.1.1	-	-	"Change ""adaption"" to ""adaptation""."
Rojas (National Meteorological Institute)	9	8	7	8	7	9.1.1	-	-	Processes could include distribution of potable water

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Kruger (South African Weather Service)	9	8	45	8	45	9.1.2	-	-	Define ILO.
Schmall (Petrobras S.A.)	9	8	45	8	45	9.1.2	-	-	What is means ILO - International Labor Organization?
POUFFARY (ADEME - French Environment and Energy Management Agency)	9	9	14	-	-	-	-	-	"Add ""apparent"" at the beginning of the sentence as cost analysis on the LCA perspectives will surely be in disfavour of fossil fuels technologies."
Schmall (Petrobras S.A.)	9	9	36	-	-	-	-	-	"Add in the end of the sentece: ""... Village level, the mix of 4% of biodiesel in the normal diesel, ensured by law, in Brazil. "
Schmall (Petrobras S.A.)	9	9	4	9	6	-	-	-	"Improve the clarity of the text by changing the sentence ""In the subsequent sections, we make use of some the relevant indicators provided by the IAEA in reporting the relative suatainable development synergies and tradeoffs of various renewable anergy opyons "" for ""In the subsequent sections, some the relevant indicators provided by the IAEA in reporting the relative suatainable development synergies and tradeoffs of various renewable anergy opyons are used."""
Sauerbrey (Energi Renovable (ENERSIA))	9	9	38	8	38	-	-	-	"recommend to be ""Lack of capacity to set policies that promote RE and design and implement programs delays and"""
Schmall (Petrobras S.A.)	9	9	26	9	27	-	-	-	"Remove the sentence ""Other renewable anergy options such as biomasss/biogas and small hydro face many constrains related to scale, cost, insttucional capacity and integration policies"", because it's contradictory with the report. The report brings, in page 48, box 9.1, the case of Rwanda for biogas production and use, that shows no cost problem . And the India example shows no scale problem found in small scaled biogas production. "
Schmall (Petrobras S.A.)	9	9	24	-	-	-	-	-	"Remove the sentence ""Such characteristics of renewable resources hinder their large scale adoption"", because it's already saided before."
Bilello (NREL)	9	9	12	9	12	-	-	-	"Suggest rewording to ""availability of low cost storage technologies"""
Bilello (NREL)	9	9	9	9	9	-	-	-	"Suggest rewording to ""relatively higher up front capital costs for some technologies"""
Menichetti (Observatoire M��tropolitain de l'Energie)	9	9	12	-	13	-	-	-	"What does ""inadequate capacity to build and monitor performance of renewables"" mean? The impact on agricultural land use might be an issue for some RES (namely biofuels), but not for all of them. In addition here you list a series of barriers that are relevant for the renewable electricity generation, but not for renewable heat production."
Outhred (University of New South Wales)	9	9	28	9	30	-	-	-	Cross-reference Chapter 8

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Moreira (Brazilian Reference Center on Biomass-University of S□Paulo)	9	9	7	9	13	-	-	-	I would like to call the attention that competition with fossil fuels is another significant barrier. As pointed out in the SAR thee will be winners and losers with energy sources changes.
Menichetti (Observatoire M□terran□ de l'Energie)	9	9	33	-	-	-	-	-	IBRD: Spell out the acronym
Steckel (Potsdam Institute for Climate Impact Research)	9	9	31	-	36	-	-	-	Leapfrogging should be made more explicit and should be elaborated
Moreira (Brazilian Reference Center on Biomass-University of S□Paulo)	9	9	14	9	20	-	-	-	Not only the cost by the finance is a serious issue. For renewables, usually the initial investment is higher and the operational cost is lower. Consequently the cost of money is a serious barrier.
Menichetti (Observatoire M□terran□ de l'Energie)	9	9	21	-	25	-	-	-	Please, substitute solar thermal with solar CSP (it seems that you are referring to solar thermal for electricity generation, not for the production of heat-hot water). Solar should be developed in areas where the resource is more abundant. These same countries tend to have daily peaking systems rather than evening ones. In addition solar CSP is the more and more associated with storage or with backup system so your statement is not correct. The claim that variability of RES hinders their large scale adoption needs to be substantiated. According to the WEO2009, the projected share of RES (including hydro) in electricity production by 2030 is 22% under a business as usual scenario. The 450 ppm scenario projects a share of 40% by 2030. Is this a large scale adoption or not? By the way in these same projections, wind is expected to play a bigger role than e.g. nuclear. Renewables are the second larger contributor to CO2 emission reduction after energy efficiency, under the 450 ppm scenario
Bilello (NREL)	9	9	21	9	21	-	-	-	Seasonality of wind regime is not generally a factor in influencing the capacity factor for the wind sector as a whole if the site is sited appropriately.
de Campos Barbosa (Petrobras)	9	9	13	-	-	-	-	-	Tarif barriers from importer countries should be added as barrier.
Bilello (NREL)	9	9	16	9	16	-	-	-	While up front capital cost are a barrier, authors should note that on levelized cost of energy basis, renewables are often a more cost optimal choice especially when considering fuel price volatility.
Bilello (NREL)	9	9	7	9	41	9.1.3	-	-	"Content here is not specific to barriers for RETs for Sustainable Development and likely covered in other sections of report. Suggest deleting this section or refocusing to specifically address barriers in respect to RE-SD nexus such as the need for complementing technology deployment programs with capacity building programs in rural areas. Can also reference ""leap frogging opportunities"" here and ability to not have to rely on existing grid infrastructure to allow for use of most current distribution technologies for example."

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Taylor (International Hydropower Association (IHA))	9	9	26	9	26	9.1.3	-	-	"Delete ""small"". Reason: See reason given for ""5, 5, 16, 5, 16"" above and c.f. comment for ""9, 55, 1, 55, 11, 9.6.3""."
Kruger (South African Weather Service)	9	9	16	9	16	9.1.3	-	-	"Replace ""concern"" with ""factor""."
Rojas (National Meteorological Institute)	9	9	37	9	41	9.1.3	-	-	might include the cultural factor in the barriers to implementing renewable energy
Kruger (South African Weather Service)	9	9	31	9	36	9.1.3	-	-	References for the statements in the paragraph should be given.
Schmall (Petrobras S.A.)	9	9	33	9	33	9.1.3	-	-	Should be define IBRD
Kruger (South African Weather Service)	9	9	21	9	30	9.1.3	-	-	The information in these two paragraphs might be best summarised in a table.
Outhred (University of New South Wales)	9	10	39	10	39	-	-	-	Renewable energy system failures are common in poor countries and maintenance & repair costs can be high
POUFFARY (ADEME - French Environment and Energy Management Agency)	9	10	18	-	-	-	-	-	"Add ""it"" between ""renewable or not"" and ""is not""."
Gagnon (Hydro-Quebec)	9	10	24	-	-	-	-	-	"Add ""only"" : "" <input type="checkbox"/> based on renewable energy sources only"""
Menichetti (Observatoire M <span style="font-size: 0.8em;">□</span> terran <span style="font-size: 0.8em;">□</span> de l'Energie)	9	10	26	-	31	-	-	-	"Could you please quantify the ""magnitude of needs"" that would represent a profound challenge to scalability? Why have you chosen Brazil and Denmark as examples? By the way, it would be worth highlighting that in 2009 wind alone contributed to 5% of total installed capacity in Denmark (EWEA, 2010). According to the WEO2009, the projected share of RES (including hydro) in electricity production by 2030 is 22% under a business as usual scenario. The 450 ppm scenario projects a share of 40% by 2030. These projections contradict the statement that ""increasing RES to 20% or 30% is a profound challenge..."""
Garcia (Renewable Energy Center)	9	10	5	10	10	-	-	-	"May I suggest to add ""wind"" as one of the RE used in throughout human history."
Schmall (Petrobras S.A.)	9	10	36	10	37	-	-	-	"Should change the text: "" either of which tends to increase costs and reduce net benefits"" for ""that's why the way seem's to be look toward a use of a mixed energy grid.""



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Schmall (Petrobras S.A.)	9	10	28	10	29	-	-	-	"Should remove the text: ""but realistic trajectories toward that kind of energy mix for other large countries remain elusive"" because it's tendencious and non-cientific. Many countries with their energy grids based on petroleum, do not produces petroleum. "
Schmall (Petrobras S.A.)	9	10	38	10	46	-	-	-	"Should remove the whole paragraph begning at ""Affordability"" and ending at ""...some areas"". It's doubtful, not referenced and dispensable."
POUFFARY (ADEME - French Environment and Energy Management Agency)	9	10	19	-	-	-	-	-	"Suggestion ""Having said that, on a long term perspective, analysis may be different regarding SD criteria. For example, all prices reliability will be a high risk for a community if they secure their energy systems only on diesel generator"""
Menichetti (Observatoire M□terran□ de l'Energie)	9	10	23	-	24	-	-	-	"The statement ""it is difficult to conceive of significant urban/industrial development based on renewable energy sources"" needs to be supported by evidence"
Menichetti (Observatoire M□terran□ de l'Energie)	9	10	17	-	19	-	-	-	"The statement made here contradicts the principle of sustainable development, where environmental compatibility is a key prerequisite for ensuring sustainable development. Therefore reading that whether or not an energy source is renewable is not important under a sustainable development perspective is a bit confusing. I would suggest changing the sentence into ""is not always the most important issue under a development perspective""."
de Campos Barbosa (Petrobras)	9	10	27	20	29	-	-	-	"These trajectories are to be built. Although undefined, different pathways are possible. ""Elusive"" seems an opinion. Better remove."
Menichetti (Observatoire M□terran□ de l'Energie)	9	10	34	-	36	-	-	-	Accurate grid management should be mentioned as well
Bilello (NREL)	9	10	36	10	48	-	-	-	Affordability paragraph does not adequately address point that on a levelized cost of energy basis the cost competitiveness equation often changes significantly for renewables. In addition, does not reference fact that externalities associated with energy choices are rarely ever reflected in true cost of technology options.
de Campos Barbosa (Petrobras)	9	10	11	10	19	-	-	-	Although this paragraph makes sense as country level meaning, there is no world sustainable development without renewable (GHG less intensive) energy, even in the near term. It would clarify assert that sustainable development isn□t a issue just for developing countries.
de Campos Barbosa (Petrobras)	9	10	41	-	-	-	-	-	As sugarcane ethanol is competitive when compared with fossil fuel, it should be included as exception, along with hydropower.
Bilello (NREL)	9	10	32	10	32	-	-	-	Condition addressed here is variability, not reliability. Concepts are distinct and is somewhat misleading for the reader as many technology systems can be extremely reliable while the resource is variable and vice versa.

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Moreira (Brazilian Reference Center on Biomass-University of São Paulo)	9	10	25	10	25	-	-	-	It is unclear the sentence on four to eight percent. These figures refers to what major value?
Bilello (NREL)	9	10	22	10	31	-	-	-	Not entirely clear that there is a rigorous analysis or basis for the assumption on potential penetration rates for renewables. This is a very complicated question and varies greatly by region and local factors. Suggest qualifying this broad based assumption with additional data.
Menichetti (Observatoire Météorologique de l'Energie)	9	10	38	-	46	-	-	-	The issue of subsidies to conventional fuels should be better explained.
de Campos Barbosa (Petrobras)	9	10	34	10	37	-	-	-	This is an opinion not necessarily correct. Diversifying sources is a good way for gain reliability.
Outhred (University of New South Wales)	9	10	33	10	33	-	-	-	Water flow and plant growth may have seasonal variations
Christophersen (Climate and Pollution Agency)	9	10	17	-	19	-	-	-	We suppose that this statement refers to the non-environmental aspects of sustainable development. This should be indicated in the text.
Outhred (University of New South Wales)	9	10	6	10	6	-	-	-	Wind energy has also been an important traditional energy resource
Menichetti (Observatoire Météorologique de l'Energie)	9	10	15	-	-	9,2	-	-	In the previous section you mentioned also: health, education, and opportunity for self-development (citing Reed, 1996), in addition to food, shelter and safety. I think they are all very relevant and should be mentioned here as well.
Schmall (Petrobras S.A.)	9	10	21	10	21	9.2.1	-	-	"Before a debate about the dimensions of renewable energy service it would be important to consider the following finding produced by the InterAcademy Council study published on the "Lighting the way: Toward a sustainable energy future", IAC, 2007 - "important to hasten the development of a less carbon-intensive mix of fossil fuel-based technologies. Natural gas, in particular, has a critical role to play as a bridge fuel in the transition to more sustainable energy systems."
Schmall (Petrobras S.A.)	9	10	27	10	29	9.2.1	-	-	Should retire the end of paragraph that says: but realistic trajectories toward that kind of energy mix for other large countries remain elusive.
Taylor (International Hydropower Association (IHA))	9	10	22	10	23	-	-	-	"Delete "large-scale". Reason: See reason given for "5, 5, 16, 5, 16" above and c.f. comment for "9, 55, 1, 55, 11, 9.6.3"."
Schmall (Petrobras S.A.)	9	11	21	11	23	-	-	-	"Should remove the whole sentence from "Often, however..." to "changes at all." It's tendentious and in the same report are said that "energy is a basic human need"."
de Campos Barbosa (Petrobras)	9	11	21	11	23	-	-	-	Phrase isn't referenced. Seems to be a disputable assertion, since access to energy is an important driver for poverty reduction.
Menichetti (Observatoire Météorologique de l'Energie)	9	11	21	-	23	-	-	-	The last sentence is incomprehensible

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Marques (The Plantar Group)	9	11	31	11	32	-	-	-	the use of charcoal poses threats IF from non-renewable sources (again, importance of adopting clear definitions for renewable and non-renewable charcoal)
Bilello (NREL)	9	11	21	11	23	-	-	-	Virtually all national energy programs rely on subsidies in one form or another. While subsidy programs can be a deterrent to establishing appropriate price signals for sustainable market creation, it is not clear how a subsidized RE program would by its very nature do more harm than good - especially if it may be helping to jump start a local market for these technologies and phased out over time.
Christophersen (Climate and Pollution Agency)	9	11	26	-	-	-	-	-	We think that this statement is inaccurate, since poor people often live in the most polluted urban areas and also often use highly pollution fuels for cooking.
Gifford (The Potsdam Institute for Climate Impact Research)	9	11	22	11	23	2.2	-	-	I would argue that current rural renewable energy projects are not sustainable because of lack of on-going maintenance and repair and end-user satisfaction with the success of a project.
Gifford (The Potsdam Institute for Climate Impact Research)	9	11	44	11	44	2.2	-	-	While Grameen shanki is an impressive example of financing programs, there are certain issues the market-approach does not address. The first being that micro-credit, unless under explicit mandates does not reach the extreme BOP (less than \$1 a day), which often constitute a majority of a village (Boiling Point 51. 2005. Mehta). Secondly, market-approach programs are often subsidized by the government or development agencies for a particular technology that may or may not be 'optimal' for an area. The common example is the solar home system, while popular with grant agencies, is relatively expensive and low-energy output compared to other renewable alternatives. (Kapadia)
Taylor (International Hydropower Association (IHA))	9	11	3	11	4	9.2.2	-	-	"Delete ""in the colonial period"". Reason: Sea transport has been a major driver for human settlement patterns since humankind developed long-distance sea transportation, tribute and trade (e.g. The ancient civilisations of around the Mediterranean, the settlement of the pacific by ancient micronesians, melanesians and polynesians)"
Schmall (Petrobras S.A.)	9	11	44	11	44	9.2.2	-	-	reference is missing...would exist a site to adress this issue..
Kruger (South African Weather Service)	9	11	44	11	44	9.2.2	-	-	Reference to WWW should be given as a footnote.
Kruger (South African Weather Service)	9	11	17	11	21	9.2.2	-	-	Rephrase sentence - unclear.

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Rojas (National Meteorological Institute)	9	11	34	11	44	9.2.3	-	-	It is necessary the support in governments agendas, with a point of view to new energy politics, is necessary principal for countries where corruption could affect the development of projects with the target for improve the actions for close the development gap
Devernay (Electricity of France - EDF Hydro Engineering Centre)	9	11	-	-	-	9.2.3.	-	-	isn't there a confusion in this para between (i) RE, (ii) small scale generation and (iii) off-grid? It is not clear if the added benefit for development is coming from the RE per se, or from the other 2 aspects.
POUFFARY (ADEME - French Environment and Energy Management Agency)	9	12	20	-	-	-	-	-	"At the end of the sentence, it may be interesting to remind that the RES development is not in line with global energy consumption's increase. View from a LCA perspective, RES looks more than ""relatively cleaner"" (except biomass in case of not appropriate use versus the ressource)."
Visconti (Inter-American Development Bank)	9	12	32	12	-	-	-	-	"I would suggest to delete ""certainly"" as it is too strong and implies a negative impact that should be evaluated specifically on a case basis"
Chum (National Renewable Energy Laboratory)	9	12	-	33	-	-	-	-	"There is some level of redundancy between the environmental part and the individual technology chapters. This chapter presents the comparison. However, the table 2 is relatively hard to read and it could be shown as a series of figures comparing the fossil fuels and the various renewable energies. The US National Academy of Sciences has collected data for renewables in the US compared to fossil energies and the figures there could be updated to include more data from other parts of the world. Those would make much easier to read and interpret figures and conclusions. See <a href="http://books.nap.edu/openbook.php?record_id=12619.html">http://books.nap.edu/openbook.php?record_id=12619.html</a> ; Electricity from Renewable Resources: Status, Prospects, and Impediments America's Energy Future Panel on Electricity from Renewable Resources; National Research Council, in press; pdf on the web"
Menichetti (Observatoire M□terran□ de l'Energie)	9	12	20	-	21	-	-	-	"What do you intend by ""they are relatively cleaner""? "
Devernay (Electricity of France - EDF Hydro Engineering Centre)	9	12	25	12	26	-	-	-	"Why is this discussion limited to bioenergy, solar and hydropower sources? Moreover, impacts of hydropower are discussed at length in chapter 5.6, and do not need to be discussed again here. The room saved could be used for a discussion on other RE sources."
Devernay (Electricity of France - EDF Hydro Engineering Centre)	9	12	44	-	-	-	-	-	Improper cultivation of energy crops on fragile soils could on the contrary lead to irreversible degradation of the soils. Stating that energy crops cultivation can lead to improvement rather than degradation of soils seems unfounded.
Avenhaus (Potsdam Institute for Climate Impact Research (PIK))	9	12	36	12	38	-	-	-	Not only economics dictate this but politic can have a main impact too.
de Campos Barbosa (Petrobras)	9	12	35	12	44	-	-	-	Paragraph has no reference. Other arrangements can be thought to deal with potential conflicts.

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Bilello (NREL)	9	12	1	12	2	-	-	-	Point not clear here. Suggest rewording
Bilello (NREL)	9	12	16	12	26	-	-	-	Points not clear in this section. Suggest rewording.
Christophersen (Climate and Pollution Agency)	9	12	15	23	42	-	-	-	The description of traditional air pollutants compared to GHGs should be discussed for all sub-chapters under chapter 9.3. As the outline now stands it is confusing that emissions of GHGs are sometimes briefly mentioned along with other air pollutants. One proposal might be to have separate chapters on traditional air pollution and GHG emissions. The chapter on GHG emissions could then be a general description of changes in (direct) emissions of GHGs caused by the renewable energy source, while the overall assessment of GHG alleviation is left to the other parts of the report. In a life-cycle context environmental impacts related to production of equipment and input of minerals, energy and other resources are also highly relevant and might be dealt with in separate chapters.
Moreira (Brazilian Reference Center on Biomass-University of São Paulo)	9	12	35	12	36	-	-	-	The discussion seems incomplete. It is worthwhile to consider that there are lands available not used for classical agricultural activities and these lands can be used for energy crops. The issue of a proper definition for unused land is still open but we should refer to this possibility.
Christophersen (Climate and Pollution Agency)	9	12	15	23	42	-	-	-	The information on environmental aspects in table 2, chapter 9 should be checked against chapter 9.3 to ensure coherency in coverage.
Rybach (Geowatt AG)	9	12	21	-	24	-	-	-	the statement that the literature on impact of geothermal sources on the environment is limited is simply not true. First, not the resource but its utilization can have impacts. These are widely treated in publications of the IEA geothermal Implementing Agreement (e.g. in journals like Geothermics), or in numerous papers in the World Geothermal Congress Proceedings (published all five years).
Menichetti (Observatoire Météorologique de l'Energie)	9	12	29	-	30	-	-	-	This statement needs to be circumstantiated
Christophersen (Climate and Pollution Agency)	9	12	15	23	42	-	-	-	To increase readability and ensure completeness, the headlines should be streamlined across sub-chapters and all relevant environmental problems should be cross checked to verify that they are dealt with for all relevant energy sources.
Verbruggen (University of Antwerp)	9	12	3	-	-	-	-	-	unclear statement
Menichetti (Observatoire Météorologique de l'Energie)	9	12	26	-	26	-	-	-	Unlike stated, you discuss also the impacts for geothermal, ocean and wind
Christophersen (Climate and Pollution Agency)	9	12	39	-	44	-	-	-	Use of grazing land for bio fuel production is not without environmental and social implications - especially in poor countries where almost all available land is used in some way or another. This should be dealt with in the text.
Christophersen (Climate and Pollution Agency)	9	12	20	-	21	-	-	-	We think that this phrase is somewhat too optimistic as regards environmental pollution problems (air, water, waste, noise) associated with large scale use of RES and should not be used as a general statement.

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Kruger (South African Weather Service)	9	12	10	12	10	9.2.4	-	-	"Change ""Banks"" to ""Bank""."
Steckel (Potsdam Institute for Climate Impact Research)	9	12	-	-	-	9.2.4	-	-	I agree. However, in the context of developing countries the lack of capacity (institutional, wrt to maintenance, own production facilities) could possibly lead to a dependency in this respect.
Rojas (National Meteorological Institute)	9	12	5	12	14	9.2.4	-	-	when talking about external factors is important to make the separation between natural factors and economic and social factors, in local, national or international sectors, which could affect Energy Security
Menichetti (Observatoire M�tropolitain de l'Energie)	9	12	-	-	-	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"
POUFFARY (ADEME - French Environment and Energy Management Agency)	9	12	-	-	-	9.3	-	-	General comment: even if this paragraph is dedicated to impacts, some language precautions need to be reinforced in order to avoid generalization (see comments 9.3.4.1)
Devernay (Electricity of France - EDF Hydro Engineering Centre)	9	12	-	-	-	9.3	-	-	The main problem with this section is that only the negative impacts of the RE sources are discussed, whereas the positive outcomes (not even talking about the use of electricity) are never touched upon. It would be better to give a balanced picture by detailing also what the benefits can be, e.g. in terms of local revenues, job opportunities, capacity building, etc...
Kruger (South African Weather Service)	9	12	32	12	32	9.3.1	-	-	"Change ""of"" to ""from""."
Schmall (Petrobras S.A.)	9	12	20	12	21	9.3.1	-	-	I believe that it is missing two words in the text...environmental with less pollution than the fossil...
Schmall (Petrobras S.A.)	9	12	25	12	25	9.3.1	-	-	It is not clear what means built environment?
Kruger (South African Weather Service)	9	12	24	12	26	9.3.1	-	-	Why only discuss bioenergy, direct solar and hydropower?
Londo (Energy research Centre of the Netherlands)	9	12	27	14	14	9.3.2	-	-	The focus in this subsection is quite strongly on bioenergy from crops, which is logical as this feedstock has most direct interrelations with land and water use, and biodiversity impacts. But it would be elegant to start the section with the short remark that there are three feedstock types: agricultural and forestry residues and wastes, forest material, and crops. The same remark can be made for Tables 2 and 3.

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Devernay (Electricity of France - EDF Hydro Engineering Centre)	9	12	-	-	-	9.3.2.	-	-	Only the impacts of production are addressed here. What about impacts from storage, transportation, use?
Schmall (Petrobras S.A.)	9	12	29	12	43	9.3.2.1	-	-	"It would be important to consider some findings produced by experts like on ""Biofuels and Sustainable Development - Executive Session on Grand Challenges of Sustainability Transition - Summary Report"", by Henry Lee, William C. Clark, and Charon Debereaux, Venice, 2008. In regard the international policy governance on biofuels issues it must be highlighted the guidance of regional and national governments could adopt. ""The best way to develop such internationally recognized guidance and information is almost certainly through multi-stakeholder mechanisms such as the Roundtable on Sustainable Biofuels and the Global Bioenergy Partnership""
Rojas (National Meteorological Institute)	9	12	29	12	34	9.3.2.1	-	-	Including land use change from forest to crops
de Campos Barbosa (Petrobras)	9	13	18	-	-	-	-	-	"Change to: ""...some bioenergy chains may cause in initial phase..."". Large GHG emissions are dependent of premisses as set by Searchinger et al.."
Schmall (Petrobras S.A.)	9	13	35	-	-	-	-	-	"Should remove "" which can have significant impacts on ecosystems and biodiversity"" to improve clarity because the "" impact"" said it's a good one, and not a bad as in the previous times."
Marques (The Plantar Group)	9	13	36	13	36	-	-	-	"The sentence says ""cultivation of bioenergy crops is likely to eliminate niches for some species..."" The term ""likely"" is too strong and reflects an ex-ante judgement. The cultivation of bioenergy crops may or may not eliminate niches, depending on management."
Menichetti (Observatoire M�terran� de l'Energie)	9	13	12	-	-	-	-	-	"What does ""potentially renewable"" mean?"
Schmall (Petrobras S.A.)	9	13	38	-	-	-	-	-	"Where's read ""impacts of bioenergy production on biodiversity"" must be ""impacts of large scale monoculture, for bioenergy production or not, on biodiversity""
POUFFARY (ADEME - French Environment and Energy Management Agency)	9	13	7	-	-	-	-	-	At least it need to be mentioned 2nd generation biofuel and use of seaweeds. Even in a short way, underline also that in many cases, main competition comes from cities/suburbs development where, by the past, lands were usually dedicated to agriculture.
Bilello (NREL)	9	13	8	8	10	-	-	-	Bioenergy-water nexus is a critical and complex issue deserving far more treatment than a single sentence.

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Christophersen (Climate and Pollution Agency)	9	13	11	-	29	-	-	-	Generally biomass feed stocks resemble their fossil counterparts with regards to emissions of traditional air pollutants. We think that this chapter should focus on these similarities and mention obvious differences between comparable fuels (for example wood and coal) where appropriate. We have given a separate comment on how greenhouse gases could be handled throughout chapter 9.3
Moreira (Brazilian Reference Center on Biomass-University of S□Paulo)	9	13	41	13	42	-	-	-	Invasive crop species are quoted in Chapter 2. Cross-check to be sure both places states the same view.
Bilello (NREL)	9	13	41	13	41	-	-	-	Not clear if switchgrass is considered an invasive species where applied as an energy crop in locations where it is considered an indigenous prairie grass.
Moreira (Brazilian Reference Center on Biomass-University of S□Paulo)	9	13	19	13	20	-	-	-	See also Pacca and Moreira, 2009, Energy Policy.
Christophersen (Climate and Pollution Agency)	9	13	9	-	10	-	-	-	Taking into account that some studies have indicated that bio energy might lead to serious water shortage and water pollution, we consider this chapter to be far to short.
Moreira (Brazilian Reference Center on Biomass-University of S□Paulo)	9	13	1	13	7	-	-	-	There are other views. Some authors claim that intensive use of land for energy will improve agriculture and technology transfer will occur for conventional agricultural activities. This should be added in this discussion.
Steckel (Potsdam Institute for Climate Impact Research)	9	13	34	-	35	-	-	-	Trivial, that is true for all forms of renewable energy.
Christophersen (Climate and Pollution Agency)	9	13	12	-	14	-	-	-	We think that this statement is incorrect. The Chemical structure of bio energy resources resembles the structure of fossil fuels and leads to direct emissions of greenhouse gases but not net emission. The principal differences between bio energi and fossil energy are related to the carbon-circuit and we think that the text should focus on this.
Menichetti (Observatoire M□terran□ de l'Energie)	9	13	23	-	-	-	-	-	Why do you compare bioenergy against coal?
Schmall (Petrobras S.A.)	9	13	22	13	22	9.3.. 2.3	-	-	" From the same reference mention before of comment number 13 where I would also hight light the following considerations: "" Policy makers ca isolate problems so as to secure in a responsible manner the potential benefits that biofuels can almost certainly offer to society"" ; ""Greenhouse Gases: When measure over the entire production chain, the production of some biofuels, such as sugar-base ethanol, results in significant reductions in carbon dioxide emissions compare to conventional gasoline"""

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Kruger (South African Weather Service)	9	13	9	13	9	9.3.2.2	-	-	"Insert ""use"" after ""land""."
Rojas (National Meteorological Institute)	9	13	9	13	10	9.3.2.2	-	-	In cases where the agricultural frontier expansion generates deforestation, affect the groundwater recharge due to removal of natural cover, and therefore water availability.
POUFFARY (ADEME - French Environment and Energy Management Agency)	9	13	-	-	-	9.3.2.2	-	-	Maybe need to be more developed. Even if the argument is true, competition between water use in general is the real problem. Example of tourism activities in Morocco and number of golfs.
Kruger (South African Weather Service)	9	13	24	13	24	9.3.2.3	-	-	"Insert ""which"" after ""SO2""."
Kruger (South African Weather Service)	9	13	37	13	37	9.3.2.4	-	-	"Give example of a ""new suite of species""."
Menichetti (Observatoire M□terran□ de l'Energie)	9	13	-	-	-	9322	-	-	"This section is very short compared to the others; the same comment applies to section 9.3.2.5 (human health) and others. In general there should be a certain balance across all sub-sections so please try to respect a minimum length for all sub-paragraphs or otherwise regroup or remove some of them"
Menichetti (Observatoire M□terran□ de l'Energie)	9	14	27	-	29	-	-	-	"Rather than saying: ""due to the popular concept of energy conservation measures"", I would suggest ""due to the adoption of energy conservation measures"""
Schmall (Petrobras S.A.)	9	14	14	-	-	-	-	-	"Replace""Any expansion for bioenergy plantation to these lands could result in displacement of these rural poor(Johansson and Azar,2007)"" by ""Any expansion for bioenergy plantation to these lands could result in displacement of these rural poor(Johansson and Azar,2007), or also can be a new opportunity of development and enhance the life quality and avoid the rural people migration to cities."
Schmall (Petrobras S.A.)	9	14	8	-	-	-	-	-	"Where's read ""Built Enviroment"" must be ""Build Enviroment(visual aspects, infrastructural aspects, transmission lines, settlement etc)"" , for enhance the organization of the report. "
Raturi (The university of South Pacific)	9	14	30	14	31	-	-	-	..mass production of solar hot water systems eg. In apartment houses .... (sentence does not make sense)

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Moreira (Brazilian Reference Center on Biomass-University of S□Paulo)	9	14	12	14	14	-	-	-	And so what? First it is recommended bioenergy plantation in degraded land and now we state that poor people will be impacted by the use of degraded land. Sorry, but no poor person can survive exploring degraded lands.
Christophersen (Climate and Pollution Agency)	9	14	4	-	7	-	-	-	Apart from issues related to particulates, we think that this chapter should focus more on the similarities between fossil fuels and bio fuels as regards (shorter term) effects on human health. We suppose that the greatest differences here are not related to the fuel itself but to implementation and technology - this should be discussed in more detail.
Bilello (NREL)	9	14	22	14	34	-	-	-	Authors may want consider balancing amount of detail on solar thermal with treatment of solar electric.
Raturi (The university of South Pacific)	9	14	23	14	24	-	-	-	Contradicting statements regarding solar hot water systems
Steckel (Potsdam Institute for Climate Impact Research)	9	14	26	-	27	-	-	-	In a very specific context, i.e. Ontario, Canada
Menichetti (Observatoire M□terran□ de l'Energie)	9	14	30	-	-	-	-	-	rather than mass production, this is large scale diffusion
Raturi (The university of South Pacific)	9	14	21	-	-	-	-	-	Reference not correct
Moreira (Brazilian Reference Center on Biomass-University of S□Paulo)	9	14	16	14	21	-	-	-	Remove to save space.
Raturi (The university of South Pacific)	9	14	28	14	29	-	-	-	Rephrase the sentence
Raturi (The university of South Pacific)	9	14	20	14	21	-	-	-	Sentence needs to be corrected
Devernay (Electricity of France - EDF Hydro Engineering Centre)	9	14	18	-	-	-	-	-	Solar energy is also the sine-qua-non condition for biomass production by all photosynthetic organisms, including energy crops.
Bilello (NREL)	9	14	16	14	21	-	-	-	Suggest deleting this paragraph.

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Moreira (Brazilian Reference Center on Biomass-University of S□Paulo)	9	14	25	14	26	-	-	-	The quantitative information (40 to 50%) has no meaning here. It depends of the region and the project.
Devernay (Electricity of France - EDF Hydro Engineering Centre)	9	14	36	14	43	-	-	-	This usage seems quite anecdotic. The extent of its use should at least be precised, as well as the potential for future developments.
Christophersen (Climate and Pollution Agency)	9	14	35	15	5	-	-	-	We think that this chapter should be extended to cover the highly relevant issues concerning land requirements related to large scale implementation of solar energy in more detail. The text indicates that land requirements are unproblematic even in cities, but we question whether this is the case for high energy demands. The chapter appears rather unbalanced, since more than half of the text deals with the rather limited topic of soil disinfection. We also question whether this topic is relevant in this context (Is it an alternative application of solar radiation, rather than an environmental impact?). The text is incoherent with line 2-3, page 51.
Schmall (Petrobras S.A.)	9	14	4	14	7	9.3.2.5	-	-	After the reference should add that: Policies and best practices in agriculture related to sugar cane harvesting , including crop fire, must be established to protect workers and neighborhood people health.
Rosinski (Electric Power Research Institute)	9	14	-	-	-	9.3.3	-	-	This section should include concerns with central station solar including land use, species / habitat interactions, water use
Menichetti (Observatoire M□terran□ de l'Energie)	9	14	36	-	43	9331	-	-	This first part is not related to the impacts of solar on land use, so I would suggest deleting it.
Menichetti (Observatoire M□terran□ de l'Energie)	9	15	26	-	28	-	-	-	""The pollution is estimated""□ You can estimate the contribution of the manufacturing phase to some impact categories like greenhouse gas, acidification, eutrophication, etc□ but you cannot estimate ""pollution""."
Outhred (University of New South Wales)	9	15	1	14	1	-	-	-	""Typically, large land areas are not required to produce solar energy"" This, of course depends on how much energy we want to produce. In cities, roof area of multi-story may not be sufficient to meet the occupants' requirements."
Rybach (Geowatt AG)	9	15	-	16	-	-	-	-	"9.3.4 Geothermal Energy: Here only power generation is treated. Geothermal direct use is significantly larger (as described in detail in Chapter 4), both in installed capacity and annual production. Environmental effects are negligible; this should at least be mentioned here."
Menichetti (Observatoire M□terran□ de l'Energie)	9	15	41	-	43	-	-	-	"Fossil fuels being responsible for GHG emissions, any alternative energy source has ""considerably high potential for reducing GHG emissions compared to fossil fuels"". I would suggest rephrasing it."

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Fulton ( Deutsche Bank)	9	15	1	15	3	-	-	-	"Seems to underestimate the amount of land needed for solar. Source: DBCCA, ""DRAFT: Strategic Power Delivery System Analysis: Overcoming Intermittent Renewable Energy Barriers to Scale,"" see pages 16, 17 (Report to be published in 1Q 2010). See SRREN_Draft0_Review_Fulton_Mark_Material_01.pdf"
Raturi (The university of South Pacific)	9	15	1	15	5	-	-	-	....produce solar energy ?? also dedicated land area will be required to generate steam for soil disinfection
Raturi (The university of South Pacific)	9	15	13	15	14	-	-	-	..materials salvaged from waste streams ..???
Steckel (Potsdam Institute for Climate Impact Research)	9	15	42	-	-	-	-	-	citation not adequate!
Steckel (Potsdam Institute for Climate Impact Research)	9	15	38	-	-	-	-	-	citation strange
Outhred (University of New South Wales)	9	15	42	15	42	-	-	-	Cross-reference Chapter 4, Geothermal Energy.
Christophersen (Climate and Pollution Agency)	9	15	6	-	18	-	-	-	Desalination and water treatment are good examples of environmentally sound use of solar radiation, but we question whether this chapter should also deal with possible direct or indirect effects from solar energy production on water quality and quantity. These considerations should cover the whole energy chain, including production of equipment and transmission.
Christophersen (Climate and Pollution Agency)	9	15	33	-	39	-	-	-	Effects of large scale systems should also be covered. We think that solar chimneys are still only on the drawing board and the text should reflect this.
Outhred (University of New South Wales)	9	15	23	15	25	-	-	-	Equipment may have to be returned to the manufacturer for recycling. This may be expensive and the transport itself may result in emissions.
Raturi (The university of South Pacific)	9	15	41	-	-	-	-	-	Geothermal 'fuels' ?? its mainly steam and hot water
Bilello (NREL)	9	15	30	15	32	-	-	-	In some cases, PV modules contain materials that are hazardous to human health to waste streams and recycling of materials must be considered. Distributed PV systems are also often coupled with battery systems which also have potential health implications if not managed.
Moreira (Brazilian Reference Center on Biomass- University of S□Paulo)	9	15	26	15	28	-	-	-	It should be nice to quantify energy balances for solar heaters and PVs here, mainly because this is directly connected with the statement on this same page, line 30 to 31.

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Devernay (Electricity of France - EDF Hydro Engineering Centre)	9	15	28	-	-	-	-	-	It would be particularly interesting to have the figure corresponding to the calculation detailed in the previous 3 lines.
Bilello (NREL)	9	15	1	15	5	-	-	-	Land requirement reference is not accurate - especially if considering both CSP and utility scale PV for both rural and urban settings for distributed and centralized plants. Desert ecosystems impacts should be noted here.
Raturi (The university of South Pacific)	9	15	39	-	-	-	-	-	Reference not correct. Larger PV systems and CSP systems do require substantial land area
Bilello (NREL)	9	15	20	15	28	-	-	-	Reference should be made to the positive benefits of SHS and solar lanterns for indoor air quality if displacing kerosene, parafin, or other traditional fuels for lighting.
Bilello (NREL)	9	15	7	15	18	-	-	-	Reference to distributed solar for water pumping should be noted here.
Menichetti (Observatoire M <span style="font-family: serif;">□</span> terran <span style="font-family: serif;">□</span> de l'Energie)	9	15	37	-	39	-	-	-	So far there are very few installations of this type all over the world, and they are not located in the built environment. In this paragraph, as in others, you tend to mix different solar technologies (PV, CSP, solar thermal) without clearly explaining the differences between them
Bilello (NREL)	9	15	34	15	39	-	-	-	Statement not accurate. The visual implications of CSP and utility PV is a major issue for siting and project approval.
Outhred (University of New South Wales)	9	15	20	15	22	-	-	-	The extent of CO2 emission reduction depends on the emissions of the alternative generation that solar energy displaces. This will be context-specific.
Christophersen (Climate and Pollution Agency)	9	15	26	-	28	-	-	-	The pollution produced should be quantified - preferably numerically.
Christophersen (Climate and Pollution Agency)	9	15	41	-	42	-	-	-	The rationale behind this sentence should be explained. We thought that geothermal energy in essence was GHG-free. Why does it have a potential of only up to 75%?
Bilello (NREL)	9	15	41	-	42	-	-	-	This passage seems to suggest that geothermal has greater GHG emission reduction potential compared to other renewable energy technologies. Is this what the authors are asserting? Counterfactual should be referenced here for context.
Menichetti (Observatoire M <span style="font-family: serif;">□</span> terran <span style="font-family: serif;">□</span> de l'Energie)	9	15	2	-	5	-	-	-	This sentence needs to be rephrased, it is very confusing
Christophersen (Climate and Pollution Agency)	9	15	43	-	-	-	-	-	What is natural wastes - is it emissions to air and water originating in the geothermal source?
Kruger (South African Weather Service)	9	15	1	15	5	9.3.3.1	-	-	These statements are only applicable to small-scale projects.

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Kruger (South African Weather Service)	9	15	6	15	18	9.3.3.2	-	-	What about the water needs of solar plants, e.g. for removal of dust.
Devernay (Electricity of France - EDF Hydro Engineering Centre)	9	15	-	-	-	9.3.3.3.	-	-	PV systems manufacturing requires substantial amount of energy (electricity). Studies indicate that in some cases several years of operation are required from these systems to generate the equivalent amount of electricity that was needed for their manufacturing. As this is a somewhat debated topic, figures on the Energy Payback Ratio, or amount of energy required vs. produced over the life cycle would be required.
POUFFARY (ADEME - French Environment and Energy Management Agency)	9	15	-	-	-	9.3.4.1	-	-	Such bad example is definitely is true one. But clearly risks assessment, environmental impacts assessment and knowledge on such concern are quite common now and would normally allow avoiding such problem. See for example line 31 in order to avoid generalization.
Rybach (Geowatt AG)	9	16	5	-	13	-	-	-	"The example of Wairakei/N.Z. is by no means typical (lines 8-13 should be deleted); reinjection of the used geothermal fluid into the ground (with no surface effects) is now standard practice in many countries. The discharge of heat and chemicals into surface waters is strongly regulated by the water protection authorities."
Menichetti (Observatoire M�tropolitain de l'Energie)	9	16	2	-	3	-	-	-	Either you describe the different geothermal technologies mentioned or you delete them.
Rybach (Geowatt AG)	9	16	3	-	-	-	-	-	it must be added here that binary-cycle geothermal power plants operate in closed circle, thus without emissions.
Rybach (Geowatt AG)	9	16	15	-	21	-	-	-	It should be mentioned that the CO2 emission of geothermal power plants is not negligible. The global average is currently about 120 g CO2 per generated kWh (see Chapter 4).
Christophersen (Climate and Pollution Agency)	9	16	2	-	3	-	-	-	The main environmental characteristics of the types should be explained.
Christophersen (Climate and Pollution Agency)	9	16	22	-	24	-	-	-	This might as well be described in the water chapter. Are there other serious effects on biodiversity, natural ecosystems or land from power plants and the associated infrastructure?
Menichetti (Observatoire M�tropolitain de l'Energie)	9	17	44	-	45	-	-	-	""It produces 60 times less GHG����. These figures should be possibly given for all the RE technologies described, and not just for hydropower - and possibly also on a gCO2eq/kWh basis"
Outhred (University of New South Wales)	9	17	44	18	1	-	-	-	"Hydropower ""produces 60 times less greenhouse gas emissions than those from coal-fired power plants, and 18-30 times less than natural gas power"" This needs an independent reference."
Devernay (Electricity of France - EDF Hydro Engineering Centre)	9	17	27	-	-	-	-	-	"Scouring and erosion is an example of ""gross impact"" that can be remediated : use of regulating pond downstream of the powerhouse enable steady release of water, therefore dramatically reducing the risk of erosion. "

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Verbruggen (University of Antwerp)	9	17	2	-	3	-	-	-	"the 16% share of hydropower refers to electricity supplies, where it is the ""highest"" RE contributor; this is not valid for energy in general as ""global energy supply"""
Christophersen (Climate and Pollution Agency)	9	17	43	-	45	-	-	-	"We propose that the wording 1/60 is used instead of ""60 times less"" (also applicable to ""18-30 times less"" in next line)."
Raturi (The university of South Pacific)	9	17	20	-	-	-	-	-	..since these matters settle down ... ( replace with materials or substances )
Rybach (Geowatt AG)	9	17	19	-	-	-	-	-	9.3.5 Hydropower: Most of the described effects do not apply to small hydro.
Devernay (Electricity of France - EDF Hydro Engineering Centre)	9	17	3	-	-	-	-	-	According to IEA, 2007, hydropower accounts for 90% of electricity produced from RES.
Bilello (NREL)	9	17	44	18	1	-	-	-	Carbon intensity figure does not seem correct especially considering methane potential from reservoirs. In addition, citing a hydropower association here is likely not best source for these data. Is this life-cycle or operating phase? Suggest reporting all GHG emissions as life-cycle for more meaningful comparisons.
Taylor (International Hydropower Association (IHA))	9	17	6	8	10	-	-	-	Delete and rewrite sections 9.3.5.1-9.3.5.6 to be consistent with the narrative on the essential characteristics of hydro (reservoir, run-of-river, pumped storage and off-grid), the GHG status of hydro reservoirs, and the sustainability of hydro in chapter 5. Reason: At the moment these sections focus on dams in a unbalanced way and without reference to the significant advancements in hydro sustainability over the past 15 years and the measurement of the GHG emissions of reservoirs in the last three years!
Christophersen (Climate and Pollution Agency)	9	17	1	19	10	-	-	-	Other possible relevant issues to be dealt with in this chapter include (possible catastrophic) dam failures and emissions of SF6 from extensive electric infrastructure.
Raturi (The university of South Pacific)	9	17	13	-	-	-	-	-	Reference not complete
Moreira (Brazilian Reference Center on Biomass- University of S□Paulo)	9	17	36	17	36	-	-	-	Should read: "Hydropower generation is currently contributing slightly over 16% of global electricity supply□;";; Jose Roberto;Moreira;Brazilian Reference Center on Biomass- University of S□Paulo;Brazil;95;9;17;36;17;36;";;Check: "aka river fragmentation□ (???)". Not all readers may understand.
Schmall (Petrobras S.A.)	9	17	31	-	-	-	-	-	The reference is missing

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Taylor (International Hydropower Association (IHA))	9	17	3	17	5	9.3.5	-	-	Delete last sentence of this section. Reason: Erroneous and irrelevant. Hydropower may be run-of-river. The key characteristic of hydro is the harnessing of water in one way or another.
Rosinski (Electric Power Research Institute)	9	17	-	-	-	9.3.5	-	-	Hydro section could include description of operational mitigation approaches currently in use such as water spillage, fish ladders, etc.
Devernay (Electricity of France - EDF Hydro Engineering Centre)	9	17	-	-	-	9.3.5	-	-	Only the gross negative impacts are discussed in this section. There is no mention of (i) the mitigation and compensation measures that are available to balance these impacts, and (ii) the benefits arising from hydropower development for the local communities and the regional economy. This section does therefore not give a balanced view of strengths and weaknesses of hydropower re. sustainable development, which is the topic of this chapter 9. For improvement, see suggestion above re. 5.6.
Gagnon (Hydro-Quebec)	9	17	-	19	-	9.3.5	-	-	The section on the impacts of hydropower will need to be revised once Chapter 5 is closer to its final version. An example of the revisions that will be needed is that the discussion of the effects of large dams on human health does not mention the health benefits that occur when dams improve access to drinking water.
Tolmasquim (Empresa de Pesquisa Energetica - EPE)	9	17	19	17	19	9.3.5	-	-	The text states that 'Constructing hydropower dams and reservoirs can dramatically affect the quality of water. It is considered that, although changes on the water quality are observed, the word dramatically is not adequate.
Devernay (Electricity of France - EDF Hydro Engineering Centre)	9	17	-	-	-	9.3.5.	-	-	"The topic of this section on Hydropower is addressed in much greater detail in section 5.6. Many of the statements in this section are not consistent with 5.6. It is therefore strongly suggested that (i) this section be removed, and reference be made to section 5.6, or (ii) that a summary of section 5.6 be made here, that would ensure consistency of the document and exhaustivity of this section."
Rojas (National Meteorological Institute)	9	17	19	17	41	9.3.5.2	-	-	Discharged into the dams can cause problems for downstream settlements because the flow is greater, hence the need to establish mechanisms for flood control
Devernay (Electricity of France - EDF Hydro Engineering Centre)	9	17	-	-	-	9.3.5.3	-	-	"This section on GHG emissions from HP does not reflect the variability and complexity of situations encountered in the world. It is misleading and somewhat provocative to assert in a general way that ""HP has very few GHG emissions compared with other large-scale fossil energy options"", and propose figures like ""60 times less GHG than coal-fired powerplants and 18-30 times less than natural gas power plants"". The section indeed only relies on emission from boreal or temperate reservoirs (Canada). The situation is somewhat different for tropical reservoirs, but this is not reflected in this section. This issue is however addressed in details in section 5.6, which should be the reference for this topic."
Outhred (University of New South Wales)	9	18	8	18	8	-	-	-	"Provide a complete citation for ""US EPA"""

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Devernay (Electricity of France - EDF Hydro Engineering Centre)	9	18	8	-	-	-	-	-	-	"the end of the sentence should be ""□release of methane gas DURING THE FIRST YEARS AFTER IMPOUNDMENT, a potent greenhouse gas (US EPA)."""
Steckel (Potsdam Institute for Climate Impact Research)	9	18	1	-	-	-	-	-	-	citation not adequate!
Sugiyama (CRIEPI)	9	18	25	19	1	-	-	-	-	Good table - please work further to capture the whole range of positive effects of hydropower to sustainable development
Moreira (Brazilian Reference Center on Biomass- University of S□Paulo)	9	18	11	18	11	-	-	-	-	Incomplete reference.
Christophersen (Climate and Pollution Agency)	9	18	5	-	11	-	-	-	-	Possible issues related to loss of forests and other carbon sinks might be dealt with in this context.
Raturi (The university of South Pacific)	9	18	4	-	-	-	-	-	-	Reference not complete
MANNEH (MINISTRY OF FINANCE AND ECONOMIC AFFAIRS)	9	18	-	-	-	-	-	-	1	Adjust the table to fit on one page if possible.
Kruger (South African Weather Service)	9	18	30	18	30	9.3.5.5	-	9.1	-	Table 1 = Table 9.1
Devernay (Electricity of France - EDF Hydro Engineering Centre)	9	18	-	-	-	-	-	-	Table 1	"It is not clear how a large dam project can affect ""flood security"" in the ""upper catchement and river"" (unless this is the downstream river, in which case this statement should be in the ""Downstream River"" section further down in the same table)"
Raturi (The university of South Pacific)	9	19	26	-	-	-	-	-	-	....in a platform, land is only required... ( sentence rearrange)
Raturi (The university of South Pacific)	9	19	8	-	-	-	-	-	-	Add- (On the other hand) hydro power projects also facilitate.....
Rybach (Geowatt AG)	9	19	3	-	10	-	-	-	-	even for large hydro projects the effects on built environment do not occur □usually□, they only □can occur□.

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Raturi (The university of South Pacific)	9	19	14	-	15	-	-	-	Please check the sentence
Moreira (Brazilian Reference Center on Biomass-University of S□Paulo)	9	19	7	19	8	-	-	-	The example of road inundation in Brazil is not a good example. This accident could be, and usually is, considered in the hydro plant planning. Some times, it is agreed that a road will be destroyed, as part of the project, but an alternative construction is implemented.
Christophersen (Climate and Pollution Agency)	9	19	2	-	10	-	-	-	Visual aspects and other issues related to (long) transmission-lines might be dealt with in this chapter.

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LEITE DRACHMANN (PETROBRAS)	9	19	3	19	10	9.3. 5.6	-	-	<p>"Circa 77 % electricity production in Brazil comes from hydropower, constitutes the major energy source for this purpose in the country .Until the 80ths, the construction of hydroelectric plants in the country was mostly focused on technical and economic viability, as there were few legal environmental restrictions. From the nineties, the hydro plants began to adopt criteria for the identification, organization and ownership of wetlands, taking into account environmental impacts and control measures. As a consequence, environmental impacts were severely reduced in recent hydro power plants.</p> <p>Measurements to control biodiversity of dams construction are adopted, such as as mechanisms to ensure the minimum flow of the rivers, slopes containment, collection and seedling establishment of nurseries for the possible recovery of the flora. Concerning fauna, several species of aquatic and terrestrial animals are rescued. In the socio-economic context, various programs such as socio-environmental education for the local population, relocation of property owners, compensation of arable land, among others, are applied to reduce the impact.</p> <p>The small hydro plants and the use of run-of- river technique, are now a good alternative to the negative environmental impacts previously caused by hidro-power, for generating small wetlands and preserving the natural flow of rivers, thus reservoir accumulation. While it is not possible to avoid totally these impacts, they can be minimized. Well succeeded examples of run-of-river include UHE Santo Antonio (3150 MW, 271 km2 reservoir) and UHE Jirau (3300 MW, 258 km2 reservoir) and PCH Santa Fe (30 MW, 2,58 km2) .</p> <p>The Brazilian territory has a large volume of water resources and environmental impacts caused by this renewable energy source are considerably reduced when compared to burning of fossil fuels. Only in seldom occasions when water shortage in the hydro plants reservoirs occurs, the country utilizes fossil derived energy. Nevertheless, it must be pointed out that natural gas is the major feedstock used in the country for this complementary thermo power production, which is the most environmentally friendly amongst fossil fuels. Therefore, hydro-power plants are today among the best options in Brazil for the present high growing energy demand.</p> <p>"</p>
POUFFARY (ADEME - French Environment and Energy Management Agency)	9	19	-	-	-	9.3. 5.6	-	-	<p>Again, impacts are pushed in the upfront. I kindly suggest underlining the need to transfer knowledge in order to develop small hydropower units with low impacts on the built environment (as it is the case in EU or in France).</p>
Kruger (South African Weather Service)	9	19	5	19	7	9.3. 5.6	-	-	<p>References for statements needed.</p>

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Tolmasquim (Empresa de Pesquisa Energetica - EPE)	9	19	7	19	8	9.3.5.6	-	-	The item is related to impacts on Built Environment and one of the examples is 'A 50-km stretch of highway was inundated during the construction of the Samuel Dam in Brazil. ♦ It should also be stressed that this kind of impact is always mitigated by the construction of new roads and are quite different for the impacts on houses our archeological sites that can include externalities not observed in the impacts of roads.
POUFFARY (ADEME - French Environment and Energy Management Agency)	9	19	-	-	-	-	-	1	"Regarding ""irrigation areas"", health impacts, as they are described, are not clear for me."
Rybach (Geowatt AG)	9	19	-	-	-	-	-	1	continuation of Table 1: sexually transmitted diseases, HIV/AIDS are hardly attributable to large hydropower dam projects.
Moreira (Brazilian Reference Center on Biomass- University of S□ Paulo)	9	19	-	-	-	-	-	1	First Row - How can irrigation areas be a driver for HIV/AIDS? It can□t be a direct effect.
Rojas (National Meteorological Institute)	9	19	30	19	30	-	-	1	What is the connection between HIV and irrigated areas???
Raturi (The university of South Pacific)	9	20	2	-	-	-	-	-	...water pollution above of them ?? please rephrase
Raturi (The university of South Pacific)	9	20	11	20	12	-	-	-	Rephrase the sentence
Raturi (The university of South Pacific)	9	20	27	-	-	-	-	-	Sea streams are not so severe..... ( needs clarification)
Menichetti (Observatoire M□terran□ de l'Energie)	9	20	13	-	13	-	-	-	The reference is a bit old (1982). Can you add a more recent one?
Devernay (Electricity of France - EDF Hydro Engineering Centre)	9	20	-	-	-	9.3.6.4	-	-	"it should be noted that on ""La Rance"" scheme (France), 10 years after the impacts associated with construction, the situation was back to normal in the estuary, compared to neighbouring estuaries. ""Despite the artificial rises and falls ecosystems reached a new equilibrium, keeping an outstanding bio-diversity"" (Patrick Le Mao, Penn Ar Bed n□ 160, 1996). Installation of a powerplant may even contribute to the improvement of a polder's water quality like for the Shiwa tidal power plant (South Korea)."
Kruger (South African Weather Service)	9	20	27	20	30	9.3.6.4	-	-	Rephrase sentences - unclear.
Outhred (University of New South Wales)	9	21	26	21	27	-	-	-	Need an independent reference

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Outhred (University of New South Wales)	9	21	21	21	21	-	-	-	""Wind is the fastest growing source of renewable energy in the world"" In %/year terms, PV may be growing more quickly."
Schmall (Petrobras S.A.)	9	21	10	-	-	-	-	-	"Remove the sentence: "" However, the risks are not larger than those for other industrial applications involving these chemicals"""
Steckel (Potsdam Institute for Climate Impact Research)	9	21	26	-	27	-	-	-	"the statement does not seem to be scientifically backed; citation NOT AT ALL adequate! The statement might be true for the comparison with other renewables, however, please elaborate under which circumstances and also with respect to fossil fuels, nuclear"
Fulton ( Deutsche Bank)	9	21	26	-	-	-	-	-	"What type of power production? Renewable, non-renewable? Land required for large MW is not insubstantial. Source: DBCCA, ""DRAFT: Strategic Power Delivery System Analysis: Overcoming Intermittent Renewable Energy Barriers to Scale,"" see pages 16, 17 (Report to be published in 1Q 2010). See SRREN_Draft0_Review_Fulton_Mark_Material_01.pdf"
Schmall (Petrobras S.A.)	9	21	12	-	-	-	-	-	"Where's written ""Build Enviroment"" must be ""Build Enviroment(visual aspects, infrastructural aspects, transmission lines, settlement etc)""", for enhance the organization of the report. "
Menichetti (Observatoire M□terran□ de l'Energie)	9	21	22	-	-	-	-	-	"Wind is not the fastest growing technology; PV is the fastest growing technology. The reference is outdated"
Hohmeyer (Flensburg University)	9	21	23	21	24	-	-	-	"Wind power actually may result in substantial noises emissions (see SR REN Chapter 7.6). In rare cases lubricants can be spilled if not handled carefully in off shore wind turbine maintenance. Thus, the wording needs to be more cautious ('does not result in any emissions' simply is wrong!). "
Hohmeyer (Flensburg University)	9	21	37	21	39	-	-	-	A clear statement concerning the indirect effects needs to be made here, as indirect air polluiton is the most important indirect effect of wind energy (use material presented in SRREN Chapter 7.6.1.2
Hohmeyer (Flensburg University)	9	21	33	21	35	-	-	-	A hint should be made to the possible loss of lubricant, which may cause soil and water pollution.
Hohmeyer (Flensburg University)	9	21	24	21	24	-	-	-	A sentence should be added that the main environmental impacts are either indirect effects through the production of wind turbines, through impacts on birds and bats, noise, flicker, and visual intrusion. Indirect effects can be approximated by the energy pay back time of the technology. See SRREN Chapter 7.6.1.2
Raturi (The university of South Pacific)	9	21	23	-	-	-	-	-	Beyond during the process of .....

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POUFFARY (ADEME - French Environment and Energy Management Agency)	9	21	14	-	-	-	-	-	-	If appropriate precautions are in place, there is almost no effect on biodiversity. For example, in France, LPO (Ligue de Protection des Oiseaux) has produced an advocacy position in favor of wind power.
Moreira (Brazilian Reference Center on Biomass-University of S□Paulo)	9	21	37	21	39	-	-	-	-	It should be nice to quote some energy balance figures here to really endorse the statement that wind energy is environment friendly.
Rosinski (Electric Power Research Institute)	9	21	-	-	-	-	-	-	-	Offshore wind impacts should also be discussed
Steckel (Potsdam Institute for Climate Impact Research)	9	21	22	-	-	-	-	-	-	publication date, regional focus and peer-review status of the citation not adequate for the statement
Christophersen (Climate and Pollution Agency)	9	21	27	-	28	-	-	-	-	Taking into account that most land areas have recreational or other non-commercial uses, we propose that this sentence is reformulated.
Rybach (Geowatt AG)	9	21	26	-	31	-	-	-	-	Visual impacts are treated better here than in 9.3.7.6
Christophersen (Climate and Pollution Agency)	9	21	26	-	27	-	-	-	-	We question whether this statement is accurate on a per kWh basis - taking additional infrastructure, effects from noise on surrounding areas and the relative low power output from wind-turbines into account.
Menichetti (Observatoire M□terran□ de l'Energie)	9	21	26	-	27	-	-	-	-	What about solar PV panels? You need to better define what the alternative technologies for power production are
Bilello (NREL)	9	21	26	21	31	-	-	-	-	Wind industry association not best source to cite here as information may appear biased. In addition, this section appears to dramatically underestimate the considerable land use requirements and siting implications for large scale wind development. At the same time, authors should reference dual purposing of land for wind development with agricultural and ranching.
Hegde (Suzlon Energy Ltd)	9	21	-	22	-	9.3.7	-	-	-	More evidence and emphasis is required. Case studies of CSR activities of wind players may be provided
Hohmeyer (Flensburg University)	9	21	21	22	34	9.3.7	-	-	-	This section should draw more on the text and sources of Chapter 7.6 to substantiate statements made.
POUFFARY (ADEME - French Environment and Energy Management Agency)	9	21	-	-	-	9.3.7.5	-	-	-	Significant R&D has been conducted and is on going. Real improvements have been achieved (check www.ewea.org)
Christophersen (Climate and Pollution Agency)	9	22	36	-	37	-	-	-	-	"We propose that the sentence is changed as follows: ""□ availability of the energy resource in question and secondary resources (e.g. water)□""

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Christophersen (Climate and Pollution Agency)	9	22	1	-	14	-	-	-	"We suppose that other relevant issues related to ecosystems might be relevant in this context - for example effects on wildlife from noise (including infrasound) and nature intervention in ""un-used"" areas."
Schmall (Petrobras S.A.)	9	22	25	-	-	-	-	-	"Where's written ""Built Environment"" must be ""Build Environment(visual aspects, infrastructural aspects, transmission lines, settlement etc)"" , for enhance the organization of the report. "
Bilello (NREL)	9	22	2	22	14	-	-	-	Impact on bats should be included in this section along with birds.
Christophersen (Climate and Pollution Agency)	9	22	30	-	31	-	-	-	It might be added that location of wind farms away from populated centres will inevitable lead to more visual impacts in recreational areas (except, possibly, for off-shore installations).
Fulton ( Deutsche Bank)	9	22	32	-	-	-	-	-	Please cite paper claiming wind farms are attractive.
Hohmeyer (Flensburg University)	9	22	2	22	10	-	-	-	Should be supported by the use of additional material presented in SRREN Chapter 7.6.2
Hohmeyer (Flensburg University)	9	22	26	22	27	-	-	-	Should not read 'Because wind farms ... tend to be located on or just below ridgelines or within sight of shores'. More appropriate: 'If wind farms are located on ridgelines, near shores or in open terrain, they are visible for long distances.' This avoids the false impression that most wind farms are located on ridgelines or near shore.
Hohmeyer (Flensburg University)	9	22	32	22	35	-	-	-	Statement can be supported by additional studies quoted in SRREN Chapter 7.6.3.1
Hohmeyer (Flensburg University)	9	22	26	22	26	-	-	-	The number of turbines does not increase visibility. Should be dropped as argument.
Hohmeyer (Flensburg University)	9	22	13	22	14	-	-	-	They..' Is not leading into the sentence. Should read 'Proper planing procedures need to consider the location of...'
Rybach (Geowatt AG)	9	22	13	-	-	-	-	-	who is □They□? Turbine blades?
Rosinski (Electric Power Research Institute)	9	22	-	-	-	9.3.7.4	-	-	Could also include issues for bats and sage grouse
Bilello (NREL)	9	22	-	-	-	9.3.7.4	-	-	Suggest clarifying link between turbine blade speed and size of turbine (there are modern, small turbines that still rotate rapidly).
Christophersen (Climate and Pollution Agency)	9	23	-	-	-	-	-	-	"Should the heading read ""Development pathways for different renewable energy sources.""?"
Menichetti (Observatoire M□terran□ de l'Energie)	9	23	16	-	-	-	-	-	"What are these ""obscure"" data?"
Menichetti (Observatoire M□terran□ de l'Energie)	9	23	14	-	16	-	-	-	Saying that the narrow focus on GHG emissions is due to the relative ease of data access for GHG emissions is tautological. Please, rephrase.

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Pehnt (Institute for Energy and Environmental Research)	9	23	33	-	-	-	-	-	The meaning of consequential LCA does not become clear to readers not familiar with LCA. Perhaps you can also illustrate this using SRREN_Draft0_Review_Pehnt_Martin_Material_03.pdf
Menichetti (Observatoire M□terran□ de l'Energie)	9	23	21	-	25	-	-	-	This is true also for conventional technologies
Venghaus (Potsdam Institut for Climate Impact Research)	9	24	39	24	40	-	-	-	"Here the order should be rearranged. It appears to me that ""employment"" is not the most pressing concern / human need. Consequently, aspects such as food, health services, running water should probably be mentioned first."
Schmall (Petrobras S.A.)	9	24	46	25	16	-	-	-	"Remove all text from ""In rural areas, women..."" to ""indirect costs"". That's non-scientific and in the last paragraph it's repeated information."
Venghaus (Potsdam Institut for Climate Impact Research)	9	24	46	-	-	-	-	-	"The example ""cooking"" was also mentioned in the passage directly above (redundant). Furthermore the statement ""fuelwood is actually the dominant source of energy in rural areas"" should be slightly changed as it suggests this to be true in 'all' rural areas."
Garcia (Renewable Energy Center)	9	24	13	24	13	-	-	-	"The statement: ""Local pollution an health benefitsare improved"" puts in the same level a negative and a positive feature of RE deployment. It should be better to state: Local environmental quality and health benefits are improved"
Christophersen (Climate and Pollution Agency)	9	24	5	-	8	-	-	-	"We think that this sentence should be revised to cover the inter-generational and long-long term environmental aspects of sustainable development , since the achievement of the socioeconomic goals in a shorter time perspective does not in itself necessarily justify large scale transformation to renewable energy options. (for example ""abatment"" as exemplified in line 31-34 might actually be a very ""sustainable"" solution in a shorter time scale, but questionable in a longer perspective)."
MANNEH (MINISTRY OF FINANCE AND ECONOMIC AFFAIRS)	9	24	4	55	10	-	-	-	Areas that needs to be looked at for possible reduction or shortened.
Steckel (Potsdam Institute for Climate Impact Research)	9	24	14	-	-	-	-	-	as table 2 is huge the reference is not sufficient
Venghaus (Potsdam Institut for Climate Impact Research)	9	24	40	24	42	-	-	-	Emigration is only but one possible consequence. The impossibility of escape and the consequent life under inhuman conditions (human rights etc.) is another alternative to be considered.
Bilello (NREL)	9	24	32	-	-	-	-	-	If all 2 billion people were to use kersone for what purpose? For all heating, lighting, and cooking needs? Suggest clarifying what services the kerosene could supply in place of unsustainable fuel use. Also suggest including a more general discussion of how fossil fuels might more effectively meet some energy service needs in the near term in the developing world.

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Venghaus (Potsdam Institut for Climate Impact Research)	9	24	14	24	16	-	-	-	Incomplete sentence.
Schmall (Petrobras S.A.)	9	24	40	24	42	-	-	-	Should be retired the comment : The lack of access....leads to emigration to industrialized countries..It is not appropriated for a IPCC SR...
Christophersen (Climate and Pollution Agency)	9	24	3	25	16	-	-	-	The concept of sustainable development implies the fulfilment of basic needs on one side and the avoidance of excess environmentally harmful consumption on the other side. We think that this chapter should deal with these two aspect of sustainability in a more systematic manner. Focus should be more on allocation of energy resources among population groups and generations and on possible options to meet sustainability targets with the use of renewable energy - but also by less use of energy in general.
Steckel (Potsdam Institute for Climate Impact Research)	9	24	34	-	-	-	-	-	The sentence somehow stands for itself, not in the context of the section --> some more elaboration wrt resource limitations needed
Bilello (NREL)	9	24	36	24	37	-	-	-	This broad brush characterization of one part of society globally does not add credibility to the assessment. Suggest deleting.
Venghaus (Potsdam Institut for Climate Impact Research)	9	24	14	24	21	-	-	-	This passage needs a more profound and detailed argumentation, e.g., what regions are affected by these (e.g., mainly developing countries, under which conditions, how...)
Gifford (The Potsdam Institute for Climate Impact Research)	9	24	30	24	30	4,1	-	-	biomass for rural energy use does not necessarily cause deforestation.
Kruger (South African Weather Service)	9	24	25	24	35	9.4.1	-	-	"Change ""elite"" to ""rich""? (and elsewhere in paragraph)"
Kruger (South African Weather Service)	9	24	32	24	32	9.4.1	-	-	Is it 50 kg per person?
Kruger (South African Weather Service)	9	24	14	24	16	9.4.1	-	-	Rephrase sentence - unclear.
Steckel (Potsdam Institute for Climate Impact Research)	9	25	9	-	16	-	-	-	Negative aspects of what?
Menichetti (Observatoire M□terran□ de l'Energie)	9	25	12	-	13	-	-	-	What is the link between renewables and weapon proliferation?

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Kruger (South African Weather Service)	9	25	1	25	1	9.4.1	-	-	""Basic level"" = ""basic need""?"
Kruger (South African Weather Service)	9	25	13	25	13	9.4.1	-	-	"Remove ""(case of weapon proliferation)""?"
Devernay (Electricity of France - EDF Hydro Engineering Centre)	9	26	-	-	-	-	-	-	"Hydropower : figure for emssions have actually a much broader range. Reference should be made to chapter 5.6 where ranges are given. There should not be a unique igure for large HP (""41""), as this is misleading."
Devernay (Electricity of France - EDF Hydro Engineering Centre)	9	26	-	-	-	-	-	-	"Hydropower : should read ""GHG emissions from reservoirs, very high range, depend on site and age of the reservoir"""
Devernay (Electricity of France - EDF Hydro Engineering Centre)	9	26	-	-	-	-	-	-	"Oil : in the column, shoul read ""Oil"", not ""Oli"""
Devernay (Electricity of France - EDF Hydro Engineering Centre)	9	26	-	33	-	-	-	-	"Table 2 : refereces given in ""[xx]"" are not clear : what do they refer to?"
POUFFARY (ADEME - French Environment and Energy Management Agency)	9	26	2	-	-	-	-	-	"Table 2 is definitely important. For what concern indicators, it has to be underlined that so far, almost no indicators are specifically dedicated to renewables. This is even more true for rural and peri urban areas where the question of access to energy is crucial. Some works have been undertaken by HELIO International on this topic. Additional works need to be done."
Verbruggen (University of Antwerp)	9	26	-	-	-	-	-	-	"table 2: the statement that nuclear plants do not emit emissions to the air is wrong; some chemical elements are emitted, considered as harmless by the industry, but in the literature there are opposite views on this."
Devernay (Electricity of France - EDF Hydro Engineering Centre)	9	26	1	-	-	-	-	-	"Title of the table should read ""and POTENTIAL impacts"", instead of ""and impacts"", as there is no mention in the table of possibe mitigation/compensation measures that change the overall impacts of the considered RES."
Christophersen (Climate and Pollution Agency)	9	26	-	29	-	-	-	-	The information on environmental aspects in table 2, chapter 9 should be checked against chapter 9.3 to ensure coherency in coverage.
Menichetti (Observatoire M□terran□ de l'Energie)	9	26	-	33	-	-	-	-	The references for the draft quantitative data highlighted in red in the table are currently missing, therefore it is impossible to check the accuracy of data and their time, technological and geographical representativeness. Many GHG emission indicators seem exagerately high, but in order to check the data and provide further comments, I would need to check the references

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Taylor (International Hydropower Association (IHA))	9	26	-	33	-	-	-	2	"Amend the hydro column to be consistent with the narrative on the essential characteristics of hydro (reservoir, run-of-river, pumped storage and off-grid), the GHG status of hydro reservoirs, and the sustainability of hydro in chapter 5. Reason: See reason given for "9, 17, 6, 8, 10" above."
Menichetti (Observatoire M□terran□ de l'Energie)	9	26	-	-	-	-	-	2	"Ocean energy: what does ""neutral"" mean?"
Kammen (University of California, Berkeley)	9	26	-	-	-	-	-	2	"Selected SD indicator: the unit of analysis is listed as gCO2e/kWh. Why? Particulate matter/m^3 may also be a very important indicator here. See: Ezzati, M. and Kammen, D. (2001) 'Indoor air pollution from biomass combustion and acute respiratory infections in Kenya: An Exposure-response study', The Lancet, 358, 619 □ 624; and Ezzati, M., Bailis, R., Kammen, D. M., Holloway, T., Price, L., Cifuentes, L. A., et al. (2004). Energy Management and Global Health. Annual Review of Environment and Resources, 29, 383 - 419."
Outhred (University of New South Wales)	9	26	-	33	-	-	-	2	"Table 2, ""energy generation/supply cost"" row: Variable renewable energy resources such as wind and solar require complementary resources, which may require additional investment and operating costs."
LEITE DRACHMANN (PETROBRAS)	9	26	-	33	-	-	-	2	"The whole Table presents inconsistency regarding quantity and quality parameters. Some examples of inconsistency: Selected SD Indicators: Environmental: Emissions and Air Quality: There is no correlation on the qualitative data: ""Methane emissions from reservoirs, very high range, site specific. Lifecycle emissions, mainly in construction phase."" Selected SD Indicators: Economic: Employment Opportunities: There is no correlation between qualitative (Medium) and quantitative data: 20 [16]. While for other sources it has been classified as high and that provide lower increase on job opportunities, for example for Geothermal Energy: High compared to natural gas (5.7 □ 19.2) [16]; Wind: High (2.8 □ 22) [16]. This table doesn't indicate the increase on job opportunities for ethanoland for biodiesel perennial plantation it is somewhat low: 9.76 Jobs/MWh [5]. In the same table it is not clear in which phase is 6 [16] and 0.32 Employment/ktoe [17]."
Menichetti (Observatoire M□terran□ de l'Energie)	9	26	-	-	-	-	-	2	"What are the ""minor emissions during operations"" referred to solar technologies? What does ""more important"" mean - can you please quantify? Why do you say this only for solar and not for other technologies? What is the value of 90 gCO2e/kWh referred to?"
Moreira (Brazilian Reference Center on Biomass- University of S□Paulo)	9	26	1	26	5	-	-	2	2nd column - 5th row - The statement that net GHG emissions in most cases of land use change is critical. First, we must define a time horizon to account net emissions. As many authors have shown some feedstocks requires few years to cancel initial emissions associated with land use changes, while other may need a century. Please, see Pacca and Moreira, Energy Police 2009. Finally, if this statement is not properly cared it will be a source of many discussion by governments.

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Rybach (Geowatt AG)	9	26	-	-	-	-	-	2	head of column 4 should be $\square$ Geothermal power $\square$ . And it needs to be mentioned that geothermal direct use has negligible effects. In the table some numbers are given in rectangular brackets. Do they refer to sources? If so, where are the sources listed?
Menichetti (Observatoire M <span style="font-family: monospace;">□</span> terran <span style="font-family: monospace;">□</span> de l'Energie)	9	26	-	-	-	-	-	2	Oil and gas: what are the emissions that can be mitigated? And why should this be true only for gas and oil, and not for other technologies?
Menichetti (Observatoire M <span style="font-family: monospace;">□</span> terran <span style="font-family: monospace;">□</span> de l'Energie)	9	26	-	-	-	-	-	2	The emissions and air quality section actually combines global emissions as GWP, with local emissions. I would suggest keeping GWP separated from other emissions in order to enhance clarity
Gagnon (Hydro-Quebec)	9	26	-	33	-	-	-	2	The information presented in the table is, at times, too fragmentary and could mislead the reader. For example the line on air quality does not show that hydropower is a clean source of electricity and may lead the reader to believe that GHG emissions from fossil fuel plants can be controlled, which is not the case with currently available technologies.
Pehnt (Institute for Energy and Environmental Research)	9	26	-	-	-	-	-	2	The numbers in this table are arbitrary and do not cover the range of studies. Why are only GHG emissions quoted? Here again, the detailed technology chapters cover this issue in a better way.
Tolmasquim (Empresa de Pesquisa Energetica - EPE)	9	26	5	26	5	9.4.1	-	2	The methane emissions should be indicated as potential methane emissions and not as 'methane emissions from reservoirs very high'. So far, methane emissions were observed in only very few reservoirs.
Kruger (South African Weather Service)	9	26	1	33	1	9.4.1	-	9.2	Cannot comment on table or sources.
Devernay (Electricity of France - EDF Hydro Engineering Centre)	9	26	-	-	-	-	-	Table 2	"The purpose of this table is very commendable. However, by focusing only on the negative impacts it fails to provide a balanced and comprehensive comparison of the various RES. For instance, there is no mention of the issues like "predictability of generation", integration to the grid, past, current and forecasted contribution to electricity/energy needs, potential for development, etc... In addition, the table is not always homogeneous, and some of the proposed figures are questionable. In its current state and scope, this table may generate more comments than provide clarifications. We would therefore suggest to remove it, or provide substantial complements (on the topics listed above for instance)."
Devernay (Electricity of France - EDF Hydro Engineering Centre)	9	27	-	-	-	-	-	-	All units in the various columns should be homogeneous and consistent with the unit announced in the first column (in that case : m <sup>3</sup> /MWh)
Devernay (Electricity of France - EDF Hydro Engineering Centre)	9	27	-	-	-	-	-	-	The figure of 22 m <sup>3</sup> /Gj (80 m <sup>3</sup> /MWh) proposed in the table seems very high. The DHI estimated this consumption to 68 m <sup>3</sup> /MWh for reservoirs in semi-arid regions. In continental France the figure is about 5 m <sup>3</sup> /MWh, close to 3 Gorges (4,6) and Manitoba Hydro (8.3). The International Hydropower Association - IHA - proposes a range of 0,7 to 400.

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Moreira (Brazilian Reference Center on Biomass-University of S� Paulo)	9	27	-	-	-	-	-	2	<p>"2nd column - 2nd row - The value quoted for biodiesel from vegetable oil of 3.5Mm3/MWh can't be compared with water used for fossil/biomass steam turbine. The 3.5Mm3 probably is obtained considering the amount of rain that drops over a vegetable oil crop. As an example, palm oil requires at least 2,000mm of rain. Over 1ha, this means 2m X 10,000m2 or 20.000m3. In one hectare of palm oil it is possible to obtain 5.000l of vegetable oil. An internal combustion engine can easily use 300 l of oil (or biodiesel) to generate 1MWh. Consequently, 1MWh requires 300 / 5000 X 20,000m3 of water, which is less than 2,000m3/MWh. Based on the above figure, we conclude that:</p> <p>1) the number quoted can't be correct;                  2) this amount of water from rainfall would occur with or without the vegetable oil plantation. Even if the land had natural vegetation a share (1/3) of this rainfall volume would evaporate, as it occurs with vegetable oil crop. On the other side, the value of 200 - 300 gal/MWhe is the amount of water that is transformed in steam for the turbine operation in open-loop equipment.</p> <p>"</p>
Menichetti (Observatoire M�terran� de l'Energie)	9	27	-	-	-	-	-	2	The water consumption should be expressed always in the same unit (here you have gallons, liters, cubic meters), in order to allow for a better comparison
Devernay (Electricity of France - EDF Hydro Engineering Centre)	9	28	-	-	-	-	-	-	"Hydropower : cf above remark on units used : ""km2/GWh"" does not seem appropriate."
Devernay (Electricity of France - EDF Hydro Engineering Centre)	9	28	-	-	-	-	-	-	"Hydropower : the range of ""130-1050 ha/MW"" seems unreasonably high (1 to 10 km2 per MW!). For instance, the UNFCCC limit for eligibility to CDM for hydro projects is set at 4W/m2, which corresponds to 25ha/MW. The Nam Theun 2 project (Laos) has an installed capacity of 1080 MW, for a flooded area of 450 km2, which corresponds roughly to 45ha/MW. We suggest to review this range accordingly."
Devernay (Electricity of France - EDF Hydro Engineering Centre)	9	28	-	-	-	-	-	-	"Unit for Land and Soil use is given as ""km2/TWh"". This would mean that there is a continuous consumption of land associated to generation of each energy/electricity unit. It would make more sense to have this land requirement expressed either a surface per installed capacity (km2/MW), or as a surface per energy produced per year (km2/TWh/yr)"
campbell (Ocean Renewable Energy Group)	9	28	-	-	-	-	-	2	energy debsity values for wave and tidal must be checked with CH6 LA
Menichetti (Observatoire M�terran� de l'Energie)	9	28	-	-	-	-	-	2	Land occupation: need to check the references in order to provide more sound comments. Please, use always the same reference unit (here you express land occupation per kW installed or GWh produced)

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Gagnon (Hydro-Quebec)	9	28	-	-	-	-	-	2	The land and soil line should mention the widespread impacts of acidic emissions of some fossil fueled plants on soils, agriculture, forestry and fisheries
Menichetti (Observatoire M <span style="font-size: small;">□</span> terran <span style="font-size: small;">□</span> de l'Energie)	9	29	-	-	-	-	-	2	"Complaints from some people; good for other people <span style="font-size: small;">□</span> what do you mean here?"
Menichetti (Observatoire M <span style="font-size: small;">□</span> terran <span style="font-size: small;">□</span> de l'Energie)	9	29	-	-	-	-	-	2	"Large areas occupied by installations; this contradicts what you have written in section 9.3.3.1: ""typically, large land areas are not required to produce solar energy"" "
Menichetti (Observatoire M <span style="font-size: small;">□</span> terran <span style="font-size: small;">□</span> de l'Energie)	9	29	-	-	-	-	-	2	Change of albedo: you should compare to the radiative forcing avoided by substituting fossil fuels
Menichetti (Observatoire M <span style="font-size: small;">□</span> terran <span style="font-size: small;">□</span> de l'Energie)	9	29	-	-	-	-	-	2	Large solar chimneys are not in the built environment
Marques (The Plantar Group)	9	29	-	29	-	-	-	2	Refer to the possibility of developing ecological corridors within monocultures (second row, second column of page 29)
Devernay (Electricity of France - EDF Hydro Engineering Centre)	9	30	-	31	-	-	-	-	"Clarification is needed on the meaning of ""Energy Generation/supply cost"" (p30) vs. ""Price of Energy generated/supplied"" (p 31)"
Devernay (Electricity of France - EDF Hydro Engineering Centre)	9	30	-	-	-	-	-	-	"Employment : mixing construction and operation makes it very difficult to understand the proposed figures. In addition, the unit should be more specific, like ""number of man.month / installed capacity"" for construction, and ""number of man.month / MWh"" for operation. It is also necessary to precise the life span of both periods : construction and operation."
Devernay (Electricity of France - EDF Hydro Engineering Centre)	9	30	-	-	-	-	-	-	"Hydropower : what does the figure relate to ( ""20"")? For instance, the construction of Nam Theun 2 project required about 80 millions hours work for an installed capacity of 1080 MW, or 370 man.month/MW installed. "
campbell (Ocean Renewable Energy Group)	9	30	-	-	-	-	-	-	Employment opportunities in ocean energy - <a href="http://www.scotland.gov.uk/Resource/Doc/281865/0085187.pdf">http://www.scotland.gov.uk/Resource/Doc/281865/0085187.pdf</a>
Devernay (Electricity of France - EDF Hydro Engineering Centre)	9	30	-	-	-	-	-	-	Income and Livelihoods : according to the table, HP would be the only RES leading to a decrease of livelihood standard. This is not taking into account the livelihood restoration plans that are (or should be, like for any other project) part of the resettlement plans, and that aim at at least restoring the livelihood of project affected people. This does not take into account the job opportunities created during the construction period, training, improved employability, etc...
Menichetti (Observatoire M <span style="font-size: small;">□</span> terran <span style="font-size: small;">□</span> de l'Energie)	9	30	-	-	-	-	-	2	"Geothermal: ""High compared to natural gas"" <span style="font-size: small;">□</span> which is also ranked high. How much is high compared to high, then? Quantitative data are not provided for conventional sources. Is this due to lack of data? Indicators are expressed in terms of ktoe, MWh, MW; please, try to use the same unit in order to make data easily comparable"

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Moreira (Brazilian Reference Center on Biomass-University of São Paulo)	9	30	-	-	-	-	-	2	Last Row - 7th Column - The statement that wind energy is competitive with other sources must be clarified. It may be competitive with other new and renewable sources but, not with conventional energy sources. The only competitive new and renewable energy source when compared with conventional energy sources is ethanol in few countries, where subsidies are not required.
Devernavy (Electricity of France - EDF Hydro Engineering Centre)	9	31	-	-	-	-	-	-	"Investments : reference is required to substantiate the forecasted ""1,900 USD/kW"" for solar in 2035. "
Devernavy (Electricity of France - EDF Hydro Engineering Centre)	9	31	-	-	-	-	-	-	Hydropower : investment cost of 5,500 USD/kW seems extremely high for large hydro.
Gagnon (Hydro-Quebec)	9	31	-	-	-	-	-	2	As investment costs are shown in the table, operation costs (including fuel costs) should also be shown
Hohmeyer (Flensburg University)	9	31	-	31	-	-	-	2	Column 'Wind' Should read 'offshore' not 'ofshore'
Kyte (E.ON AG)	9	31	-	-	-	-	-	2	Why subsidies for wind not mentioned - wind generally only competitive in best locations
Devernavy (Electricity of France - EDF Hydro Engineering Centre)	9	32	-	33	-	-	-	-	"Displacement of people - Hydropower. The range given p 33 ("61-120 persons/MW") is totally misleading. The low value is 0, as there are project not requiring any resettlement. Other projects do require resettlement, like for instance the Nam Theun 2 project where 6500 persons were relocated, for 1080 MW installed capacity, that is 6p/MW, far from the proposed range. The 3 Gorges project (1 400 000 resettlers, for 18 000 MW) would be about 80p/MW"
Hohmeyer (Flensburg University)	9	32	-	32	-	-	-	2	Category 'Displacement of people' / column 'Wind' Last sentence should be amended by '...if poorly sitede'
Outhred (University of New South Wales)	9	34	6	34	7	-	-	-	""generation of power and heat from renewable sources per se has indeed very little impact on the environment in terms of emissions of polluting substances"". This clearly depends on the amount of renewable energy being used. Therefore it should be expressed in per-unit terms."
Menichetti (Observatoire M��tropolitain de l'Energie)	9	34	5	-	-	-	-	-	"I would suggest deleting the first part of the sentence, i.e. ""even though this is only partially true"", and start directly by ""generation of power...""."

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Moreira (Brazilian Reference Center on Biomass-University of S□Paulo)	9	34	24	34	28	-	-	-	Delete. It is repetition.
Menichetti (Observatoire M□terran□ de l'Energie)	9	34	15	-	16	-	-	-	Here you do not seem to take into account technology improvement
Schmall (Petrobras S.A.)	9	34	24	34	28	-	-	-	Remove the whole paragraph that begin in the line 24 and end at line 28. The information is repeated in the same chapter.
Devernavy (Electricity of France - EDF Hydro Engineering Centre)	9	34	33	34	37	-	-	-	the Water Footprint has shortcomings which are better addressed by the new concept of Water Life Cycle Analysis, or WLCA, that could be metioned here.
Bilello (NREL)	9	34	24	-	28	-	-	-	This seems redundant after LCA discussion in 9.3.8. Suggest consolidating LCA definition in 9.3.8 and referring back to that section as necessary.
Christophersen (Climate and Pollution Agency)	9	34	6	-	7	-	-	-	We propose that this sentence is reformulated, since we consider it to be too general and imprecise. For example are the emission of traditional polluting substances from biomass more characterized by similarities to fossil fuels than by fundamental differences in the fuels themselves.
Christophersen (Climate and Pollution Agency)	9	34	1	-	14	-	-	-	We think that the main message here should be that the environmental advantages with renewable energy on a kW-by-kW comparison is that it reduces emissions of greenhouse gases - and is renewable. We think that these very important long-term aspects alone justify efforts to increase the use of renewable energy. General statements as regards the superiority of RE with respect to other environmental problems should be used carefully. For example we question the accuracy of the statement in line 12 to 14 - especially as regards issues related to land use and biodiversity in the shorter term.
POUFFARY (ADEME - French Environment and Energy Management Agency)	9	34	-	-	-	9.4.2	-	-	General comment: even if this paragraph is dedicated to impacts on use of ressources, just take care not missing the point that all energy processes will have and will rely on availability of air, land, water and other requirements (see line 15 and 16 p. 34)
Schmall (Petrobras S.A.)	9	34	5	34	14	9.4.2	-	-	Should add at the end of the paragraph: Adoption of a proper management and policies can prevent these environmental impacts.
campbell (Ocean Renewable Energy Group)	9	35	-	-	-	-	-	-	energy access discussion can be strengthened by reference to scaleability (up/down) of many renewable approaches
Gagnon (Hydro-Quebec)	9	35	-	-	-	-	-	2	The statement that oil based energy has a high contribution to poverty reduction is highly questionable. Some countries have to import all their fossil fuels at a high price and this has a negative contribution to the atndard of living
Rybach (Geowatt AG)	9	35	-	-	-	-	-	3	4th column □ Geothermal Energy□: the given characteristics apply only to geothermal power, not to direct use.



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Menichetti (Observatoire M□terran□ de l'Energie)	9	35	-	-	-	-	-	3	The source is missing
Kyte (E.ON AG)	9	35	-	-	-	-	-	3	Why lack of data in table for energy access & energy affordability for fossil & nuclear
Kruger (South African Weather Service)	9	35	1	35	1	9.4.2.1	-	9.3	A better caption is needed. Some of the contents of the table need improvement/clarity.
Devernay (Electricity of France - EDF Hydro Engineering Centre)	9	35	-	-	-	-	-	Table 3	"The pupose of this table is not clear, and some ""SD Goals"" require clearer definition. In particular ""Water security"", in relation to the idicators given for the various RES (""Low"", High"", etc□). This table is also sometimes too schematic in the qualification of the various RES and onventional type of energies. For instance, why would the ""long transmission lines"" be a specific feature of HP only, and not for geothermal or ocean?"
Outhred (University of New South Wales)	9	36	41	36	41	-	-	-	""A recent report from the US based Centre for Public Integrity"" Reference required"
Menichetti (Observatoire M□terran□ de l'Energie)	9	36	4	-	-	-	-	-	parts of the bioenergy agenda - what do you mean here?
Moreira (Brazilian Reference Center on Biomass- University of S□Paulo)	9	36	40	36	41	-	-	-	Please, provide a reference clearly.
Steckel (Potsdam Institute for Climate Impact Research)	9	36	26	-	37	-	-	-	The developing country perspective is missing
Schmall (Petrobras S.A.)	9	36	40	37	2	9.4.3.1	-	-	A recent report from the US based....until...and poorer nations...It should removed. It is not appropriate for an IPCC report.
Rojas (National Meteorological Institute)	9	36	25	36	37	9.4.3.1	-	-	Include documentary films with information on RE and other with climate change issues to raise awareness
Kruger (South African Weather Service)	9	36	40	37	1	9.4.3.1	-	-	Reference needed.
Rybach (Geowatt AG)	9	37	18	-	22	-	-	-	here the REN Alliance (=International Renewable Energy Alliance) should by all means be mentioned. 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
Moreira (Brazilian Reference Center on Biomass- University of S□Paulo)	9	37	19	37	19	-	-	-	Please, provide full reference for REN 21.

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Kruger (South African Weather Service)	9	37	12	37	12	9.4.3.1	-	-	"Insert ""these form"" before ""part□""."
Kruger (South African Weather Service)	9	37	41	37	41	9.4.3.1	-	-	Refer to a box number.
Kruger (South African Weather Service)	9	37	19	37	19	9.4.3.1	-	-	Reference for REN 21 needed.
Menichetti (Observatoire M□terran□ de l'Energie)	9	38	11	-	-	-	-	-	"The concepts of ""technology push"" and ""market pull"" policies should be defined somewhere"
Kruger (South African Weather Service)	9	38	1	38	1	9.4.3.1	-	-	A box number is needed. Expand the title of the box.
Winkler (Energy Research Centre, University of Cape Town)	9	39	8	39	32	-	-	-	Is this a one-way shift? The way this is presented (including 'old' and 'new' paradigms in the figure) seems normatively loaded, i.e. favouring market solutions over regulation. The reality is surely more complex - what about the role of regulation in deregulated markets. Seems relevant to independent power producers for example. Generally, suggest a more neutral framing of the paradigms, and allowing the trends may shift back in future
Schmall (Petrobras S.A.)	9	39	14	39	32	9.4.3.2	-	4	Could be removed to reduce the number of pages
Kruger (South African Weather Service)	9	39	14	39	14	9.4.3.2	-	9.4	Change caption to reflect the contents of the table.
Devernay (Electricity of France - EDF Hydro Engineering Centre)	9	40	35	-	-	-	-	-	"read ""up-front"""
Rybach (Geowatt AG)	9	40	4	-	-	-	-	-	here it should be added that quality assurance is vital to guarantee reliable services by companies. Various qualifications procedures are now
Menichetti (Observatoire M□terran□ de l'Energie)	9	40	27	-	29	-	-	-	Please, rephrase

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Schmall (Petrobras S.A.)	9	41	1	41	15	-	-	-	"Remove the text form ""In the context..."" to ""other sectors."" due the conference COP15 feature to deal with the topics mentioned in the text."
Menichetti (Observatoire M□terran□ de l'Energie)	9	41	39	-	42	-	-	-	"Renewable energy sources, by definition, are naturally replenished. Therefore your statement that ""excessive consumption can lead to limits in the availability of renewable resources"" is difficult to understand□ It is like saying that if we use too much solar, we risk depleting the sun..."
Moreira (Brazilian Reference Center on Biomass- University of S□Paulo)	9	41	39	41	43	-	-	-	"The statement that ""renewable resources can also be come non-renewable"" is new for me and difficult to understand. I recommend that an example be provided to facilitate other people understanding."
Menichetti (Observatoire M□terran□ de l'Energie)	9	41	19	-	22	-	-	-	This sentence is not clear, please reformulate it
Menichetti (Observatoire M□terran□ de l'Energie)	9	42	21	-	-	-	-	-	""In 2005□"" Please, use a more recent reference year"
Outhred (University of New South Wales)	9	42	7	42	7	-	-	-	""State of the World, 2008 □ The World watch Institute"". State of the World, 2009 is also relevant."
POUFFARY (ADEME - French Environment and Energy Management Agency)	9	42	11	42	16	-	-	-	"Add ""reliability of technologies"" and ""availability of technologies"""
Taylor (International Hydropower Association (IHA))	9	42	22	42	24	-	-	-	"Delete ""large"" and ""small"" and ""except lare hydropower"". Reason: The figure is for all hydro and see reason given for ""5, 5, 16, 5, 16"" above and c.f. comment for ""9, 55, 1, 55, 11, 9.6.3""."
Steckel (Potsdam Institute for Climate Impact Research)	9	42	38	-	39	-	-	-	"The primary target should be sustainable development; to identify the contribution of RET is the goal of this section. Not the other way around"
Menichetti (Observatoire M□terran□ de l'Energie)	9	42	11	-	16	-	-	-	I cannot see the link between the table reported here and the concepts expressed in the paragraph. I would suggest eliminating it
Menichetti (Observatoire M□terran□ de l'Energie)	9	42	37	43	7	-	-	-	I would suggest to eliminate this methodological part since such scenarios are not displayed anywhere

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Bilello (NREL)	9	42	21	42	26	-	-	-	Is Martinot the reference for all of these percentages? I could not find the Martinot 2007 reference. There are potentially problems with the way these values are calculated, specifically inclusion of large hydro and traditional use of biomass. Previous sections have already covered the fact that traditional biomass use is non-renewable and non-sustainable so this category shouldn't be included in the calculations.
Bilello (NREL)	9	42	42	43	3	-	-	-	Suggest authors clarify language in discussion of vision and use of backcasting. It seems that increased use of renewables is one way of achieving a future with stabilized CO2 emissions, but some may argue that it is one of many approaches and not the sole means of reaching this vision.
POUFFARY (ADEME - French Environment and Energy Management Agency)	9	42	21	-	-	-	-	-	Take 2008 figures.
Marques (The Plantar Group)	9	42	23	42	25	-	-	-	The sentence is significantly reducing the potential of biomass/bioenergy to heat and transportation. It carries an implicit notion that all other appliances are not relevant, e.g. energy for industries, co-generation, etc.
Kruger (South African Weather Service)	9	42	11	42	16	9.5	-	-	Change to main text - remove box.
Kruger (South African Weather Service)	9	42	8	42	10	9.5	-	-	Rephrase sentence - unclear.
Schmall (Petrobras S.A.)	9	42	28	42	28	9.5.1	-	-	RET has to be defined
POUFFARY (ADEME - French Environment and Energy Management Agency)	9	43	31	-	-	-	-	-	"CDM is a flexible mechanism so called ""Carbon Finance"" which intends to pay additional costs versus a baseline situation. A specific item on Carbon Finance can be added."
Menichetti (Observatoire M�tropolitain de l'nergie)	9	43	19	-	-	-	-	-	"Please substitute ""to facilitate"" by ""facilitating"". The same comment applies to page 44, lines 1-2"
Devernay (Electricity of France - EDF Hydro Engineering Centre)	9	43	28	-	-	-	-	-	"read ""GVEP"", and not ""GEVP"""
Schmall (Petrobras S.A.)	9	43	3	43	7	-	-	-	"Remove the whole paragraph that begin in the line 3 (""Once...""and end at line 7[""details""]. The information is presented already in the same chapter."

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POUFFARY (ADEME - French Environment and Energy Management Agency)	9	43	26	43	30	-	-	-	"Separate so called ""funds"" to ""financial support mechanism""."
Rybach (Geowatt AG)	9	43	37	-	-	-	-	-	GEF was already mentioned in line 28.
Bilello (NREL)	9	43	14	43	16	-	-	-	Politically motivated conclusion. In fact, many countries like China are actively pursuing positions in renewable technology development as they see the job creation and global market potential for these technologies. This paper does not seem the appropriate place for policy recommendations. Suggest authors reword this paragraph in the context of the ongoing negotiations.
Christophersen (Climate and Pollution Agency)	9	43	19	-	21	-	-	-	Trans-national energy infrastructures might also be relevant in this context.
Schmall (Petrobras S.A.)	9	44	47	-	-	-	-	-	"Remove the expression "" the disadvantaged"". It's seems to be unappropriated as a ""too sexist"" citation."
Schmall (Petrobras S.A.)	9	44	34	-	-	-	-	-	"Where's written ""their own countries."" must be ""their own borders"", for enhance the clarity of the report. "
Steckel (Potsdam Institute for Climate Impact Research)	9	44	38	-	48	-	-	-	Elaborate how leapfrogging could contribute to sustainable development
Menichetti (Observatoire M□terran□ de l'Energie)	9	44	10	-	12	-	-	-	In which way is the UNEP's REED program a first step towards a pathway for RE in the developing world? More information should be provided on the program and its main achievements
Christophersen (Climate and Pollution Agency)	9	44	8	-	-	-	-	-	What are the tree dimensions of sustainable development?
Schmall (Petrobras S.A.)	9	44	35	44	37	9.5.1.1	-	-	"The paragraph: IT is imperative that researches ...until...in developed country, should be removed. Impossible to see comments like that in an IPCC report. Unappropriated and prejudiced comment for IPCC report, as well as would not be acceptable to say on other part of text that the developing countries should not be explored by people or colonizers from developed world. "
Schmall (Petrobras S.A.)	9	44	13	44	17	9.5.1.1.1	-	-	Should define a AREED, SIDA, BMZ
POUFFARY (ADEME - French Environment and Energy Management Agency)	9	44	-	-	-	9.5.1.1.2	-	-	Maybe the part dedicated to TREC and DESERTEC can be reduced.

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Verbruggen (University of Antwerp)	9	45	2	-	3	-	-	-	-	"true that the HV grids in developed nations need a lot of investment (ref: IEA), but here a grid is seen as a 40 year old thing running to its end-of-life; this is not reality: grids are a patch-work of thousands of components, some more than 40 year old, others brand-new. For the integration of RE as the main supplies significant changes are needed (ch.8)."
Moreira (Brazilian Reference Center on Biomass- University of S□Paulo)	9	45	31	45	34	-	-	-	-	Desertic is also discussed in Chapter 8.Check to avoid repetition.
Kammen (University of California, Berkeley)	9	45	-	-	-	-	-	-	-	The DESERTEC 'case study' is not appropriate. It is one of many large-scale potential projects that is neither funded nor in construction.
Moreira (Brazilian Reference Center on Biomass- University of S□Paulo)	9	45	10	45	11	-	-	-	-	What does it means high-voltage valves?
Visconti (Inter-American Development Bank)	9	45	-	-	-	9.5.1.1.	-	-	-	Green Certificates could be added in the innovative funding models listed in the bullet points
Kruger (South African Weather Service)	9	45	31	45	31	9.5.1.1.2	-	-	-	"Reference needed for ""White Book from the DESERTEC Foundation""."
Schmall (Petrobras S.A.)	9	45	31	45	31	9.5.1.1.2	-	-	-	Define or explain DESERTEC Foundation
Schmall (Petrobras S.A.)	9	45	22	45	22	9.5.1.1.2	-	-	-	Define PEER
Devernavy (Electricity of France - EDF Hydro Engineering Centre)	9	46	15	-	-	-	-	-	-	"what does the ""75%"" relate to? 75% of what?"
Christophersen (Climate and Pollution Agency)	9	46	16	-	-	-	-	-	-	"What is ""this energy demand"" - does it refer to the remaining energy needed after energy efficiency measures?"
POUFFARY (ADEME - French Environment and Energy Management Agency)	9	46	26	-	-	-	-	-	-	Data more recent are available.
POUFFARY (ADEME - French Environment and Energy Management Agency)	9	46	13	46	14	-	-	-	-	Data more recent are available. See UNEP-SBCI building and climate change updated report 2009.

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Outhred (University of New South Wales)	9	46	20	46	20	-	-	-	Experience with small wind turbines on buildings is mixed.
Moreira (Brazilian Reference Center on Biomass- University of S□Paulo)	9	46	15	46	15	-	-	-	Please, clarify the figure 75%. It is 75% of what? What is being accounted as indirect emissions due the building sector?
Christophersen (Climate and Pollution Agency)	9	46	15	-	-	-	-	-	What does 75% refer to?
Rybach (Geowatt AG)	9	46	13	-	-	-	-	-	what emissions? Of GHG?
Menichetti (Observatoire M□tarran□ de l'Energie)	9	46	-	-	-	9.5.1.2	-	-	The title mentions RE in different end-use sectors. However, only the following sectors are covered: built-environment, transport, land-use. I can barely see the land use as an end-use sector. I would suggest a different classification, e.g.: domestic/residential, industrial, service/tertiary, transport.
Schmall (Petrobras S.A.)	9	46	22	46	22	9.5.1.2.1	-	-	Define ECN
Christophersen (Climate and Pollution Agency)	9	47	2	-	3	-	-	-	"Changing the wording to "" Explore the potential of electric cars powered by electricity of renewable origin."" might make this sentence easier to read."
Christophersen (Climate and Pollution Agency)	9	47	10	-	-	-	-	-	"This might be reworded to ""Renewable energy is not without its controversy as regards land use.""
Christophersen (Climate and Pollution Agency)	9	47	31	-	-	-	-	-	"We think that references to websites should be used with care - is the report mentioned only quoting the web-site? Would it be better just to write ""According to UNSW□""?"
Steckel (Potsdam Institute for Climate Impact Research)	9	47	2	-	-	-	-	-	Bio-diesel and ethanol are found to cause severe problems wrt to sustainability
POUFFARY (ADEME - French Environment and Energy Management Agency)	9	47	13	47	14	-	-	-	Data more recent are available.
Menichetti (Observatoire M□tarran□ de l'Energie)	9	47	24	51	25	-	-	-	It is not clear which point you want to make here. I think it would be more useful to build on the many RE technology roadmaps available in order to give a long-term overview of the development pathways of RETs. The current draft collects a series of information without a clear order and structure. There are also many concepts already expressed before

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Steckel (Potsdam Institute for Climate Impact Research)	9	47	7	-	8	-	-	-	It would have been desirable to elaborate how renewable energies can be developed in the sector (this is also true for the other sectors) including LCA considerations
Steckel (Potsdam Institute for Climate Impact Research)	9	47	13	-	-	-	-	-	Reference not adequate
Bilello (NREL)	9	47	34	-	42	-	-	-	Suggest that the authors distinguish between non-sustainable use of biomass in this paragraph and throughout the chapter.
Menichetti (Observatoire M <span style="font-family: serif;">et</span> erran <span style="font-family: serif;">n</span> de l'Energie)	9	47	24	-	25	-	-	-	Technical solutions are well documented as well. You always seem to over-emphasize the barriers without giving a balanced and more perspective view
Venghaus (Potsdam Institut for Climate Impact Research)	9	47	4	-	-	-	-	-	This is a logical contradiction with chapter 8, p. 85, where an argument is that Evs are far from commercialization.
Menichetti (Observatoire M <span style="font-family: serif;">et</span> erran <span style="font-family: serif;">n</span> de l'Energie)	9	47	11	-	13	-	-	-	This statement needs to be better articulated. It also contradicts your table 2. Please, discuss also the availability of surfaces for PV and other small-scale installations in the built environment.
Menichetti (Observatoire M <span style="font-family: serif;">et</span> erran <span style="font-family: serif;">n</span> de l'Energie)	9	47	13	-	15	-	-	-	What is the link between emissions from agriculture and renewables?
Schmall (Petrobras S.A.)	9	48	1	48	4	-	-	-	Remove the whole paragraph, the information its repeated.
Christophersen (Climate and Pollution Agency)	9	48	7	-	13	-	-	-	The potential for positive GWP impact from waste methane combustion i.e., by the conversion of high GWP methane to lower GWP CO2, should be mentioned here.
Christophersen (Climate and Pollution Agency)	9	48	-	50	-	-	-	-	This example might be good from a technical or environmental point of view, but may be the text could be shortened somewhat. There are also other good examples.
POUFFARY (ADEME - French Environment and Energy Management Agency)	9	48	-	-	-	-	Box 9.1	-	Interesting example but can be reduced.
Bilello (NREL)	9	48	14	49	45	-	-	9.1	Very interesting case study in box 9.1 but could perhaps be shortened to focus on key elements if space considerations require editing this chapter as a whole.
Steckel (Potsdam Institute for Climate Impact Research)	9	50	45	-	-	-	-	-	""mainly decentralized energy"" might be true when direct solar is equal to PV (not necessarily, though; as soon as PV generated electricity is fed into the grid it is not local any more); however, direct solar includes CSP, which is mostly not decentralized."
Christophersen (Climate and Pollution Agency)	9	50	43	-	45	-	-	-	A direct reference to other parts of the SRREN report might be more appropriate here.
Pehnt (Institute for Energy and Environmental Research)	9	50	42	-	-	-	-	-	Redundant to chapter 9.3 and the PV chapter

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Steckel (Potsdam Institute for Climate Impact Research)	9	51	38	-	-	-	-	-	""recently held COP14"" "
POUFFARY (ADEME - French Environment and Energy Management Agency)	9	51	33	-	-	-	-	-	"Add at the end of ""Environment"": ""(UNEP)""
POUFFARY (ADEME - French Environment and Energy Management Agency)	9	51	36	51	38	-	-	-	"Please refer to COP 15 where dedicated ""call to actions"" were addressed."
Devernay (Electricity of France - EDF Hydro Engineering Centre)	9	51	11	51	14	-	-	-	"This paragraph does not give an accurate summary of hydropower features : (i) ""large hydro dams release methane emissions"" : regardless of the syntax, this statement is misleading, as methane emissions occur only for young reservoirs in tropical regions, (ii) ""have high lifecycle emissions, mainly during construction"" : GHG emissions occur actually mainly during the first years after impoundment; emissions due to construction are negligible in comparison (this is however site specific, and generalization are somewhat difficult) (iii) ""potential to displace people and damage settlement"" : the issues at stake are more complex than this, and reference should be made to chapter 5.6 for more detailed discussion on the potential impacts (social and environmental) --> we therefore recommend removing these 4 lines, which anyway don't add much to what is already said in this chapter 9 and chapter 5."
LEITE DRACHMANN (PETROBRAS)	9	51	11	51	14	-	-	-	"This paragraph states that ""...large hydro dams release methane emissions and have high lifecycle emissions, mainly during construction...""; however all data presented on chapter 9 doesn't come to this conclusion."
Christophersen (Climate and Pollution Agency)	9	51	16	-	-	-	-	-	"We think that ""some emissions"" will always arise during manufacturing and installation (comparable wind - next paragraph)."
Menichetti (Observatoire M�diterran� de l'Energie)	9	51	37	-	38	-	-	-	"Well, no longer ""recently held"" now�"
Christophersen (Climate and Pollution Agency)	9	51	12	-	-	-	-	-	"What is meant by ""high lifecycle emissions"" - is it a generally valid statement? Why are life-cycle emissions mainly associated with the relatively short construction phase?"
Christophersen (Climate and Pollution Agency)	9	51	5	-	6	-	-	-	A direct reference to other parts of the SRREN report might be more appropriate here.

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Bilello (NREL)	9	51	39	51	46	-	-	-	All organizations noted here are public sector. Would be useful to identify critical role that private sector and private finance is playing in accelerating technology transfer and project development.
Moreira (Brazilian Reference Center on Biomass-University of S□Paulo)	9	51	11	51	12	-	-	-	Check literature. Energy payback time for large hydro plants is around 1 or 2 years.
Visconti (Inter-American Development Bank)	9	51	28	52	24	-	-	-	Delete. There is no added value in listing organizations/initiatives that work on renewables policy framework as the list cannot be exhaustive.
Outhred (University of New South Wales)	9	51	4	51	4	-	-	-	Maintenance & repair costs of solar thermal & PV systems can be high in rural areas.
Christophersen (Climate and Pollution Agency)	9	51	28	-	30	-	-	-	Taking into consideration that most GHG emissions originate in developed countries, the rationale for focusing on renewable energy development in developing countries in particular should be explained.
Christophersen (Climate and Pollution Agency)	9	51	2	-	4	-	-	-	These considerations should also be reflected in chapter 9.3.3.
Bilello (NREL)	9	51	5	51	25	-	-	-	This is more or less a repeat of the individual technology section discussion of emissions rather than discussion of technology development pathways by emissions. Suggest authors revise to focus on discussion on what traditional technologies or energy services can be replaced or met with renewables and the factors that will influence these pathways.
Moreira (Brazilian Reference Center on Biomass-University of S□Paulo)	9	51	19	51	20	-	-	-	This is not necessarily true. Electricity from biomass waste (like for example sugar cane bagasse and straw) is cheaper than wind energy in some tropical countries.
Taylor (International Hydropower Association (IHA))	9	51	20	51	20	9.5.1.3	-	-	"Delete ""large"" and replace with ""larger-scale"". Reason: See reason given for ""5, 5, 16, 5, 16"" above and c.f. comment for ""9, 55, 1, 55, 11, 9.6.3""."
Taylor (International Hydropower Association (IHA))	9	51	11	51	13	9.5.1.3	-	-	"Delete ""large"" and replace with ""reservoir"" and delete ""dams"" and replace with ""can"" and delete ""have high lifecycle emissions, and potential to displace people and damage existing settlements"". Reason: This summation should be consistent with the narrative on the essential characteristics of hydro (reservoir, run-of-river, pumped storage and off-grid), the GHG status of hydro reservoirs, and the sustainability of hydro in chapter 5. Also see reason given for ""9, 17, 6, 8, 10"" above."
Menichetti (Observatoire M□iterran□ de l'Energie)	9	52	6	-	8	-	-	-	"I would rather say ""they have represented important occasions for□"""

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Sonntag-O'Brien (REN21)	9	52	21	52	22	-	-	-	Delete Basel Agency for Sustainable Energy (BASE). BASE is not a national organisation and does not work with or for the Swiss government.
Christophersen (Climate and Pollution Agency)	9	52	29	-	41	-	-	-	Is the bulleting of these two paragraphs intended?
Menichetti (Observatoire M□terran□ de l'Energie)	9	52	29	-	36	-	-	-	One should read all the mentioned references in order to understand what you are talking about. Can you make this point more explicit? What are the objectives and main findings of these studies?
Menichetti (Observatoire M□terran□ de l'Energie)	9	52	37	-	41	-	-	-	This whole paragraph is totally unclear and the link with policy framework is not obvious
Schmall (Petrobras S.A.)	9	53	43	54	7	-	-	-	"Remove the whole paragraph begning at ""Sustainable Development..." and ending at "...future generations.", the information its repeated."
Garcia (Renewable Energy Center)	9	53	25	53	28	-	-	-	"the sentence shows a preference for feed-in-tarif legislation over other types of incentives (tax incentives, RPS, etc). The statement ""The countries with successful renewable energy programs are those that have legistlated a feed-in-tariff, (□)"" implies on an indirect way that other countries with other policies have not been succesful. I think each country can find which is the best policy for its local circumstances. The statement in the report is, in a subtil way, policy prescriptive. Probably, feed-in-tariff is the quicker way to install and deploy renewable energies, but the statement does not have here analitical support and there is no metric to assess the effectiveness of this or other policies. "
POUFFARY (ADEME - French Environment and Energy Management Agency)	9	53	12	-	-	-	-	-	Add an item on NAMA which can play a key role in RES market deployment through appropriate national actions.
Winkler (Energy Research Centre, University of Cape Town)	9	53	21	-	-	-	-	-	South Africa adopted a REFIT, see NERSA (National Energy Regulator of South Africa) 2009. NERSA decision on renewable energy feed-in tariff (REFIT). Media statement. Pretoria. Some initial analysis of the REFIT in South Africa has been done in Edkins, M T, Winkler, H & Marquard, A 2009. Large-scale rollout of concentrating solar power in South Africa Cambridge, Climate Strategies. <a href="http://www.eprg.group.cam.ac.uk/wp-content/uploads/2009/09/edkins_csp.pdf">http://www.eprg.group.cam.ac.uk/wp-content/uploads/2009/09/edkins_csp.pdf</a> last accessed 19 September 2009.
Menichetti (Observatoire M□terran□ de l'Energie)	9	53	13	-	15	-	-	-	The use of subsidies includes the gradual phase out of subsidies□ can you reformulate this sentence?
POUFFARY (ADEME - French Environment and Energy Management Agency)	9	53	16	53	18	-	-	-	This is the EU Climate energy package (20-20-20 %) (do not forget 20% GHG abatement).

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Bilello (NREL)	9	53	25	-	28	-	-	-	This is unclear. Successful by what measure? Most installed capacity over x years? Greatest contribution to power production? Economic sustainability. Clarification required.
Menichetti (Observatoire M <span style="font-size: small;">□</span> terran <span style="font-size: small;">□</span> de l'Energie)	9	53	22	-	30	-	-	-	To provide a more balanced view, please see for example: Deploying renewables - Principles for effective policies (IEA, 2008)
Christophersen (Climate and Pollution Agency)	9	53	38	55	10	-	-	-	We propose that, at least parts of, this section is moved to the beginning of chapter 9.
Bilello (NREL)	9	54	25	54	25	-	-	-	Do authors mean that attention was paid to electrification specifically via grid extension. If so, should specify.
Steckel (Potsdam Institute for Climate Impact Research)	9	54	27	-	-	-	-	-	not only in western europe, but in most OECD countries
Bilello (NREL)	9	54	17	54	22	-	-	-	Suggest moving this paragraph to follow subsequent paragraph for timeline continuity.
Menichetti (Observatoire M <span style="font-size: small;">□</span> terran <span style="font-size: small;">□</span> de l'Energie)	9	55	8	-	10	-	-	-	""Political leadership still does not exist"" I think that this statement should be more articulated"
Bilello (NREL)	9	55	38	55	38	-	-	-	Authors should mention home enterprise opportunities. A more in-depth treatment of energy services and their direct link to productive use, development, health, and job creation is also recommended for this section as a whole.
Menichetti (Observatoire M <span style="font-size: small;">□</span> terran <span style="font-size: small;">□</span> de l'Energie)	9	55	5	-	10	-	-	-	You could refer also to UN Energy. The UN Energy is the interagency mechanism within the UN related to energy. UN-Energy was established to help ensure coherence in the UN system's multi-disciplinary response to the World Summit on Sustainable Development (WSSD) and to ensure the effective engagement of non-UN stakeholders in implementing WSSD energy-related decisions. It aims to promote system-wide collaboration in the area of energy with a coherent and consistent approach since there is no single entity in the UN system that has primary responsibility for energy ( <a href="http://esa.un.org/un-energy/">http://esa.un.org/un-energy/</a> ).
Taylor (International Hydropower Association (IHA))	9	55	1	55	11	9.6.3	-	-	Comment: I strongly support this summation of the political and ideological drivers behind the classification of renewables. This point deserves emphasis elsewhere in the report and we must avoid falling into the trap of this kind of thinking in this report.
Steckel (Potsdam Institute for Climate Impact Research)	9	56	19	-	21	-	-	-	"I understand that this list is not supposed to be complete; however, ocean energy is missing"
Garcia (Renewable Energy Center)	9	56	1	56	5	-	-	-	"May I suggest to add ""incentives"" with ""subsidies and tax concessions"" so the word would be ""(...) would be eligible for incentives, subsidies and tax concessions, (□)"""

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Devernay (Electricity of France - EDF Hydro Engineering Centre)	9	56	35	57	2	-	-	-	"The political basis for the distinction of small vs. Large hydro is clearly highlighted here. However, as this section is located in a paragraph titled ""Sustainable renewable"", it seems necessary to go one step further and remind also that the impacts of hydro, on a unit basis (installed MW for instance), depend on many other aspects than the size only (location, age, operation, design, etc...), and that this political threshold does not prejudge the actual level of impact of a given project."
Garcia (Renewable Energy Center)	9	56	19	56	21	-	-	-	May I suggest to include ocean energies in the description,
LEITE DRACHMANN (PETROBRAS)	9	56	35	57	2	-	-	-	On lines 37 and 38 large hydro are quoted to be not renewable (□□large hydro□□ is labeled by some of the legislators as being either not renewable), however this is not true and in contradiction with chapter 1 that classifies it as renewable
Bilello (NREL)	9	56	35	57	2	-	-	-	The authors discuss here the distinction between large and small hydro and designate small hydropower as renewable and exclude large hydropower from that category, yet the rest of this chapter focuses exclusively on large hydro in the discussion of impacts and potential and includes large hydro in discussions of current RE installed. Authors should address this inconsistency.
Kammen (University of California, Berkeley)	9	57	58	-	-	-	-	-	An added focus is needed on the carbon impact and issues of international biofuel trading - of Biofuels and development. An important issue to consider focuses on the economic and policy framework under which biofuel/resource flows between developed and industrializing nations. As assessment of this in the case of biofuels is the recent paper of: Searchinger, T., Hamburg, S., Melillo, J., Kammen, D. M., Lubowski, R., Oppenheimer, M., Robertson, G. P., Schlessinger, W., and Tilman, G. D. (2009) 'Fixing a critical climate accounting error', Science, 326, 527 □ 528 (23 October).

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Taylor (International Hydropower Association (IHA))	9	57	2	57	2	9.6.3	-	-	"Add ""All hydropower generates movement or electricity using the same technology. The only relevant difference in kind is the way which a hydropower scheme captures and harnesses its water and whether it connects to a grid or not. Therefore if categorisation is to be used it should be ""reservoir"", ""run-of-river"", and ""off-grid"" (as necessary). Categorisation by ""large"" or ""small"" falls into the trap of policy relativity. ""Large"" and ""small"" vary widely across regions and countries from 1-50MW reflecting the policy choices, in time and space, a particular region or country has made according the mores of their societies. Additionally, the categorisation by ""large"" or ""small"" fails to encompass real world examples of ""large"" hydropower projects that have minimal negative socio-environmental impacts or the cumulative negative effect of multiple ""small"" hydropower projects over a given geography. It is fundamental that the debate between ""large"" and ""small"" be recast to reflect the scientific nature of the technology and highlight the sustainability policy choices societies make according to time and space."
Menichetti (Observatoire M□terran□ de l'Energie)	9	57	-	-	-	9.6.4	-	-	This whole section does not seem to have any direct link with the previous and following ones. The different tools are just listed but not described. I do not see any added value
Devernay (Electricity of France - EDF Hydro Engineering Centre)	9	58	24	58	25	-	-	-	the sentence needs to be re-phrased.
Menichetti (Observatoire M□terran□ de l'Energie)	9	59	22	-	23	-	-	-	I think JREC should be mentioned as well. The link to the website should be provided. I would delete the rest of the paragraph, and add a reference to the REN21 Global Status Report
Menichetti (Observatoire M□terran□ de l'Energie)	9	61	5	-	-	-	-	-	Jatropha
Menichetti (Observatoire M□terran□ de l'Energie)	9	61	2	-	-	-	-	-	Reference incomplete
Steckel (Potsdam Institute for Climate Impact Research)	9	61	1	73	41	-	-	-	References not always in alphabetical order
Menichetti (Observatoire M□terran□ de l'Energie)	9	61	9	-	10	-	-	-	Year?
Menichetti (Observatoire M□terran□ de l'Energie)	9	63	41	-	42	-	-	-	Year?
Menichetti (Observatoire M□terran□ de l'Energie)	9	66	28	-	29	-	-	-	Hightower Mike not the author see Filmore□ ? Please check

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Raturi (The university of South Pacific)	9	66	2	-	-	-	-	-	Reference not complete
Raturi (The university of South Pacific)	9	66	-	73	-	-	-	-	References not complete
Schmall (Petrobras S.A.)	9	-	-	-	-	2.4.5	-	-	Add a section about Brazilian Programs to eradicate forced labor, with the text: In 2002, Brazil created the National Plan for the Eradication of Slave Labor, the goal is to combine efforts to prevent, suppress and eradicate forced labor, illegal labor of children and adolescents, crimes against the organization of work and other violence to the health rights of workers, especially in rural areas. Companies and individuals fined by exploitation of slave labor suffer legal sanctions and are included in a register of public access.
Verbruggen (University of Antwerp)	9	-	-	-	-	9.1	-	-	"The introduction starts with the concept of SD; only the usual and used-up goal statement (6:5-7) is repeated with reference to WCED, 1987 and Bojo et al., 1992. WCED, chapter 2 provides more and better elements to complete the usual and used-up goal statement. One of the elements that re-reading WCED revives is the 4th crucial dimension of SD, i.e. governance, institutions, policy, participation, and related aspects. See e.g. Kemp & Martens ""SD: etc..."" in Sustainability: Science, Practice, & Policy, 2007, vol.3, N°2. Also the WCED chapter on energy (chapter 7) merits re-reading by the authors, for example for a clearer SD vision on energy and development (section 9.2.1 is quite strange and in conflict with a lot of the latest literature on the role RE has to play)"
Verbruggen (University of Antwerp)	9	-	-	-	-	9.1.1	-	-	"The 3 dimension vision is strongly followed here (p.7:20,28,34; p.8:1-3); this is not as in the ExSum.(p.4:22-23) where the four dimensions are mentioned (so including next to social ""institutional""). Also later (e.g.p.38:27) governance is argued as an important dimension (what it of course is)."
Winkler (Energy Research Centre, University of Cape Town)	9	-	-	-	-	9.1.2	-	-	"The use of energy indicators for SD in developing countries deserves some discussion. Such a set of indicators were developed in a UNEP project with case studies by country teams in China, India, Brazil and South Africa. See 1) La Rovere, E L, Pereira, A O, Simoes, A F, Pereira, A S, Garg, A, Halsnaes, K, Dubeux, C B S & da Costa, R C 2007. Development First: Linking energy and emissions policies with sustainable development in Brazil. ISBN: 978-87-550-3630-7. Roskilde, UNEP Risø Centre.; 2) Shukla, P R, Garg, A, Dhar, S & Halsnaes, K 2007. Balancing development, energy and climate priorities in India. ISBN: 978-87-550-3627-7. Roskilde, UNEP Risø Centre. 3) Jiang, K, Hu, X, Zhu, X, Garg, A, Halsnaes, K & Liu, Q 2007. Balancing development, energy and climate priorities in China. ISBN: 978-87-550-3628-4. Roskilde, UNEP Risø Centre.; 4) Winkler, H, Mukheibir, P, Mwakasonda, S, Garg, A & Halsnaes, K 2007. Electricity supply options, sustainable development and climate change priorities: Case studies for South Africa. ISBN: 978-87-550-3629-1. Roskilde, UNEP Risø Centre."

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Winkler (Energy Research Centre, University of Cape Town)	9	-	-	-	-	9.1.2	-	-	A useful set of indicators - limited to only 8! - was developed by Helio International. These were applied in the South African context to a case study, see Spalding-Fecher, R 2003. Indicators of sustainability for the energy sector: a South African case study. Energy for Sustainable Development 7 (1): 32-46. March. Both the conceptual work on a short list of indicators and teh case study might be usefully included here.
Verbruggen (University of Antwerp)	9	-	-	-	-	9.1.3	-	-	"This section with as title ""Barriers and Opportunities"" makes no link or reference to the sections 1.5 and 11.4, and to the cross-cutting efforts to clarify terms and division of work among the chapters. The list of 8 is not in accordance with the work by other SRREN authors on this. For example numbers 1), 4), 6) and 8) do not seem to correspond to the definition of barriers. Also the section has no single reference, and there is some rather inaccurate phrasing, e.g. p.9: 19-20; 24-25; 28-29; 37;40-41."
Pálvölgyi (Budapest University of Technology and Economics)	9	-	-	-	-	9.2.	-	-	The energy dependence (ie. energy carrier's import) is an important element of the sustainable energy management, in certain developed and developing countries, as well. Consideration of energy dependence should be included in this chapter.
Verbruggen (University of Antwerp)	9	-	-	-	-	9.2.1	-	-	"Again a section with only 1 reference (dating from 1984) on energy services; the idea of putting energy services central is down in the section overridden by a logic that is contradictory to the main findings and arguments in other chapters of the SRREN (being: RE are ""the"" sustainable energy supplies that can bring along SD and therefore must substitute for non-sustainable energy). I miss e.g. in this chapter and in this section the reference to UNDP, 2007. Human Development Report 2007/2008. Fighting Climate Change: Human solidarity in a divided world. On the three central issues mentioned (abundance, reliability, affordability) I disagree with the text. Abundancy is to be related with services and efficiency; there is no future for the world in copying the non-sustainable practices and technologies of the rich part. Reliability is covered better in ch.8 (there they try to ban the term intermittency or at least the wrong use of the term). Affordability has been discussed in cross-cutting sessions, and also in the joint article by 8 IPCC authors, Sathaye being one of them (in Energy Policy, february 2010): cost and price is a different thing; as now-and-then also stated in Ch.9 non-inclusion of external costs and risks hides the real cost (extremely high cost for human beings when the planet is no longer a pleasant place to live) of fossil fuels and nuclear power. Such things may be considered as available and known, or not? FURTHER READING OF CH.9 SHOWS THIS SECTION 9.2.1 CONFLICTS WITH FOR EXAMPLE SECTION 9.4.1 IN ANALYSIS AND CONCLUSIONS."
Verbruggen (University of Antwerp)	9	-	-	-	-	9.2.2	-	-	"Few references (none post 2000). The intro (p.11:2-7) are repetititve generalities. Issues about rural electrification require more analysis and assessment, for example: distributed renewable supplies versus grid power (+ what supplies the grid?); the role of the grid as supporting system (back-up and complementary or make-up power) versus overwhelming power, etc."

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de Campos Barbosa (Petrobras)	9	-	-	-	-	9.2.2	-	-	This section is biased to developing country energy issues (not constrained to bioenergy). Better to balance with rich countries issues to create sustainable energy access. Guarantees of sustainable energy access should be equal to rich or poor.
Pehnt (Institute for Energy and Environmental Research)	9	-	-	-	-	9.2.4	-	-	"This section does not adequately address energy security and renewables. There is a large body of literature on this issue, e. g. by REN 21; Adephi institute; etc."
Visconti (Inter-American Development Bank)	9	-	-	-	-	9.3	-	-	An overall comment for this section: why do we concentrate here only on environmental impacts ? As we are examining renewable energy in the context of sustainable development, it would be more appropriate to examine briefly for each renewable also the social and economical implications. In the case of biofuels for example we could consider the development of a new industry, new infrastructures that can be used also for other purposes, new jobs. Including also the other two components of sustainable development, in addition to the environmental one, will give a more balanced picture. The creation of competitive clusters should also be considered.
Pálvölgyi (Budapest University of Technology and Economics)	9	-	-	-	-	9.3.	-	-	Content of this section is overlapping with the relevant sections in chapter 2 (bimass), chapter 4 (geothermal) etc. The consistences among these parts of the reports should be carefully checked.
POUFFARY (ADEME - French Environment and Energy Management Agency)	9	-	-	-	-	9.3.1	-	-	Barriers should be presented in a more neutral way in order to reflect also solutions and associated barriers for other energy sources (fossil and nuclear).
Winkler (Energy Research Centre, University of Cape Town)	9	-	-	-	-	9.3.2	-	-	"The issue of competition over crops for energy or to ensure food security seems a key indicator for bioenergy. The ultimate objective of the UNFCCC includes ""to ensure that food production is not threatened"", in Article 2."
Visconti (Inter-American Development Bank)	9	-	-	-	-	9.3.2.1	-	-	sustainability standards and certification scheme will correct the economics simply dictation
de Campos Barbosa (Petrobras)	9	-	-	-	-	9.3.2.1	-	-	This theme have been discussed in chapter 2, and this affirmation is not in accordance with the key messages in it ( see p.111 line 7-21).
Steckel (Potsdam Institute for Climate Impact Research)	9	-	-	-	-	9.3.2.5	-	-	Using human and animal residues to produce biogas could also improve the hygiene situation in rural areas (see e.g. Gautam et al. (2009): Biogas as a sustainable energy source in Nepal: Present status and future challenges. Renewable and Sustainable Energy Reviews, Vol. 13, pp. 248 - 252)
Bilello (NREL)	9	-	-	-	-	9.3.2.5.	-	-	This section should include discussion of increased efficiency of biomass use with improved cookstoves and biogas and the potential improvements to human health. In additions, there are conflicting studies to the assertion that biofuels always yield lower emissions that impact human health

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Steckel (Potsdam Institute for Climate Impact Research)	9	-	-	-	-	9.3.3	-	-	"CSP technologies are missing; section is focused on solar heating; should consider electricity aspects more prominently"
Bilello (NREL)	9	-	-	-	-	9.3.3.1	-	-	Development of large CSP plants and studies of desert ecosystem impacts should be included.
Pehnt (Institute for Energy and Environmental Research)	9	-	-	-	-	9.3.3.1	-	-	This is one example where the technology chapter is much more detailed than chapter 9.3.3 on solar energy. E. g. to start discussing land use of PV with soil disinfection is very special! There is a detailed debate on land use of PV systems. E. g. Germany is right now seriously lowering the feed-in tariffs for open ground PV systems on fields. These are really relevant issues to be discussed.
Pehnt (Institute for Energy and Environmental Research)	9	-	-	-	-	9.3.3.2	-	-	Address water demand of solar thermal power plants
Bilello (NREL)	9	-	-	-	-	9.3.3.2	-	-	Suggest mentioning solar plants (particularly CSP) as a source of competition for water resources in constrained environments.
Menichetti (Observatoire M□terran□ de l'Energie)	9	-	-	-	-	9.3.3.3	-	-	"Please, quantify the ""considerable"" amount of GHG emissions avoided by solar. ""Solar energy produces almost zero emissions"": are you taking into account only the operation phase or the whole life cycle emissions? Actually, the values you provide in table 2 for solar PV are very high (maximum value of 300 gCO <sub>2</sub> eq/kWh), thus contradicting your claim here. My comments on the values reported in the table are provided below, here I just wanted to point out the inconsistency between what you state here and what you report later."
Menichetti (Observatoire M□terran□ de l'Energie)	9	-	-	-	-	9.3.3.K7 162	-	-	Again, this section is not related to the impacts of solar technologies on water, as mentioned in the introduction. It is rather a description of how solar can be used to treat water
Kleidon (Max-Planck-Institute for Biogeochemistry)	9	-	-	-	-	9.3.4	-	-	A missing impact is that geothermal heat extraction can result in local earthquakes. See e.g. Nature 462, 848-849.
Bilello (NREL)	9	-	-	-	-	9.3.4	-	-	Should this section also include discussion of geothermal heat pumps?
Bilello (NREL)	9	-	-	-	-	9.3.4.2	-	-	Suggest being more specific about emissions that are none to negligible (NO <sub>x</sub> , SO <sub>x</sub> , VOCs, and lifecycle GHGs?).
Bilello (NREL)	9	-	-	-	-	9.3.5	-	-	Suggest including discussion of small/micro/pico hydro systems as these are important technologies for reaching rural populations in the developing world.
Menichetti (Observatoire M□terran□ de l'Energie)	9	-	-	-	-	9.3.5	-	-	You only seem to refer to big, reservoir power plant, not to run of river hydro power plants. For sake of consistency, a table similar to table 1 should be prepared for all other technologies, but actually it would be better to merge it with table 2

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SCOWCROFT (EURELECTRIC)	9	-	-	-	-	9.3. 5.	-	-	This section only discusses possible negative effects of hydropower, and not the positive attributes (economic growth, water management incl irrigation, local development, infrastructure (roads, electricity etc), investments in the region/locally, efficient use of resources per MWh produced (energy density). Reference to study where HIV stems from hydro should be taken out, these are at best indirect leffects of
Devernay (Electricity of France - EDF Hydro Engineering Centre)	9	-	-	-	-	9.3. 5.1	-	-	Resettlement may indeed be associated to HP project, but this is not always the case : projects in remote areas, and run of river projects do not generate any resettlement.
Garcia (Renewable Energy Center)	9	-	-	-	-	9.3. 5.4	-	-	May I suggest this comment at the end of the paragraph: Run-of-river power plants implies some damage associated with channel construction, including limited deforestation and land remotion.
Steckel (Potsdam Institute for Climate Impact Research)	9	-	-	-	-	9.3. 7.3	-	-	"Global environmental impacts do also include possible impacts on the global climate system. The discussion under which circumstances the removal of kinetic energy from the atmosphere can have critical impacts must be included (see e.g. Keith et al. (2004): The influence of large-scale wind power on global climate, PNAS; Archer and Jacobson (2005), Evaluation of global wind power. Journal of Geophysical Research Letters; Lu et al.(2009), Global potential for wind-generated electricity, PNAS)"
Kyte (E.ON AG)	9	-	-	-	-	9.3. 7.6	-	-	Ministry of Defense in UK is major objector to windfarms
Verbruggen (University of Antwerp)	9	-	-	-	-	9.3. 8	-	-	"On this section there should be interaction with ch.11; the description of LCA here is interesting (but ADD MORE REFERENCES for becoming an assessment report). The approach and findings should be linked with the discussion on policies and policy instruments, where part of the literature argues the necessity (prerequisite) of RE ""qualification"" for good policy making."
Menichetti (Observatoire M□terran□ de l'Energie)	9	-	-	-	-	9.3. 8	-	-	I would suggest moving this section before the paragraph 9.3.1, as an introduction to the impact assessment of the various technologies
Verbruggen (University of Antwerp)	9	-	-	-	-	9.4. 1	-	-	"Interesting section (conflicts with other parts of ch.9, for example with section 9.2.1); the analysis here better comes upfront of the chapter, for setting the stage/clarifying the framework for studying RE & SD. Again: references are too few. Some small editorial suggestions: p.24:4 replace ""can be translated in"" by ""is related to""; p.24:13 replace ""benefits"" by ""conditions""; p.24:15 replace ""cheaper"" by ""lower""."

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de Campos Barbosa (Petrobras)	9	-	-	-	-	9.4.1	-	-	"Suggestion: incorporate ""Another important socio-economic impact associated with the development of biofuels in developing countries is the income and job generation in rural areas. (reference: (2006) Daniel M. Kammen, Bioenergy in developing countries experiences and prospects: bioenergy and agriculture promises and challenges, IFPRI, 2020 Vision Briefs,n.14). Bioenergy could make important contributions to the rural development and reduce poverty. This is an important topic for the development of policies to support biofuels production in some countries. Furthermore this section is biased to developing country energy issues. Sustainable development is for everyone. Developed countries non-sustainable aspects should be equally cited as well as how renewable energy could help to cope with them. Necessary GHG emission reduction is one of these aspects. There is also a general lack of references."
Steckel (Potsdam Institute for Climate Impact Research)	9	-	-	-	-	9.4.1	-	-	"This section should be revised with respect to the storyline and structure of the arguments; some points are really difficult to understand."
Venghaus (Potsdam Institut for Climate Impact Research)	9	-	-	-	-	9.4.1	-	-	This entire section would benefit significantly from a revision under consideration of additional sources and more specific examples. Currently, it appears rather arbitrary.
Verbruggen (University of Antwerp)	9	-	-	-	-	9.4.2	-	-	"there is repetition of info compared to other chapters and to other sections in ch.9. For example the intro (p.34:2-7) belongs more to ch.1; □ p.34:19-28 on LCA overlap with 9.3.8 (here line 24-28 is quite affirmative; there should be more references assessed to qualify the statements). Subsection 9.4.2.1 (there is no 9.4.2.2) is also repetitive; table3 has no quantitative info as the text mentions (p.34:40); why is that info here??"
Menichetti (Observatoire M□terran□ de l'Energie)	9	-	-	-	-	9.4.2	-	-	This section repeats the same concepts already expressed in section 9.3.8. To be merged?
Steckel (Potsdam Institute for Climate Impact Research)	9	-	-	-	-	9.4.2.1	-	-	Additional explanatory text introducing and explaining table 3 would be desirable.
Verbruggen (University of Antwerp)	9	-	-	-	-	9.4.3	-	-	"The line between this section and ch.11 is very thin; there is need for cross-cutting meeting on this material. Here I limit the comments to a few small points: p.36:8 replace ""is immediately maintained"" by ""will continue""; p.36:40 add references to the source because the point raised is absolutely relevant but also highly contentious; p.37:8-10 are there no more and more recent references?; p.37:16-17 delete ""and carbon trading"" because this is an instrument while the point is on options clean energy and efficiency (these are measures, i.e. real changes, not just instruments)"
Bilello (NREL)	9	-	-	-	-	9.4.3	-	-	Not clear if this section is appropriately located. Issues covered seem more appropriate to Chapters 8 or 11. Suggest moving this content to one of those chapters.

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Venghaus (Potsdam Institut for Climate Impact Research)	9	-	-	-	-	9.4.3.1	-	-	"One argument to be considered in this section is the fact that much more indepth knowledge is required with respect to ""understanding acceptance"". Recent studies especially in the field of marketing have focused on the construct of e.g., consumer acceptance (e.g., lifestyles, TAM (technology acceptance models), the three-component theory of acceptance (affective, cognitive, conative and the gaps between the mere ""attitudinal acceptance"" (which is very high for RE - nearly everyone things RE are 'good', and the 'behavioral acceptance' and 'acceptance to use' (i.e., to actually change behavior and purchase RE technologies etc.)))"
Dunn (GE Energy)	9	-	-	-	-	9.4.3.1	-	-	For a recent Yale/CMU survey on public attitudes toward RE in the context of CC, see SRREN_Draft 1_Review_Dunn_Seth_Material_06.pdf.
Verbruggen (University of Antwerp)	9	-	-	-	-	9.5	-	-	"here cross-cutting talking with ch.11 (mainly section 11.7) seems necessary; on some subsections are paragraphs wider talking may be needed, for example on barriers (p.43:3-7) there is only reference made to 9.1.3. but there our comment was to link to at least ch.1 (1.5) and ch.11 (11.4)"
Steckel (Potsdam Institute for Climate Impact Research)	9	-	-	-	-	9.5	-	-	Some statements seem to be biased by a personal/emotional attachment of the authors to renewable energy. In parts, I doubt that the authors have a sufficient overview of the relevant scientific literature.
Steckel (Potsdam Institute for Climate Impact Research)	9	-	-	-	-	9.5.1	-	-	The reader could get the impression that renewable energy is sustainable per se <input type="checkbox"/> please make very sure that it is not always the case, outline the circumstance, cite adequate peer reviewed literature and avoid subtle equalizing of the term sustainable development and renewable energy
Steckel (Potsdam Institute for Climate Impact Research)	9	-	-	-	-	9.5.1	-	-	This section does in general not fulfill my expectations: Talking about scenarios for renewables I expect 1) a review of available scenarios, 2) a classification of findings and 3) an analysis of development pathways in different regions. These include instruments how these development pathways could be reached, including the discussion of micro credits, technology transfer, CDM etc. for developing countries (this section is going in the right direction) and a discussion of suitable policies for developed countries, including a review of SCIENTIFIC literature of policies, including feed in tariffs, standards, infrastructure investment programmes, labeling etc. The literature review should not be driven by grey literature edited by various regional renewable energy lobby associations.
Winkler (Energy Research Centre, University of Cape Town)	9	-	-	-	-	9.5.1	-	-	With scenarios, the broadest possible range should be assessed. Greenpeace developed some thoughtful scenarios, with signficiant emphasis on renewables (and a foreword by a certain Dr Pachauri!). The citation following is for a general piece, but there are also case studies of different countries. Greenpeace 2007. energy [r]evolution: A sustainable world energy outlook. Amsterdam, Greenpeace International.

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Verbruggen (University of Antwerp)	9	-	-	-	-	9.5.1.1	-	-	"It is good to deal with the respective roles/responsibilities of developed and developing countries in the transition to RE, but this issue requires more references and assessment than now provided on p.43; the bullet list seems to list specific existing mechanisms (CDM, Grameen, GEF) and general models; there is little text with it."
Steckel (Potsdam Institute for Climate Impact Research)	9	-	-	-	-	9.5.1.1.1	-	-	An in depth discussion of how renewable energy can contribute to sustainable development in rural areas is missing and should be elaborated (e.g. solar home systems for illumination --> positive effects for education, security etc □ )
Steckel (Potsdam Institute for Climate Impact Research)	9	-	-	-	-	9.5.1.1.2	-	-	"This section is eurocentric; either Europe should be used as an example if its lessons could be applied to other developed regions (this should then be clearly communicated, also how!) or a systematic overview of different developed regions could be expected including North America, Australia and Japan"
Bilello (NREL)	9	-	-	-	-	9.5.1.2	-	-	Authors should include an industry sub-section.
de Campos Barbosa (Petrobras)	9	-	-	-	-	9.5.1.2	-	-	Discussio expected to this section is the development pathways for renewable energy in different end-use sectors. There are some sectors that weren't considered, like Agriculture and Industrial sectors, and the land-use discussion isn't best included here.
Steckel (Potsdam Institute for Climate Impact Research)	9	-	-	-	-	9.5.1.2.1	-	-	"Passive housing is missing; the question how renewable energy can be developed in the building sector is not addressed"
Steckel (Potsdam Institute for Climate Impact Research)	9	-	-	-	-	9.5.1.2.2	-	-	the question how renewable energy can be developed in the transport sector is not addressed
Steckel (Potsdam Institute for Climate Impact Research)	9	-	-	-	-	9.5.1.2.3	-	-	Nothing is said about development pathways for renewable energy in the land-use sector.
Steckel (Potsdam Institute for Climate Impact Research)	9	-	-	-	-	9.5.1.3	-	-	"It is not clear to me how the title of this section corresponds to the text; I expected a discussion of renewable energy for solid, liquid, gaseous and grid energy sources. Gas is partly covered by the box. Scenarios (referring to the section title) are not at all discussed. Rather, the section simply lists different RET and says something about storage of electricity. The section must be completely revised (I exclude the box from this statement)"
Menichetti (Observatoire M□terran□ de l'Energie)	9	-	-	-	-	9.5.1.3	-	-	"What do you mean by ""for renewable energy in different energy sources""?"
Verbruggen (University of Antwerp)	9	-	-	-	-	9.5.1.3	-	-	almost entirely overlap with ch.2-7 and ch.8
Verbruggen (University of Antwerp)	9	-	-	-	-	9.5.2	-	-	"the intro part of the section (p.51-52) repeats a lot of section 9.5.1.1; p.52:35-36 speaks of a ""recent market survey"" with a reference to 2000"

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Steckel (Potsdam Institute for Climate Impact Research)	9	-	-	-	-	9.5.2	-	-	the section's quality would be improved significantly if the key requirements on a policy framework were pointed out, instead of listing all kinds of institutions. the possibilities and propositions to combine climate policy and renewable energy as exemplarily proposed by Harald Winkler (SD-PAMs etc., various publications available) are not considered
Dunn (GE Energy)	9	-	-	-	-	9.5.2.1	-	-	"Some of the discussion in this section, pertaining to RE-specific policies, is redundant with (and belongs in) Chapter 11. At most the discussion should refer to Ch. 11 and focus more on broader SD strategies that may lay the basis for RE-specific policies. This is an important point (e.g. the EU has strong RE policies because of its CO2 strategy; China and India RE policies can be traced to long-term SD plans."
Steckel (Potsdam Institute for Climate Impact Research)	9	-	-	-	-	9.5.2.1	-	-	"The authors should make clear that there is a need for specific instruments that ensure sustainability (e.g. labels, standards ... ) in contrast/complementary to technology support (e.g. in the form of renewable energy quotas or feed-in tariffs, discussed in the section (which is positive)). One relevant example would be biofuels/biomass use. In the section it is not clear to me, whether the authors call for renewable energy targets in general (as it is the case in the EU); if so, this point should be made explicit and be discussed, using peer-reviewed literature as reference. In the center of the section should be a generic discussion of available instruments rather than a list of available policy instruments in different regions. The latter could be summed up e.g. in a table. "
Verbruggen (University of Antwerp)	9	-	-	-	-	9.5.2.1	-	-	"the title is ""Required instruments for SD pathways for RE"": the contents gives a brief, incomplete description of existing instruments. Main question: does this mean that we are safe, because what is required is there? Second question: the text is not an assessment of the instruments (this should be in ch.11) and takes over the stories of policy makers; for example p.52:5-11 is the standard talk on the Kyoto instruments, but there are several scholars that criticize those for being not effective, efficient, fair. Better is to delete the whole section here."
Pehnt (Institute for Energy and Environmental Research)	9	-	-	-	-	9.6	-	-	"This is on the one hand a synthesis of the synthesis (because the full chapter 9 has the character of a synthesis chapter); on the other hand it brings up totally new aspects that do not really belong into this chapter and are redundant to the policy chapter."
Menichetti (Observatoire M□terran□ de l'Energie)	9	-	-	-	-	9.6	-	-	I think this part would be very good as an introduction, rather than as a synthesis
Steckel (Potsdam Institute for Climate Impact Research)	9	-	-	-	-	9.6	-	-	Well written, covers the most important aspects, interestingly some very important aspects wrt to renewables and SD are SOLELY covered in this excellent summary of a in total unsatisfactory chapter

## Special Report on Renewable Energy Sources and Climate Change Mitigation, First Order Draft

Verbruggen (University of Antwerp)	9	-	-	-	-	9.6.1	-	-	"the background provided is quite general, repetitive regarding other sections of ch.9 and with other parts of the srren (ch.1). Some points can be discussed, e.g. P.54:31-32 ""until the relative political stability in the Middle East reduced international oil prices"" (ref.?? where is the demand-supply/market analysis gone?? energy efficiency played a major role in reducing demand growth while also higher prices had created more supplies: this makes prices fall - as the first Gulf war showed: it was but a short and limited price instability); p.54:37-39: references?; p.54:40-42; where is the pillar of people being involved, participate, govern, ... for development being sustainable (and also RE projects); see the period of several development aid failures (also many RE projects) because people was not involved."
Bilello (NREL)	9	-	-	-	-	9.6.1	-	-	This section appears to repeat much of the content covered in the introduction to Chapter 9. Suggest deleting or editing.
Verbruggen (University of Antwerp)	9	-	-	-	-	9.6.2	-	-	most is repeating of ideas covered already higher in ch.9
Verbruggen (University of Antwerp)	9	-	-	-	-	9.6.3	-	-	"the sections on hydro (p.56:35-p.57:2) and on bio (p.57:3-18) are incomplete and need more complete treatment in the respective technology chapters; is it good to provide partial info here?"
Verbruggen (University of Antwerp)	9	-	-	-	-	9.6.4	-	-	why that list of seven tools here?
Winkler (Energy Research Centre, University of Cape Town)	9	-	-	-	-	9.6.5	-	-	"Please assess the literature on whether the CDM has achieved its 2nd objective, SD. Including critical views, such as ""The CDM was created as a market institution, but sustainable development is not incorporated into the market aspect of the mechanism"" (Ellis et al 2007), see sections 4 and 5 of their article, Ellis, J, Winkler, H, Morlot, J C & Gagnon-Lebrun, F 2007. CDM: Taking stock and looking forward. Energy Policy 35 (1): 15-28."
Verbruggen (University of Antwerp)	9	-	-	-	-	9.6.5	-	-	"tedious text on the CDM and the EB# decisions; maybe try to make it more attractive to read, because it is an important issue, and the final outcome (stated p.58:19-22) is of high relevance."
Bilello (NREL)	9	-	-	-	-	9.6.5	-	-	Section specifically addressing sustainability criteria for CDM seems out of the scope of an RE report. May be more helpful to use this example along with others to show commonly used sustainability factors when evaluating RE projects.
Verbruggen (University of Antwerp)	9	-	-	-	-	9.6.6	-	-	reference for statement p.58:24-25 is needed. The statement p.58:35-37 on RPS is very general: what added value does it have? Delete. Integration (p.59: 9-11) is treated poorly (see ch.8). The section ends with a reference to the Swiss 2000W idea, but why is this here?
Verbruggen (University of Antwerp)	9	-	-	-	-	9.6.7	-	-	"the section is a reference to OECD/IEA and a list of examples; what does a reader has to take up here?"
Verbruggen (University of Antwerp)	9	-	-	-	-	9.7	-	-	this section needs more work

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Steckel (Potsdam Institute for Climate Impact Research)	9	-	-	-	-	-	-	1	the impact of irrigation areas on HIV/AIDS/sexually transmitted diseases is not clear
Bilello (NREL)	9	-	-	-	-	-	-	2	"The solar and geothermal sections do not include thermal technologies. Unclear what is meant by ""sustainable GHG emissions"" for bioenergy. Should be consistent units across technologies for meaningful comparisons."
Tagashira (Central Research Institute of Electric Power Industry)	9	-	-	-	-	-	-	2	Chapter 10 includes social, environmental cost and benefits. Chapter 9, for example table 2, also describes similar contents. The role of each chapter should be clarified.
Verbruggen (University of Antwerp)	9	-	-	-	-	-	-	2	sources? References?
Steckel (Potsdam Institute for Climate Impact Research)	9	-	-	-	-	-	-	2	The table contains too much information. The reader is confronted with a huge amount of data which is only insufficiently explained and not brought well into context. More explanation is needed in the text. If the table shall remain in the chapter, one could think of including it as an Appendix, while working on a more condensed version in the text.
de Campos Barbosa (Petrobras)	9	-	-	-	-	-	-	2	There is a general lack of references (seems to be edit error). Selected indicator should be referenced.
Pehnt (Institute for Energy and Environmental Research)	9	-	-	-	-	-	-	2 and 3	These tables (2 and 3) and the introduction of section 9.5 somehow discuss the same --> please amalgamate.
Bilello (NREL)	9	-	-	-	-	-	-	3	Low vs. high for these categories is not defined and so is unclear. There is no supporting discussion for this table, so assertions such as direct solar/reduces poverty appear unsubstantiated. These linkages seem central to this chapter, and the lack of discussion and therefore lack of clarity in the relationships between the technologies and these selected SD indicators needs addressing.
Steckel (Potsdam Institute for Climate Impact Research)	9	-	-	-	-	-	-	3	The table does not seem to use the same standards for every energy form, e.g. with respect to primary and secondary effects (e.g. direct effects of renewable energy supply in rural areas vs. electrification by a regional/national grid). Thus, the filling of the information from the table is somewhat arbitrary. Also, small hydro is obviously not considered.
Pálvölgyi (Budapest University of Technology and Economics)	9	-	-	-	-	-	-	9.2.	The values are highly uncertain and not comparable. It is not clear how the energy carrier's transportation are considered (ie. emissions from biomass's transportation)
Pálvölgyi (Budapest University of Technology and Economics)	9	-	-	-	-	-	-	9.3.	"The first column (""selected SD goals"" ) should be explained. Certain important SD elements are missing, such as ecosystem services, equity issues, landscape conservation etc."

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Branche (Electricite de France (EDF))	9	-	-	-	-	-	-	Table 2	This table contains a lot of mistakes and wrong numbers. However such a table is very interesting and useful to compare different technologies, but it should be built regarding the technology chapters, not rely only on the authors' opinion. As mentioned before, nuclear is not subsidized.
Cozzi (International Energy Agency)	9	-	-	-	-	-	-	table 2	This table is extremely valuable - an extreme care should be put double checking the references

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Consideration by the writing team	
Comments 110-113 should be addressed and included if appropriate.	
Comments 110-113 should be addressed and included if appropriate.	
Comments 110-113 should be addressed and included if appropriate.	
Chapter 11 should address this if appropriate.	
Outline was provided by SRREN organizers. Please see Introduction.	
Thank you will look at this report.	
Noted	

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Noted	
Accepted	
All authors and check with the technology chapters. TSU can issue a guideline. Cross-cutting issue	
Accepted	
Noted	
Noted	

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Address in Section on capacity building	
Please see AR4 WGIII Ch.12 for detailed SD review. This chapter is limited in scope to RE only.	
Include a section in developing countries on island nations.	
Include this in the introduction.	
Chapter 11 should address this if needed.	

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Include large scale charcoal/fuelwood use	
Include a section in developing countries on island nations.	
Comments 110-113 should be addressed and included if appropriate.	
Agreed	
Small and large hydro have different impacts. Need to address these separately.	

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Chapter 1 should address this.	
Accepted	
Description of gender is included in Tables 2 and 3; could be expanded.	
The three pillars are covered in Tables 2 ad 3; a better description of the tables will be improve harmonization	
Comments 110-113 should be addressed and included if appropriate.	
Include a section in developing countries on island nations.	

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Chapter 1 should include this if appropriate.	
Thank you.	
SRREN organizers need to address this.	

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A box on leapfrog	
Accepted	
Noted	
Not clear which chapter and page number this comment references to.	
Noted	
Noted	

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One of the main causes not the cause. No change	
Noted	
Accepted	
Noted	
Noted	
See 9.1 and 9.5.1 text.	
Noted	
Will be fixed in the SOD.	
Noted	
Accepted	
Noted	
Noted	
Noted	
Noted	

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Delete sentence or reword it.	
Delete sentence or reword it.	
Reword it sentences.	
Reword it sentences.	
Delete sentence or reword it.	
Delete sentence or reword it.	
Delete sentence or reword it.	
Reword it sentences.	
Noted	

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Delete sentence or reword it.	
Will add couple of sentences here on MDG but it is described in more detail in 9.5.1.	
It is only cited twice in the report.	
Accepted	
Accepted	
Ignore; Table numbering problem -- TSU	
Leave as is -- cited reference.	
Biofuels negative impacts are also described.	
Ignore; Table numbering problem -- TSU	
Noted	

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Unclear what this comment is referring to.	
Not always true. Please see Table 3.	
Sentence is clear as is with reference to biofuels..	
Accepted	
Ignore; Table numbering problem -- TSU	
Yes.	
Accepted	
Accepted	
Unnecessary.	
Disagree with change	

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Accepted	
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Unclear what this comment is referring to.	
Not relevant to the referred line number. Page 8 line 18.	
Accepted.	
Accepted	
Reword	
Accepted	
Reword	
Accepted	
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Unclear what this comment is referring to.	

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Accepted	
Will be defined.	
Disagree with change	
Noted	
Unnecessary.	
Noted	
Disagree with change. Boxes show examples of successes. Does not imply wide scale acceptability.	
Accepted	
Noted	
Noted	
Add barriers for non-electricity renewable sources	
Accepted	

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Noted	
Accepted	
Okay. Will create a new section on leapfrogging.	
Agree	
Agree. Barriers refer to current conditions. We will note that as barriers are removed in the future penetration will increase.	
Agreed. It is a barrier otherwise.	
Agree	
Agree	
Section to be reviewed with other chapters to avoid duplication -- Verbruggen note.	

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Disagree with change. Small noted as just an example.,	
Disagree with change	
Noted	
Accepted	
Accepted	
Disagree with change	
Accepted	
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Qualification of 'needs' (energy needs?) with examples/references required	
Accepted	
Rejected	

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Accepted	
Accepted	
Accepted	
Accepted	
Accepted	
Accepted	
Accepted	
Accepted	
Accepted	
Accepted	
Accepted	
Accepted	

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Include a definition for renewable charcoal	
Addressed. The sentence deleted.	
Accepted	
Accepted	
Accepted	
use ,for instance, in the colonial period'	
To provide full reference	
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Replace the sentence 'One focus... World Bank' with 'Some initiatives such the UNEP Global Clean Energy Network and the Global Village Energy Partnership reinforced the need for sustained attention to rural energy (World bank, 1996).	

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Accepted	
Author to better explain	
Sentence is clear	
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Link is broken, no suggestion. Team decided for a table instead of figure. Figure may be considered prescriptive/judgemental	
Accepted	
Sentence ends at "are discussed".	
sentence is clear	
Accepted	
Accepted	

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Accepted	
Accepted	
Section will be re-structured, but each impact will be addressed in the technology. Chapters. Both categories may be under an "Atmophere" title, separating paragraphs for GHGs and local pollution	
Accepted	
Accepted	
Accepted	
Accepted	
Text in section 9.3 will be reorganized	
Accepted	
Sentence ends at "are discussed".	
Accepted	
Sentence is clear	

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Accepted	
Accepted	
Accepted	
Sentences with generalization will be looked upon	
Tables address that, plus Section 9.4	
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Accepted	
Glossary to explain	
Sentence ends at "are discussed".	
Accepted	

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In section 9.3.8	
biased source	
Accepted	
Accepted	
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Accepted	
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.	
But 2nd gen biofuels are still not widely used	
Accepted	



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Accepted	
Accepted	
Accepted	
Accepted	
Accepted	
Accepted	
Accepted.	
Start sentence from "bioenergy resources"	
It is important to compare with conventional sources	
Accepted	

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Accepted	
Accepted	
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Will go through references	
Structure will change within space limitation.	
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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.	
Glossary to explain.	
The final draft of the SRREN will be processed by a professional copy-editor. All editorial comments such as this will be resolved at that time.	

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Look up for reference	
Accepted	
Generally instead of currently	
Check if source is site specific	
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Accepted	
Accepted	
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Accepted	
Accepted, note taken	
Accepted	

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Check if source is site specific	
Take out the paragraph or search new peer reviewed references for steam soil treatment	
Noted. Balance will be dealt with in restructuring Section 9.3	
Look up for reference	
The comment is not clear	
Take out the paragraph or search new peer reviewed references for steam soil treatment	
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Delete sentence "typically...". Rephrase the remaining sentences.	
Accepted	
Accepted	

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Accepted	
Delete sentence "typically...". Rephrase the remaining sentences.	
Solar energy could be as much as conventional disinfection processes (check it out).Delete sentence "this method...equipment.'	
Noted	
Accepted	
Accepted	
Direct impact of solar energy on water resources. References required.	
Look for references	
Check in the Table or the Section on Life Cycle Analysis. Technology Chapters.	
Accepted	
Include impact on human health	
Noted	

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Noted	
See comment number 328. Mention desert ecosystem impacts	
consult references	
Look for references	
Direct impact of solar energy on water resources. References required.	
refereces are required for solar chimneys	
acceptance is site specific	
The sentences are clear	
Start with environmental impacts...pollution, etc.	
There are emissions according to the source	
High instead of higher	
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Accepted	
Accepted	

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Noted	
Noted	
Noted	
Accepted	
Accepted	
Accepted	
Mention in the text	
Comment provided to Tech Chapter	
Address this more generally when modifying the text	
Accepted	
Accepted	
Accepted	

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It will be addressed as much as possible	
Noted	
Accepted	
It will be addressed as much as possible	
Noted	
Accepted	
Accepted	
Accepted	



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Although editorial, last sentence should not be deleted. "Because in most cases hydropower requires..."	
Accepted	
Accepted	
Accepted	
Accepted	
Noted	
Accepted	
Noted	
Accepted	

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Accepted	
Accepted	
Already in text	
Accepted	
Noted	
Accepted	
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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.	
Accepted	
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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.	
Take out "usually"	

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Accepted	
Need to find reference for this	

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Subject available to literature and page limits	
Only site-specific	
Accepted	

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Accepted	
Needs explanation, but common to large infrastructure projects	
Needs explanation, but common to large infrastructure projects	
Needs explanation, but common to large infrastructure projects	
Needs explanation, but common to large infrastructure projects	
Accepted	
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Accepted	
Accepted	
Accepted	
Accepted	
Accepted	
Accepted	

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Accepted	
Accepted	
rephrase	
Accepted	
Glossary to explain	
Accepted	
Accepted	
Noted	
Noted	
Noted	
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Accepted	
Noted	
Accepted	
Accepted	
Accepted	
Accepted	
Other sections, chapters	
Accepted	
add another reference	
unclear	
Accepted	
Noted	
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Accepted	
Glossary to explain	
Accepted	
Accepted	
Noted	
Accepted	
Text is correct	
Accepted	
Text is correct	
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Accepted	
Noted	
Should be covered in technology chapter.	
No such heading in this section	
Will be clarified.	
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Accepted	
Accepted	
Agreed, remove employment or put last	
Accepted	
Accepted	
Accepted	
Accepted	
Accepted	
Accepted	
remove "- as shown in Table 2 -"	
Accepted	
Accepted	

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Poorer do not emigrate	
Page 24 line 4 must include environmental	
Accepted	
rephrase	
Accepted	
Accepted	
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Will be clarified.	
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Will be clarified.	
Remove	

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Accepted	
Accepted	
Accepted	
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.	
Will be clarified.	
Noted	
Accepted	
Accepted	
Accepted	
Noted	

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Noted	
Will be clarified.	
Accepted	
Noted	
Noted	
Will be clarified.	
Noted	

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Noted	
Will be clarified.	
Noted	
Accepted	
Noted	
Accepted	
unclear	
Noted	
Accepted	
Accepted	

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Accepted	
Accepted	
Accepted	
Accepted	
Accepted	
Accepted	
Accepted	

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Accepted	
Will be clarified.	
Accepted	
No reference found on this	
No reference found on this	
Accepted	
Accepted	
Accepted	
Accepted	
Accepted	
Accepted	
Will consider, subjected to available references	
Accepted	

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# Special Report on Renewable Energy Sources and Climate Change Mitigation, First Order Draft

Accepted	
Accepted	
Comment provided to Tech Chapter	
Accepted	
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.	
Accepted	
People per MW may be misleading. Better some examples	
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.	
Accepted	
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Accepted	
We will consider rephrasing	
Accepted	
context-specific	
Accepted	
Accepted	
modify language	
Accepted	
Accepted	
Accepted	
Accepted	
4th column is about geothermal energy only	

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Accepted	
Accepted	
Accepted	
Will consider, subjected to available references	
Accepted	
Will be clarified.	
Accepted	
Accepted	
Accepted	
Accepted	
Accepted	
Noted	
Accepted	

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Accepted	
Accepted	
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.	
Add a new column with linkage to SD - and reference it.	
Add a new column with linkage to SD - and reference it.	
Accepted	
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.	
Accepted	
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Accepted	
Accepted	
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.	
Accepted	
Accepted	
Box will be removed.	
Consistent with hydro chapter	
Rephrase the whole paragraph	
Language will modify establishing the links better	
Subjected to consistency check	

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Accepted	
Rephrase the whole paragraph	
Accepted	
Include	
Accepted	
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Accepted	
Cite as an example	
The final draft of the SRREN will be processed by a professional copy-editor. All editorial comments such as this will be resolved at that time.	
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Accepted	

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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.	
Accepted	
Reword carefully this sensitive part, tech development & financing are necessary under the principle of common but differentiated responsibilities	
Accepted	
Accepted	
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.	
Accepted	
Accepted	
Will be included.	
Accepted	
Accepted	
Accepted	

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Consider RE as an option	
Accepted	
Accepted	
Will be clarified.	
Accepted	
Accepted	
Will be clarified.	
Will be clarified.	
Will be clarified.	
Will be clarified.	
Accepted	
Accepted	

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Accepted	
Will be clarified.	
Will be clarified.	
Will be clarified.	
Classification logical for energy but difficult for impact assessment. Literature not widely available with such classification.	
Accepted	
The final draft of the SRREN will be processed by a professional copy-editor. All editorial comments such as this will be resolved at that time.	
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Accepted	
Noted	
Accepted	
Accepted	

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Accepted	
Accepted	
Accepted	
Accepted	
Noted	
Accepted	
Will be clarified.	
Accepted	
Accepted	
Accepted	
Accepted	
Accepted	
Accepted	
Clarify CSP	
Accepted	
Noted	

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Accepted	
Noted.	
Accepted	
Noted	
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.	
Will be clarified.	
Noted	

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Accepted	
Hydro chapter plus reference needed for this	
These are only leading examples	
Accepted	
Accepted	
Noted	
Noted	
Accepted	
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.	
Noted	
The final draft of the SRREN will be processed by a professional copy-editor. All editorial comments such as this will be resolved at that time.	

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Accepted	
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.	
Reword paragraph	
Reword paragraph, on the merit	
move only	
Noted.	
Accepted	
Some example from SA, but don't expand too much	
Will be clarified.	
Accepted	

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Accepted	
Accepted	
Accepted	
Accepted	
source Johansson	
Accepted	
sufficient	
Accepted	
Noted	
Accepted	
Accepted	
according to source	

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Noted	
Accepted	
source + correct in context	
Accepted	
Accepted	

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Comment provided to Tech Chapter	
Noted	
Accepted	
Accepted	
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.	
Accepted	
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.	
Will be included.	
Will be included.	
Accepted	

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Accepted	
Accepted	
no reference	
Accepted	
Noted	
Noted	

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Noted	
Noted	
Accepted	
Accepted	
Accepted	

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Section is not biased - the issue is intrinsically focused for the poorer	
Accepted	
Will be restructured, if agreed at the Oxford plenary	
Accepted	
Noted.	
Accepted	
Accepted	
Accepted	
Accepted	
Accepted	

**Special Report on Renewable Energy Sources and Climate Change Mitigation, First Order Draft**

Accepted	
irrelevant	
Noted	
irrelevant	
irrelevant	
Noted	
Accepted	
Noted	
will check, subjected to references and x-cutting with tech chapter	
Accepted	
Noted	
Noted	

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Accepted	
Accepted	
Accepted	
Noted	
no reference	
Noted	
Accepted	
Accepted	

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Accepted	
Noted	
Noted	
Noted	
Noted	
Accepted	
Accepted	
Noted	

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Accepted	
Accepted	
Accepted	
Noted	
Accepted	
Accepted	
Noted	

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Accepted	
Noted	
Noted	
Noted	
Noted	
Noted	
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Noted	
Noted	
Accepted	
Accepted	
Noted	
Accepted	

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prescriptive	
Accepted	
Accepted	
Noted	
Noted	
Accepted	
Accepted	



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Accepted	
Accepted	
Accepted	
Noted	
Will be clarified.	
Noted	
Rewrite	
closely related	
Accepted	
Accepted	
Noted	

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Accepted	
Accepted	
Accepted	
Accepted	
Accepted	
Accepted	
Accepted	
Accepted	
Accepted	
Accepted	
Accepted	
Noted.	

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Noted	
Accepted	