



INTERGOVERNMENTAL PANEL ON CLIMATE CHANGE



Special Report on Renewable Energy Sources and Climate Change Mitigation

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

Chapter 3

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

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

Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table Info	Comments	Consideration by writing team
Kruger (South African Weather Service)	3	2	21	2	21	Cont ents	-	-	"Change to ""Passive Solar Applications""."	Accepted change
Drury (NREL)	3	3	3	-	-	-	-	-	Solar' used twice	Rejected: keep parallel with PV solar electricity generation
Twidell (AMSET Centre)	3	5	47	-	-	-	-	-	..'at peak loads.' Only for regions where there is significant air conditioning/cooling. Does not apply everywhere. Clarify.	Accepted
Twidell (AMSET Centre)	3	5	9	-	-	-	-	-	"Check that the phrase 'world's energy' does not mean 'world's electricity'; clarify by 'world population's use of energy in all forms'. 'World' can include all ecological processes; not just humans. Be precise. What happens at night over the Sahara? Ho	Accepted
Pinho (Institut of Tecnology)	3	5	41	-	-	-	-	-	"Only ""50 countries""? I do not have the data, but I suppose it is much more than that."	"in most countries"
HERVAS JATIVA (CONELEC NATIONAL ELECTRICITY COUNCIL OF ECUADOR)	3	5	35	-	-	-	-	-	"Reference of ""100 EJ in 2050"""	don't see this in text
Rosinski (Electric Power Research Institute)	3	5	11	-	-	-	-	-	"Reword to ""most countries receive enough to?"""	Accepted
Christophersen (Climate and Pollution Agency)	3	5	9	-	10	-	-	-	"We propose the following change in the sentence: ""In a more practical example, with today's solar power technology, the world's energy requirements could be met by operating solar power stations on only about 4% of the surface area of the Sahara Desert.	Accepted
Twidell (AMSET Centre)	3	5	38	-	-	-	-	-	.. spend up to..of their energy budget ?'. Is this in financial or energy terms? Why mix language like this? Be precise.	Rewritten to indicate energy budget
Pinho (Institut of Tecnology)	3	5	20	-	21	-	-	-	Actually, more than 3,000oC can be achieved in solar furnaces.	Accepted
Twidell (AMSET Centre)	3	5	12	-	-	-	-	-	Add 'We also need to remember that all biological plants and crops are produced by photosynthesis from sunlight'. The reader needs to be reminded that solar energy processes are not just technology, but natural. Is photosynthesis covered in the report a	Accepted
Rybach (Geowatt AG)	3	5	-	6	-	-	-	-	Executive Summary: besides giving time-averaged power production also average capacity factors should be given (also in the main text). Line 12: the number ? prevented 6000 tonnes of CO2 per year? is much too low. What is the correct number? No cost figur	See comment 136; Correct number is 6,000,000, Terry and Arnulf
Drury (NREL)	3	5	11	-	-	-	-	-	I don't think 'blessed' belongs in a technical report	Accepted
Drury (NREL)	3	5	13	-	33	-	-	-	many italics in this and only this paragraph. I think they should be removed	Rejected: italics help to find sub-technologies in paragraph
Pietzcker (PIK)	3	5	34	5	36	-	-	-	no 'but'. Possible formulation: 'Some technologies are already economically competitive in certain locations, and the overall competitiveness of solar technologies in general is continually improving through R&D and economies of scale.'	Accepted

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HERVAS JATIVA (CONELEC NATIONAL ELECTRICITY COUNCIL OF ECUADOR)	3	5	2	5	14	-	-	-	Please include the reference of the figures used	Accepted
HERVAS JATIVA (CONELEC NATIONAL ELECTRICITY COUNCIL OF ECUADOR)	3	5	26	-	-	-	-	-	Reference of 400 EJ	Accepted
Drury (NREL)	3	5	5	-	-	-	-	-	should be 'adoption' not 'adaption'	Accepted
Twidell (AMSET Centre)	3	5	33	-	-	-	-	-	The greatest use of solar energy for fuels is through biomass (which is stored energy). This should be mentioned and respected here, with a link to the Bioenergy chapter.	Chapter is on direct solar energy
Drury (NREL)	3	5	42	-	-	-	-	-	time-averaged power is a confusing concept. Also, page 5, line 5 discusses CSP capacity that is not time averaged, but has the same GW units which is confusing. I recommend citing everything in installed nameplate capacity.	"world installed capacity"
Treber (Germanwatch)	3	5	-	-	-	Ex.S um.	-	-	If I compare the Executive Summaries of Ch. 3 and of Ch. 7, the latter is structured in way so that is more informative and better to grasp: a sort of main evidence / message (in bold) can be seen. I would prefer to see such a structure in each `technical	Check out the other organization/structure, Terry
Ogimoto (The University of Tokyo)	3	5	48	5	48	Exec tive Sum mary	-	-	"There appears no description of ""cost savings by photovoltaics"" in the main body of the chapters. It can be described in ""Chapter 8 Integration""."	Noted to be dealt in Ch.8, Arnulf
Renne (National Renewable Energy Laboratory)	3	6	5	-	-	-	-	-	"0.5 GW seems low; this is practicaly the installed capcity of the US alone, and there are several systems installed in Spain. Might be useful to check this number, and perhaps list those countries that are currently using CSP."	Accepted
Sauerbrey (Energ?Renovable (ENERSIA))	3	6	22	6	23	-	-	-	"recommended to be ""but government support and incentives as well as stable political conditions are needed to lessen the risk of private investment and to boost the assurance of faster development.""	Accepted
HERVAS JATIVA (CONELEC NATIONAL ELECTRICITY COUNCIL OF ECUADOR)	3	6	5	-	-	-	-	-	"Reference ""20-30 US/Tonne""	don't see this text
Pietzcker (PIK)	3	6	15	-	-	-	-	-	"talk more directly about learning (and maybe the 20% learning rate observed for PV); 'Over the past 30 years, solar technologies have seen huge cost decreases through technological learning. Looking to the future, we can expect further"	added a couple sentences on 20% learning curve
Twidell (AMSET Centre)	3	6	3	-	-	-	-	-	"These characteristics apply in ALL countries;clarify and do not condescend. "	"many countries"
Twidell (AMSET Centre)	3	6	13	-	-	-	-	-	..remaining DIRECT solar technologies.. [avoids muddling with biofuels]	lines 8 and 9?

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Pietzcker (PIK)	3	6	13	-	-	-	-	-	6000 t CO2 would be ~ 6 *10^9 g CO ~ the emissions from the production of 10^7 kWh (= 10 GWh) electricity from fossil fuels. If PV has a time-averaged capacity of 2GW, that would make ~3000 GWh. If this calculation is not flawed, the number has to be wro	Accepted
Drury (NREL)	3	6	23	-	-	-	-	-	boost the assurance of faster development' should be reworded along the lines of 'will boost customer assurance leading to faster development'.	Accepted
Pietzcker (PIK)	3	6	4	6	6	-	-	-	CSP has not really seen a huge increase in capacity over the last year (only a doubling from 0.35 to 0.6 GW) ? the interest and the planned capacity has seen a huge increase (from ~.1 to 1.5GW)	Accepted
Drury (NREL)	3	6	21	-	-	-	-	-	increase the total cost' refers to an increase relative to optimistic scenarios, not absolute increase. Please clarify.	Accepted
Jennings (Murdoch University)	3	6	13	-	-	-	-	-	this number is much too low	6.000.000
Pinho (Institut of Tecnology)	3	7	37	-	38	-	-	-	"It should be ""equals approximately 1,368"" instead of ""equals 1368"", since this value, although calles ""Solar Constant"", varies along the year."	Accepted
Renne (National Renewable Energy Laboratory)	3	7	39	-	-	-	-	-	"Should be ""around solar noon"" after ""1000 W/m2""	Accepted
Drury (NREL)	3	7	20	-	26	-	-	-	"Solar research' here is presented as limited to studies by societies and organizations. I think the focus should be more on technology development and market deployment. But kept brief. Alternately, section 3.1.1. could be removed, since it's an unnece	Arnulf, Terry to rephrase
Gagnon (Hydro-Quebec)	3	7	5	-	-	-	-	-	"The ""modest"" adjective maybe not well chosen since silicon based PV showed Energy Payback periods of 4-5 years in the recent past. It's improving but still not ""modest""	Added 18 to 76 g/kWh info
Renne (National Renewable Energy Laboratory)	3	7	34	-	-	-	-	-	"The basis for this theoretical potential should be provided; e.g., accounting for the fact that the earth is spherical, and mentioning whether the calculation is for land surfaces only , or the entire surface of the earth. Besides using Joules, or EJ, t	Too much detail for an introduction
Twidell (AMSET Centre)	3	7	18	-	-	-	-	-	.. Photovoltaic effect.'. I suggest adding a footnote 'Not to be confused with the photoelectric effect'. This confusion happens frequently in general literature.	Accepted
Treber (Germanwatch)	3	7	38	-	-	-	-	-	According to MPG (Max-Planck-Gesellschaft ? Max Planck Society) the solar constant is 1367 W/m2 (e.g.: http://www.atmosphere.mpg.de/enid/Klimawandel_im_Unterricht_ss/ss_Sonnenenergie_e_6db.html)	Accepted
Chum (National Renewable Energy Laboratory)	3	7	34	-	-	-	-	-	Chapter 1, table 1.1 at p.17 lists the annual flux as 3.9 million EJ/yr whereas Chapter 3 cites 5.5 million EJ/yr. Reconcile.	Terry will check with Ch.1 and will resolve
Pietzcker (PIK)	3	7	39	7	43	-	-	-	delete these sentences.	Important information
Pinho (Institut of Tecnology)	3	7	41	-	-	-	-	-	Either 5,800 K or 5,800 kelvin (not Kelvin).	Accepted
Drury (NREL)	3	7	44	-	-	-	-	-	embraces daylight' - generates daylight	Some better wording here
Twidell (AMSET Centre)	3	7	43	8	3	-	-	-	Figures (or links if elsewhere in the Report) needed here of the solar spectral distributions, labelled by frequency, wavelenght and photon energy.	Will insert figure

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Drury (NREL)	3	7	19	-	-	-	-	-	fossil fuels still 'highly abundant'	Terry modified
Drury (NREL)	3	7	16	-	19	-	-	-	The photovoltaic effect was discovered in the 1839, but it wasn't considered a PV cell until much later. These sentences are misleading.	Accepted
Chum (National Renewable Energy Laboratory)	3	7	6	-	-	3.1	-	-	?essentially no GHG (except the modest amounts?.manufacture of conversion devices) - Add also their disposal at the end of the lifecycle. The industry uses toxic and explosive gases and corrosive liquids.	Terry modified
Smith (PNNL)	3	7	-	7	-	3.1	-	-	The introduction is unbalanced. The amount of solar energy is large, but supplying all human energy service needs with solar is a large challenge.	Accepted
Smith (PNNL)	3	7	-	7	-	3.1.1	-	-	If length were not an issue the background is interesting, but not particularly pertinent to the goal of the report.	keep for now, may get cut eventually
Renne (National Renewable Energy Laboratory)	3	7	-	-	-	3.1.1	-	-	There should be some references for this Section, and one good one would be the Fifty Year History of ISES, by Karl Boer	Accepted
Smith (PNNL)	3	7	32	7	45	3.1.2	-	-	If length were not an issue some of this background would be interesting, but not particularly pertinent to the goal of the report.	Rewritten to shortened somewhat
Renne (National Renewable Energy Laboratory)	3	8	28	-	-	-	-	-	"I believe the author is referring to ""resource variability"", rather than the sun's variability (which is very small)"	reworded
Halme (Aalto University School of Science and Technology)	3	8	4	-	-	-	-	-	"Replace ""in their cells"" with: ""bound in the atomic structure of materials""."	Accepted
Rybach (Geowatt AG)	3	8	5	-	-	-	-	-	after line 5: the ratio absorbed/re-radiated solar radiation at the earth?s surface need to be added.	sentence deleted
Drury (NREL)	3	8	36	-	40	-	-	-	CSP with storage could be integrated to firm solar capacity	Terry, noted
Pietzcker (PIK)	3	8	43	9	2	-	-	-	delete these sentences.	Required by TSU
Drury (NREL)	3	8	25	-	-	-	-	-	here and elsewhere, it would be good to make statements with less certainty. Here, instead of 'will' it would be better to say 'could'	OK
Drury (NREL)	3	8	13	-	-	-	-	-	if 'market barriers' mean cost/economics, say that instead to make more clear.	reworded
Drury (NREL)	3	8	21	-	-	-	-	-	manufacturability development' ? change to manufacturing capability.	reworded the paragraph
Jennings (Murdoch University)	3	8	2	-	-	-	-	-	photons are quanta of energy, not particles	Accepted
Drury (NREL)	3	8	9	-	-	-	-	-	potential is projected to extend well beyond the current century' - sentence is confusing and not necessary, i think it should be removed.	keep for now
Pietzcker (PIK)	3	8	22	8	23	-	-	-	replace or add something like: 'Given the major role solar technologies can play in all energy sectors, it is very important to research the integration of solar technologies with other energy technologies to overcome the inherent problem of variability/i	reword paragraph
Drury (NREL)	3	8	18	-	-	-	-	-	use consistent units throughout. 1GW instead of 1000MW to be consistent with the rest of the chapter	may change for consistency
Ogimoto (The University of Tokyo)	3	8	2	8	2	3.1.2	-	-	""This means that?.."" is not understandable. I am afraid that joules and electron volts mean so little to many of the readers."	explained in the side-box glossory

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Smith (PNNL)	3	8	-	8	-	3.1.3	-	-	This section can be deleted or combined with material elsewhere.	To be shortened, Terry
Kruger (South African Weather Service)	3	8	46	8	46	3.1.4	-	-	"Instead of ""following section"", refer to the section number."	OK
Kruger (South African Weather Service)	3	8	41	8	41	3.1.4	-	-	"Instead of ""next section"", refer to the section number."	OK
Ogimoto (The University of Tokyo)	3	8	46	8	46	3.1.4	-	-	"the following section does not deal with the variability. Many people are getting to know the variability. However, very few people know the real variability. The lack of the knowledge may occur overestimating and underestimating. Some examples or an e	Will insert paragraph on variability in section 3.2
Smith (PNNL)	3	8	-	8	-	3.1.4	-	-	Section is overly simplistic. Should be deleted in lieu of more technical content.	Required by TSU
Pinho (Institit of Tecnology)	3	9	14	-	-	-	-	-	""...must know..."" instead of ...""must to know..."". I think the term ""...radiation will fall on..."" is not appropriate; more appropriate would be ""...radiation is incident upon...""	some rewording done
Renne (National Renewable Energy Laboratory)	3	9	14	-	-	-	-	-	"More accurately, rather than saying ""astronomical factors"", say ""the solar constant""	don't see this wording
Renne (National Renewable Energy Laboratory)	3	9	21	-	-	-	-	-	"Should be ""beam radiation times the cosine of the zenith angle""	OK for general description
Raturi (The university of South Pacific)	3	9	14	-	-	-	-	-	...must know (delete to)	keep words
MANNEH (MINISTRY OF FINANCE AND ECONOMIC AFFAIRS)	3	9	10	41	26	-	-	-	Areas that needs to be looked at for possible reduction or shortened.	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.
Twidell (AMSET Centre)	3	9	16	-	-	-	-	-	Good to see the word 'Earth' with a capital letter. But why not capital s for Sun previously? Consistency is needed throughout the Report.	check convention
de Campos (Petrobras)	3	9	16	9	18	-	-	-	Lack of reference in the last sentence.	adding reference
Pietzcker (PIK)	3	9	13	9	14	-	-	-	replace the line 'But to plan ...' by something like 'However, good knowledge of the local insolation characteristics is required to appropriately design solar technologies/applications'	seems OK as is
Coulibaly (International Institute fo Water and Environmental Engineering (2iE))	3	9	12	-	-	-	-	-	The sentence is not correct or undestandable	seems OK as is
Renne (National Renewable Energy Laboratory)	3	9	29	-	-	-	-	-	This number seems quite a bit higher (by a factor of 4-5 than other more recent estimates I have seen. Does this account for the curvature of the earth? Does it include water as well as land surfaces? Perhaps the WEA reference is outdated? Are there o	Dan to check reference

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Renne (National Renewable Energy Laboratory)	3	9	29	-	-	-	-	-	Why are units different here than in Section 3.1.1. The units here are preferable to those used in 3.1.1.	Change will be made in sec 3.1.2 for consistent unit
Smith (PNNL)	3	9	-	9	-	3.2.1	-	-	"The statement that solar is ""able to be used in all countries"" is irrelevant. It is the cost of the resultant service that is important. "	This section is not about cost
Renne (National Renewable Energy Laboratory)	3	9	-	-	-	-	3.1	-	A more acceptable approach would be to use a satellite-derived solar map here, such as the one provided by the NASA/SSE or DLR. Otherwise, explain how solar resource information is obtained in the ECMWF re-analysis data.	Explain ECNW renalysis
Rybach (Geowatt AG)	3	10	4	-	-	-	-	-	?technical? must be in italics.	not necessary
Pinho (Institut of Tecnology)	3	10	11	-	-	-	-	-	""...in the three bottm lines..."" , instead of ""...in the bottom three panels...""	reworded
Pietzcker (PIK)	3	10	1	10	27	-	-	-	"also mention newer resource potential quotes, e.g., Trieb et al. (2009) 'Global Potential of Concentrating Solar Power ' with recent sattelite data and GIS-based land exclusion & wich also uses a cut-off at 2000DNI, thus limiting itself to 'economicall	added Trieb et al, 2009
Pietzcker (PIK)	3	10	12	10	16	-	-	-	"delete these sentences; is already better(shorter) said in lines 20-21"	reworded
Drury (NREL)	3	10	10	-	24	-	-	-	"economic potential lists several factors: these are important - 'competition with alternatives', 'national and local policies', 'coverage of electricity grid'; these are important only at high penetration - 'structure of electricity grid', 'output inte	making change
HERVAS JATIVA (CONELEC NATIONAL ELECTRICITY COUNCIL OF ECUADOR)	3	10	22	-	-	-	-	-	"Is better include ""Section 2.3 examine the main ...""	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.
HERVAS JATIVA (CONELEC NATIONAL ELECTRICITY COUNCIL OF ECUADOR)	3	10	19	-	-	-	-	-	"Is better include ""we first examine in 2.2 the biomass resource...""	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.
Rosinski (Electric Power Research Institute)	3	10	4	10	17	-	-	-	"The basis for the minimum and maximum technical potential is unclear; suggest removing the discussion of technical potential and continue with the economic potential discussion on line 17"	Valentin to clarify
Raturi (The university of South Pacific)	3	10	3	-	-	-	-	-	..27% of entire global land area .. (insert global)	OK
Coulibaly (International Institute fo Water and Environmental Engineering (2IE))	3	10	4	10	28	-	-	-	Cancelled to reach the mean lenght of the chapter	not deleted yet, but will do so if still too long
Drury (NREL)	3	10	26	-	-	-	-	-	resource potential' is not much of a moving target, 'economic potential' is.	OK, accept
Rosinski (Electric Power Research Institute)	3	10	3	-	-	-	-	-	Update with more recent IEA data	OK

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Smith (PNNL)	3	10	16	10	24	3.2.1	-	-	It is rather surprising that a list of the factors that impact the economic potential of solar technologies neglects the capital cost of the conversion technology! Which is one of the major limiting factors at present.	addressing this concern in rewrite
Pinho (Institut of Tecnology)	3	10	-	-	-	-	-	3.1	""Approximate Total"", instead of ""Total"", since the sum is not exact."	redid table
Renne (National Renewable Energy Laboratory)	3	10	-	-	-	-	-	3.1	"Is the methodology used to calculate ""Technical Potential"" consistent throughout the SRREN? It does not appear so. Also, the methodology for developing Table 3.1 needs further explanation. There are many other, more recent references, as well. Howe	see comment on 205
Ogimoto (The University of Tokyo)	3	10	13	10	13	-	-	3.1	"Technology is developing. Is ther any other newer source? The definition if ""technical potential"" is unclear."	reworded
Renne (National Renewable Energy Laboratory)	3	11	20	-	-	-	-	-	"Delete ""available at different locations""?not needed in this sentence."	don't see this text
Renne (National Renewable Energy Laboratory)	3	11	2	-	-	-	-	-	"Not quite true; under some conditions (which occur frequently in tropical areas), cloud reflections and clean atmospheric conditions will result in values higher than 1000 W/m2"	Terry to modify
Philibert (International Energy Agecy)	3	11	8	11	10	-	-	-	"Please replace ""at least three times"" with ""at least four times"". The energy received by 1 square meter perpendicular to solar rays is the energy that would be received by all square meters of a disk with the same diameter than the Earth. On average,	keep at "three"
Halme (Aalto University School of Science and Technology)	3	11	43	11	44	-	-	-	"Raplac: ""None of the available empirical relations reproduces the actual measurements within limit up to ?30 W/m2 on a monthly basis"" with ""The available empirical relations reproduce the actual measurements at best with accuracy of ?30 W/m2 on a m	rewritten
Renne (National Renewable Energy Laboratory)	3	11	4	-	-	-	-	-	"Rephrase: ""?less than one third of the maximum value?"""	comment not clear
Renne (National Renewable Energy Laboratory)	3	11	42	-	-	-	-	-	"Replace ""must"" with ""can"""	don't see the text
Halme (Aalto University School of Science and Technology)	3	11	23	11	24	-	-	-	"Replace ""such as buildings and power plants require data measured at the place of the application, i.e., directly"" with: ""require data of available solar energy"""	kept
Raturi (The university of South Pacific)	3	11	9	-	-	-	-	-	..due to change of day and night and (modify sentence)	rewritten
Drury (NREL)	3	11	42	-	-	-	-	-	collectors and storage systems must be installed' - shouldn't specify technology, should state with less certainty	don't see the text
Pietzcker (PIK)	3	11	12	11	14	-	-	-	delete these sentences.	kept
Pietzcker (PIK)	3	11	42	11	45	-	-	-	I don't understand this. Better than saying what cannot be reached is to say what can be reached ? how well can the actual global solar flux be calculated from what data? (is the input 'clear sky solar flux' and 'hours of bright sunshine'? Why is the late	Valentin to cross check

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Drury (NREL)	3	11	29	-	-	-	-	-	it is 'caused by', not 'attributed to'	kept
de Campos (Petrobras)	3	11	38	11	40	-	-	-	Lack of reference for the last two sentences.	adding references
Drury (NREL)	3	11	35	-	37	-	-	-	most current assessments use satellite-derived data	OK
Pietzcker (PIK)	3	11	36	11	39	-	-	-	pull this sentence forward and replace line 23 to 26 with it.	rewording
Halme (Aalto University School of Science and Technology)	3	11	6	11	12	-	-	-	Shorten this part and move it to line 26 on page 9, where figure 3.1 is discussed.	moving text
de Campos (Petrobras)	3	11	27	3	30	-	-	-	The last two sentences, contained between these lines, appear to be outside of the context of the subsection. I suggest the suppression of these sentences.	kept for now
Drury (NREL)	3	11	1	-	9	-	-	-	this paragraph fits above, not here	move this
Philibert (International Energy Agency)	3	11	28	-	-	-	-	-	What is most useful for the development of concentrating solar devices (thermal or PV) is the direct normal beam, which needs to be either inferred from direct beam, or measured on the ground with pyrheliometers.	OK
Drury (NREL)	3	11	-	-	-	3.2.2	-	-	section needs to be rewritten to clarify and condense.	rewritten
Renne (National Renewable Energy Laboratory)	3	12	11	12	22	-	-	-	"The use of satellite-based methods is now the most common approach outside of on-site measurements, and this section needs to be expanded and referenced properly. A good overview was provided by Renn?t al in ""Advances in Solar Energy"", Vol. 13, Chapter	some rewording
Pietzcker (PIK)	3	12	3	12	14	-	-	-	as already commented on in the ZOD: use 3.2.2.1 to talk in general about the differences between ground-based and satellite-based measurements, and move WRDC to the other databases in 3.2.2.2	Valentin to revise
Drury (NREL)	3	12	19	-	-	-	-	-	atmospheric composition' is not contained in that data, it is set exogenously.	OK
Pietzcker (PIK)	3	12	1	12	3	-	-	-	delete these sentences, start next one with 'Radiation data can be provided ...'.	Delete
Renne (National Renewable Energy Laboratory)	3	12	29	-	-	-	-	-	This is not the actual reference for the NSRDB. Please contact Steve Wilcox (stephen.wilcox@nrel.gov), who leads the NSRDB effort, for the correct reference, or go to the nrel.gov website and look for NSRDB.	OK
Drury (NREL)	3	12	21	-	22	-	-	-	unclear & weak statement - see Vignola et al. Solar Energy 768-772, 2007 for an example verification study	rewritten
Drury (NREL)	3	12	29	-	-	-	-	-	weather (temp and wind speed) measured from ground stations, solar insolation from satellite	OK
Pietzcker (PIK)	3	12	27	12	29	-	-	-	what is this sentence supposed to say? 'at least in some locations'? - on average, how accurate is satellite data?	rewritten
Renne (National Renewable Energy Laboratory)	3	12	-	13	-	3.2.2	-	-	"Since this chapter includes a discussion of passive solar and building-related technologies, there should also be included a discussion on weather-related data bases, such as Typical Meteorological Year data sets; especially the Energy Plus global TMY dat	To be included, Dan

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Renne (National Renewable Energy Laboratory)	3	12	-	13	-	3.2.2.2	-	-	"There are many other data bases, and this is only a partial list. Please check the annual reports and other publications from the IEA.SHC Task 36 ""Solar Resource Knowledge Management"", and the MESoR program. Also, check the databases summarized in NR	rewritten
Kruger (South African Weather Service)	3	12	35	12	35	3.2.2.2	-	-	Mention the period covered by the ESRA Atlas.	OK
Smith (PNNL)	3	12	25	12	27	3.2.2.2	-	-	Proper references should be given for these datasets. The reference for the NASA data is: Chandler, William S., C.H. Whitlock, and P.W. Stackhouse, Jr., 2004: NASA Climatological Data for Renewable Energy Assessment, Journal of Solar Energy Engineering, V	rewritten
Pinho (Institut of Tecnology)	3	12	-	-	-	-	3.2	-	One cannot see much from the figure.	enlarged
Halme (Aalto University School of Science and Technology)	3	12	-	-	-	-	3.2	-	The figure is unclear. The dots indicating sites are not easily visible in the black and white figure. Replace with a larger color figure.	enlarged
Halme (Aalto University School of Science and Technology)	3	13	10	13	12	-	-	-	"Delete: ""Satellite imeages? (USA)."" as an unnecessary detail."	Delete
contaldi (ISPRA, Institute for Environmental Protection and Research)	3	13	28	-	36	-	-	-	Cut, reduntant info and of little interest fon non specialists.	Relevant discussion in the context of climate change
Drury (NREL)	3	13	34	-	36	-	-	-	express lack of certainty in model results	add as available
Drury (NREL)	3	13	9	-	28	-	-	-	too much detail - condense. line 23 - 'confirmed' should be changed to 'suggest' or another term that implies less certainty	OK
Pietzcker (PIK)	3	13	34	13	35	-	-	-	what is the relative bias/standard deviation? (in percent)	adding percent
Kruger (South African Weather Service)	3	13	13	13	13	3.2.2.2	-	-	Does this atlas cover only the period 1985-86?	add full dates
Renne (National Renewable Energy Laboratory)	3	13	-	-	-	3.2.2.3	-	-	"This section could be expanded to examine results of long-term trend studies that have led to the issue of ""global dimming"" and ""brightening"". This is an issue being examined in IEA/SHC Task 36 Solar Resource Knowledge Management, and has been discu	Expand based on peer review literature, Dan
Kruger (South African Weather Service)	3	13	29	13	36	3.2.2.3	-	-	What about historical changes in cloud cover, which might give an indication of future changes?	Noted
Kruger (South African Weather Service)	3	13	37	13	37	3.3	-	-	While I do not suggest the radical shortening of text, if there is a section to be shortened it is this one.	Shorten, Luisa
Drury (NREL)	3	13	-	-	-	3.3.1	-	-	This section has many redundancies. The text should be condensed and written more clearly.	Shorten, Luisa
Drury (NREL)	3	14	9	-	-	-	-	-	forced ...' above you state no mechanical parts.	see description of passive

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Coulibaly (International Institute fo Water and Environmental Engineering (2iE))	3	14	-	16	-	-	-	-	Should be split into two parts : 33111 passive heating and 33112 passive cooling. The heating part is too big	NO Split, Luisa
de Campos (Petrobras)	3	14	27	-	-	-	-	-	The reference to the figure should be Figure 3.3, instead of Figure 3.3.1	OK
de Campos (Petrobras)	3	14	32	-	-	-	-	-	The reference to the figure should be Figure 3.3, instead of Figure 3.3.1	OK
Raturi (The university of South Pacific)	3	14	-	-	-	3.3.1	-	-	Only buildings are considered in this section- passive solar water heating, drying etc. should also be included. Is it possible to make the part on building technologies concise to reach the required number of pages?	doing some rewriting
Twidell (AMSET Centre)	3	15	26	-	-	-	-	-	"Large thermal mass is needed to avoid rapid changes in temperature, i.e. sentence should be ' to avoid rapid overheating and cooling'; it is not just 'to avoid overheating in summer'. The time constant of the building is the fundamental property and at	rewritten
Philibert (International Energy Agecy)	3	15	15	15	20	-	-	-	One traditional technique for solar control is to have deciduous trees near buildings providing shadow in summer	OK
Drury (NREL)	3	15	33	-	-	37	-	-	move to environmental impacts section	Move, Dan
Rybach (Geowatt AG)	3	15	-	-	-	-	-	3.2	caption of last column, also line 37: saving and reduction are not the same. Passive solar applications do not reduce CO2 emissions, they only avoid (?prevent?) additional emission!	Dan, will replace reduction with avoidance/reduction
Philibert (International Energy Agecy)	3	16	34	17	2	-	-	-	Another proven traditional technique for passive cooling of building, based on phase change materials, is to let some water flow in or nearby (patios) buildings in fountains and bassins, and have some heat taken away through its vaporisation. Beyond archi	OK
Pietzcker (PIK)	3	16	36	17	2	-	-	-	How are the 50% and the 15% linked? Another 15% percentage points, so a total reduction of 65%? the co2-number seems low ? in Germany, average heating energy requirements are ~100kWh_th/year/m^2, so halving that would be 50kWh_th, or about 10kg CO2	Luisa revise. Dan moves
Philibert (International Energy Agecy)	3	16	34	17	2	-	-	-	In hot but dry areas windcatchers typical of Persian architecture have an proven efficacy in keeping buildings cooler during hot daytime. See e.g. http://en.wikipedia.org/wiki/Windcatcher	OK
de Campos (Petrobras)	3	16	32	16	36	-	-	-	Lack of reference for the last two sentences.	add references
Ogimoto (The University of Tokyo)	3	16	47	16	47	3.3.1	-	-	""kWh/m?a"", which appears only here, is very unfamiliar. Any other ?"	don't see this text
Drury (NREL)	3	16	-	-	-	3.3.1	-	-	too much detail on individual systems instead of types of systems. Not sure this section is necessary, new information here (ie. ventilation and shading) could be folded into preceeding section. Partially transparent PV seems like a niche technology - not	Shorten, Luisa
Drury (NREL)	3	16	31	-	-	36	-	-	"move to environmental impacts section; try to quantify in more intuitive units"	Luisa revise. Dan moves

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Twidell (AMSET Centre)	3	16	-	-	-	-	-	3.2	"Define solar fraction in the caption. Total solar gains: per house?, per country?; how estimated? CO2 reduction is an average for the particular country's 'average' form of heating or cooling, especially the national electricity source. Nothing to do wi	deleted table
Pietzcker (PIK)	3	16	-	-	-	-	-	3.2	What does 'solar fraction' mean?	deleted table
Raturi (The university of South Pacific)	3	18	13	18	18	-	-	-	This paragraph should appear after PV is introduced.	rewritten
contaldi (ISPRA, Institute for Environmental Protection and Research)	3	18	-	-	-	-	-	3.5.b	The figure need more explanations, e.g. how is configured a rolling shutter, it is applied on office glazing?	too detailed
Philibert (International Energy Agency)	3	19	11	-	-	-	-	-	A solar heating system includes solar collectors, storage tanks, distribution network and radiators.	rewritten
Drury (NREL)	3	19	14	-	19	-	-	-	belongs in the solar collector section 3.3.2.1.1.1.	OK
Pietzcker (PIK)	3	19	8	19	9	-	-	-	delete these sentences	deleted
Pietzcker (PIK)	3	19	14	19	16	-	-	-	I don't see the important difference between 'service provided' and 'temperature range'.	OK
Drury (NREL)	3	19	12	-	-	-	-	-	specify 'solar fluid' - antifreeze? oil?	OK
Philibert (International Energy Agency)	3	19	11	22	30	-	-	-	The mistake in the initial sentence reflects the shortcomings of the overall description of solar heating systems (including solar water heaters), which is way too short. Even the description of collectors includes nothing about where these collectors sho	rewritten
Smith (PNNL)	3	19	-	19	-	3.3.2	-	-	This section could be cut back considerably. It is written as a textbook introduction to the technology. The descriptive portion should be much briefer and material summarizing analytical results (of which there are a number of published paper not referen	Shorten, LUisa
Kutscher (National Renewable Energy Laboratory)	3	20	19	-	-	-	-	-	""Flat collectors"" should read ""Flat plate collectors.""	changed
Twidell (AMSET Centre)	3	20	10	-	-	-	-	-	".. Absorbers look black to the human eye since sunlight is almost totally absorbed, however, with a selective surface they are reflective to infrared heat radiation. [i.e. absorbers are not as simple as they look; a good example of technical development	rewritten
Twidell (AMSET Centre)	3	20	14	-	-	-	-	-	Add sentence 'However, the best surface is a 'selective surface' that is black to incoming solar irradiation (and therefore absorbs well) but is reflective to long-wave infrared heat radiation (and therefore does not emit so much heat by radiation). Sele	too much detail
Twidell (AMSET Centre)	3	20	12	-	-	-	-	-	Matte black finishes should not be so recommended, but only as a cheap application. Selective surfaces should be favoured and explained. It seems that SELECTIVE SURFACES have been forgotten! Extra section or paragraph needed with appropriate figures.	Noted. Section will be rewritten, Luisa

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Drury (NREL)	3	20	-	-	-	3.3.2 .1.1. 1	-	-	too much detail on individual collector dynamics. Brief description and operating temperature would suffice.	Shorten, Luisa
HERVAS JATIVA (CONELEC NATIONAL ELECTRICITY COUNCIL OF ECUADOR)	3	20	-	-	-	-	2.2.5	-	That Figure is not clear I recommend some explanation of the data represented	add further explanation
Ogimoto (The University of Tokyo)	3	20	-	-	-	-	-	3.7	Needs reference. Please check all the figures and tables, where necessary.	Noted, Luisa
Halme (Aalto University School of Science and Technology)	3	21	8	21	15	-	-	-	"It is not clear from the description of the evacuated tube construction, where the vacuum is located with respect to the glazings and piping etc. Shorten this text by replacing the details with a cross-section image of an evacuated tube collector place	Shorten
de Campos (Petrobras)	3	21	5	21	6	-	-	-	"Lack of reference to the sentence ""These evacuated-tube collectros must be re-evacuated every one to three years.""	add reference
Twidell (AMSET Centre)	3	21	25	-	-	-	-	-	Capillary action cloths are also used.	OK
Twidell (AMSET Centre)	3	21	5	-	6	-	-	-	DISAGREE. Vacuum tubes do not need to be re-evacuated 'every one to three years'. ERROR. Check with manufacturers.	changed
Kutscher (National Renewable Energy Laboaratory)	3	21	5	-	-	-	-	-	I have never heard of evacuated tube collectors that have to be re-evacuated every 1-3 years. At least I am not aware of American tubes that are like that. How could anyone ever afford such maintenance on a rooftop installation? They use getters to mainta	Will be rewritten, Luisa
Ogimoto (The University of Tokyo)	3	21	31	21	33	-	-	-	If new evaluated-tube is a specific one, it needs reference. Please check others.	OK
de Campos (Petrobras)	3	21	29	21	32	-	-	-	Lack of reference.	add reference
Twidell (AMSET Centre)	3	21	30	-	-	-	-	-	More expensive PER WHAT? It is the energy capture that matters. Also a smaller capture area may be beneficial to reduce the costs of fixings and to utilize available siting areas.	deleted
Coulibaly (International Institute fo Water and Environmental Engineering (2IE))	3	21	5	21	30	-	-	-	The description of water heaters is too related to cold regions. They are also more and more used for hot water in several hot regions	OK
Kutscher (National Renewable Energy Laboaratory)	3	21	31	-	-	-	-	-	The new design referred to has been available for many years	OK
REUTOV (FEDERAL AGENCY FOR SCIENCE AND INNOVATION (RUSSIA))	3	22	11	-	-	-	-	-	"two variantsof the word ""standalone"" and ""stand-alone"" are used; should be unified (also see p. 281 line 20, p. 309 line 17"	OK

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Pietzcker (PIK)	3	22	2	22	19	-	-	-	I am not sure I understand the difference between termosyphon and ICS systems. Is it really that important? Better shorten these paragraphs to one paragraph of 4-5 lines,	Shorten, Luisa
Coulibaly (International Institute fo Water and Environmental Engineering (2iE))	3	22	32	-	-	-	-	-	Instead of heat pump it should be refrigeration in this section. The section is about heat not cold even if the same sytem does both.	don't see this text
de Campos (Petrobras)	3	22	6	-	-	-	-	-	The reference to the figure should be Figure 3.9a, instead of Figure 3.9	OK
de Campos (Petrobras)	3	22	22	-	-	-	-	-	The reference to the figure should be Figure 3.9b, instead of Figure 3.9	OK
Twidell (AMSET Centre)	3	22	-	-	-	3.3.2 .1.1. 2	-	-	More is needed about heat transfer to the potable water andfor maintaining a temperature stratification in storage tanks. The heat transfer loops shown in Fig 3.9 discourage useful stratification by promoting convective water movement. Other systems a	To be referenced, Luisa
Kruger (South African Weather Service)	3	22	22	22	22	3.3.2 .1.1. 2	-	-	Refer to Figure 3.9b, instead of only Figure 3.9.	OK
Pietzcker (PIK)	3	23	23	-	-	-	-	-	higher' than what? The COP numbers for adsorption are similarly high (0.6-0.7)	reworded
de Campos (Petrobras)	3	23	8	-	-	-	-	-	Lack of reference in the last sentence.	add reference
Pietzcker (PIK)	3	23	3	23	4	-	-	-	Why do you need industrial deployment of small-power absorption pumps in 'any building'? If the hurdle right now is costs, say so more directly.	Review, look for reference, Luisa
Coulibaly (International Institute fo Water and Environmental Engineering (2iE))	3	23	-	-	-	3.3.2 .1.2	-	-	The most used solar cooling (at least in developing countries) is the compression system using PV panels. It is missing in this section.	reworded
Hirschhausen von (Workgroup for Economic and Infrastructure Policy)	3	23	-	24	-	3.3.2 .1.3	-	-	the subsections are too detailed, containing only 2 sentences (3.3.2.1.3.1 and 3.3.2.1.3.2). I suggest to leave chapter 3.3.2.1.3 without subsections and introduce the different storage systems as bullet points	Shorten, LUisa
Coulibaly (International Institute fo Water and Environmental Engineering (2iE))	3	23	-	-	-	3321 21	-	-	the description is confusing. The cooling comes from the humidification of the air. The dessicant is just to reset the air in its initial condition. A figure would give the best explanation for the system	reworded
de Campos (Petrobras)	3	24	15	24	33	-	-	-	"The section is about ""Termochemical heat storage systems"", but the text between these lines refers to underground thermal energy storage. I suggest the creation of a new subsection."	New phrasing
Twidell (AMSET Centre)	3	24	41	-	-	-	-	-	Plastic pipes and tanks may be important to reduce concern about FREEZING and so bursting metal pipes and tanks, thus making simpler systems usable in cold climates.	OK
HERVAS JATIVA (CONELEC NATIONAL ELECTRICITY COUNCIL OF ECUADOR)	3	24	17	-	-	-	-	-	Please include. An objctive assessment of all the social and environmental impacts of intensive agricultural technologies of bioenergy plantations needs to be done in responsible way before promote such kind of technologies to avoid CO2 emissions.	rewritten
Pietzcker (PIK)	3	24	17	24	37	-	-	-	this paragraph should have an own heading, 'underground seasonal heat storage'	trying to reduce headings

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Pietzcker (PIK)	3	25	40	26	2	-	-	-	can be deleted, this is not application but rather technology detail.	Delete, Luisa
Pietzcker (PIK)	3	25	8	25	13	-	-	-	delete these sentences ? little informational value	Delete
Kutscher (National Renewable Energy Laboratory)	3	25	13	-	-	-	-	-	It states that process heat applications are a new technology. The U.S. had a robust industrial process heat program in the late 1970s and early 1980s with many demonstration projects. IST, or Industrial Solar Technology, was a spin-off company from the S	Rephrasing, Luisa
HERVAS JATIVA (CONELEC NATIONAL ELECTRICITY COUNCIL OF ECUADOR)	3	25	17	25	36	-	-	-	The GM energy crops maybe will be an alternative to GHG abatement despite severe unclear environmental, social and health impacts not well analysed in responsible way. I recommend the report should be more conservative about this new technologies.	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.
HERVAS JATIVA (CONELEC NATIONAL ELECTRICITY COUNCIL OF ECUADOR)	3	25	34	-	-	-	-	-	Very few information is better eliminate this item	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.
Coulibaly (International Institute fo Water and Environmental Engineering (2iE))	3	25	-	-	-	3.3.2	-	-	All this section and the previous lack figures and sketches. It makes the explanation difficult to follow.	not here because of space limitations
Twidell (AMSET Centre)	3	26	3	-	-	-	-	-	-	Comment unclear
Chum (National Renewable Energy Laboratory)	3	26	20	-	-	-	-	-	"Add reference to photocatalytic oxidation: Blake, D. M. (2001). Bibliography of Work on the Heterogeneous Photocatalytic Removal of Hazardous Compounds from Water and Air: Update Number 4 to October 2001. 272 pp.; NREL Report No. TP-510-31319"	p25, OK
Halme (Aalto University School of Science and Technology)	3	26	8	27	5	-	-	-	"This part of the section does not fity well to its title. Put them in a separate section ""Special applications"", and shorten the text by making it more like a list with the idea and impact of each application states with one or two sentences only."	Shorten, Luisa
Pietzcker (PIK)	3	26	3	26	7	-	-	-	can be deleted, not much new information	Delete
Coulibaly (International Institute fo Water and Environmental Engineering (2iE))	3	26	3	26	47	-	-	-	Cancelled to reach the mean lenght of the chapter	Delete
Pietzcker (PIK)	3	26	8	26	36	-	-	-	introduce new subheading 'water supply'	section will be rewritten
Ogimoto (The University of Tokyo)	3	26	3	26	47	-	-	-	There are some overlaps with 8.2.5 Autonomous systems. Some talks will be necessary between Ch.3 and Ch.8.	Check with Ch. 8, LUisa
Twidell (AMSET Centre)	3	27	12	-	-	-	-	-	"freeing them from their atomic structure'. This sentence is misleading and actually incorrect; the photoelectric effect does this. The semiconductor materials are like one big molecule of single atoms with a band structure for the outer electronic stru	p26, rewritten

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Sinke (Energy research Centre of the Netherlands (ECN))	3	27	26	29	36	-	-	-	"I suggest to adopt the categorisation used by the European Photovoltaic Technology Platform in its Strategic Research Agenda and the Implementation Plan. ""First and second generation"" PV gives a misleading picture of the sector. Wafer-based crystalline	making changes
Pinho (Institut of Tecnology)	3	27	17	-	-	-	-	-	"The word ""stacking"" is not appropriate in the context, since it gives the impression that the two types of semiconductors are doped separately and then put together, which is not the case. In my oppinion, the text should be rewritten, since there is no	rewrite
Sinke (Energy research Centre of the Netherlands (ECN))	3	27	-	-	-	-	-	-	"There is some overlap in the texts of 3.3.3.1 and 3.3.3.1.1; option for shortening"	Shorten, Palani
Jennings (Murdoch University)	3	27	33	-	33	-	-	-	conversion efficiency should be defined before it is used in this context.	OK
Twidell (AMSET Centre)	3	27	15	-	-	-	-	-	explain that the junction is not made by pushing two materials together, but is formed within continous material by deposition.	rewritten
Gagnon (Hydro-Quebec)	3	27	31	-	34	-	-	-	repeat description already made in previous section (3.3.3.1)	OK
Philibert (International Energy Agecy)	3	27	2	-	-	-	-	-	Some solar cookers do concentrate the sunlight, most do not.	OK
Drury (NREL)	3	27	28	-	-	-	-	-	specify if this is global or U.S. makret share	OK
Twidell (AMSET Centre)	3	27	7	-	-	-	-	-	State that there are only two methods of producing commercial electricity, (1) with magnetic fields and rotating coils requiring engines and turbines, (2) photovoltaic with no moving parts. This comment rases the stature of photovoltaics.	rewrite
Jennings (Murdoch University)	3	27	9	-	20	-	-	-	the barrier at the junction exists even when the device is not illuminated. This explanation is incorrect.	p26, OK
contaldi (ISPRA, Institute for Environmental Protection and Research)	3	28	13	-	15	-	-	-		Arnulf will rewrite
Pinho (Institut of Tecnology)	3	28	1	-	2	-	-	-	""Standard test conditions"" instead of ""Standard reporting conditions""."	rewritten
Halme (Aalto University School of Science and Technology)	3	28	3	28	6	-	-	-	"Delete: ""Light absorption? ?1961)."" as redundant to the text in section 3.3.3.1 "	OK
Halme (Aalto University School of Science and Technology)	3	28	3	-	-	-	-	-	"Replace: ""p-n junction."" With ""p-n junction that acts as the electron and hole separating interface mentioned above.""	rewritten
Drury (NREL)	3	28	7	-	-	-	-	-	"These efficiencies are lower than the 25% cSi efficiency estimate on page 27, line 28; however the paragraph talks about higher efficiency gains"	OK
Pietzcker (PIK)	3	28	2	28	6	-	-	-	delete these sentences, information already presented in 3.3.3.1	Delete, Palani
de Campos (Petrobras)	3	28	10	28	14	-	-	-	Lack of references.	add references
Gagnon (Hydro-Quebec)	3	28	14	-	-	-	-	-	Please add reference	add references
Gagnon (Hydro-Quebec)	3	28	29	-	-	-	-	-	Please add reference	add references

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Drury (NREL)	3	28	12	-	-	-	-	-	sunpower is at 19.3% efficiency, and say they will go higher with their new line.	OK
Jennings (Murdoch University)	3	28	13	-	-	-	-	-	this efficiency is for small test samples in the laboratory. This should be specified.	OK
Jennings (Murdoch University)	3	28	2	-	6	-	-	-	this is a much better explanation of the PV effect than that on page 27	OK
Gagnon (Hydro-Quebec)	3	29	34	-	36	-	-	-	"CPV also benefits (\$) from the fact you replace costly semiconductors by ""cheap"" opticals. Increased efficiencies under concentrated irradiance is a benefit for some PV materials but others cant take the ""heat"" of this solar concentration "	More detail
Sinke (Energy research Centre of the Netherlands (ECN))	3	29	27	29	36	-	-	-	"III-V solar cells are applied in CPV modules and system primarily because of the orders-of-magnitude higher ratio of light harvesting area to cell area; efficiency gain is just an ""extra"". The efficiency record mentioned is no longer up-to-date."	OK
Drury (NREL)	3	29	26	-	-	-	-	-	"indium resources are estimated to allow for significantly more than 10TW of potential capacity [Wadia et al. 2009]. The barriers to CdTe and CIGS deployment are much more economic than materials constraints."	Wadia reference added
Sinke (Energy research Centre of the Netherlands (ECN))	3	29	37	30	20	-	-	-	"This section is not representative of current insights and strongly outdated in terms of technical data as well (references are mostly 5 or more years old). The emphasis on dye-sensitized cells seems not justified by global developmen, in which polymer P	rewritten
Drury (NREL)	3	29	11	-	19	-	-	-	cadmium toxicity from CdTe has been shown to be a non-issue, and total Te reserves suggest a potential of ~10TW of capacity [Wadia et al. Environ. Sci. Technol., 2009, 43, 2072-2077]	Wadia reference added
contaldi (ISPRA, Institute for Environmental Protection and Research)	3	29	35	-	43	-	-	-	In my opinion concentrating PV cells are a viable option for the future and extensive research is going on. I would like more details on concentrating modules in this para.	Dan, original reference
Jennings (Murdoch University)	3	29	18	-	26	-	-	-	this is somewhat out of date as this technology is currently in large scale commercial use.	OK
Chum (National Renewable Energy Laboratory)	3	29	37	-	-	3.3.3 .1.3	-	-	This section is repeated in 3.7.3.1 -- perhaps 3.7.3.1 is a more logical place as it is describing future technologies. Consolidate the two texts. It may not need to have so many subsections (a paragraph per subsection).	Palani, a-C, CIGS title (Dan), retain DSSC, move organic to 3.7
Twidell (AMSET Centre)	3	30	34	-	-	-	-	-	"Explain what 'consumer applications' are. You mean 'smaller scale self-powered devices such as lights, laptop computers, toys, calculators etc'; "	OK
Twidell (AMSET Centre)	3	30	2	-	-	-	-	-	"PV costs depend on the scale of manufacture; this should be said before writing off crystalline Si. Clarify this sentence and be less dogmatic. Refer to a section on costing."	Statement removed
Halme (Aalto University School of Science and Technology)	3	30	19	-	-	-	-	-	"Replace ""Graetzel"" with ""Gr?el"""	OK

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Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table Info	Comments	Consideration by writing team
Halme (Aalto University School of Science and Technology)	3	30	8	-	-	-	-	-	"Replace ""Gratzel"" with ""Gr?el"""	OK
Halme (Aalto University School of Science and Technology)	3	30	16	-	-	-	-	-	"Replace ""Gratzel"" with ""Gr?el"""	OK
Halme (Aalto University School of Science and Technology)	3	30	24	30	25	-	-	-	"Replace: ""...efficiency, stability, and strength?"" with ""...efficiency and stability?"". (""Strength"" is not well defined)"	rewritten
Halme (Aalto University School of Science and Technology)	3	30	10	-	-	-	-	-	"Replace: ""long-term stability is a key issue in commercializing these PV cells against ultraviolet light irradiation and high temperature."" with ""long-term stability against ultraviolet light irradiation and high temperature is a key issue in commerci	reworded
Halme (Aalto University School of Science and Technology)	3	30	13	-	-	-	-	-	"Replace: ""that is adsorbed on the nanoporous oxide semiconductors (e.g., TiO2) as a cathode electrode into the conduction band of the electrode semiconductor."" with: ""into the conduction band of the nanoporous oxide semiconductor (e.g., TiO2) of the	deleted
Pietzcker (PIK)	3	30	36	30	38	-	-	-	improve formulation/wording	OK
Jennings (Murdoch University)	3	30	18	-	19	-	-	-	the use of Ru in the dye is also an issue of concern as it is very scarce and expensive	Noted,
Jennings (Murdoch University)	3	30	26	-	30	-	-	-	this information is out of date as Opv devices have now reached efficiencies of 8%	OK
Woyte (3E sa)	3	30	-	33	-	3.3.3	-	-	In addition to grid-connected and off-grid, add a section on PV hybrid systems (in combination with hydro, diesel, wind). These systems are very relevant for mitigation of climate change and poverty alleviation as they can contribute significantly to thes	Add section with reference, Roberto
Woyte (3E sa)	3	30	-	33	-	3.3.3	-	-	In contrast to the technology sections, only high-level statistics are provided. No technology details are given. E.g., current inverter efficiencies of >98%, transformerlessinverters, advantage and drawback of different topologies, integration of inverters	Michio, a short paragraph with ref
Halme (Aalto University School of Science and Technology)	3	31	26	-	-	-	-	-	"It is not clear what ""The average annual performance ratio?"" means. Please define the term or use common terms."	OK, defined
Gagnon (Hydro-Quebec)	3	31	26	-	-	-	-	-	"Please define or elaborate or expand on this ""performance ratio"" "	OK, defined
Ogimoto (The University of Tokyo)	3	31	23	31	23	-	-	-	"The description ""they improve the system efficiency"" should be deleted, because it causes many arguments and the Chapter 3 has no supporting contents in it. (The peak may be reduced. But it is difficult to put the very simple document here."	rewritten
Philibert (International Energy Agency)	3	31	26	-	-	-	-	-	"What is meant here by ""annual performance ratio"" is unclear to the reader."	OK, defined

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Drury (NREL)	3	31	24	-	-	-	-	-	300 kWh/kW implies a capacity factor of 3.4% - very low. minimum economic CFs are likely to be more like 10%	study of IEA PVPS-Task2 do show these data, yields around 300 kWh/kW peak are found in building integration facade
Coulibaly (International Institute fo Water and Environmental Engineering (2iE))	3	31	22	31	23	-	-	-	Add : storage is one of the main weak points of a non grid connected system.	OK
Drury (NREL)	3	31	26	-	-	-	-	-	define performance ratio	OK, defined
Pietzcker (PIK)	3	31	23	-	-	-	-	-	improve formulation/wording	rewritten
Jennings (Murdoch University)	3	31	12	-	16	-	-	-	mention the important role of off-grid Pv in village electrification, especially in developing countries.	Roberto in the Mini grid para
Drury (NREL)	3	31	23	-	-	-	-	-	unclear what is meant by 'they improve the system efficiency and decrease the environmental impact' - is this the lack of battery?	rewritten
Kruger (South African Weather Service)	3	31	26	31	26	3.3.3 .2.2	-	-	"Define ""average annual performance ratio""."	Michio will include a box glossory
Twidell (AMSET Centre)	3	31	-	-	-	-	3.11	-	Does 'off grid' include 'consumer devices'? Clarify with a comment in the caption.	OK
Rosinski (Electric Power Research Institute)	3	32	24	-	-	-	-	-	"Mention other disadvantages, e.g., ""?The disadvantages are the cost of the installation land, especially in developed countries, the potential environmental impacts associated with covering large parcels of land, and the need for transmission to deliver	OK
Sinke (Energy research Centre of the Netherlands (ECN))	3	32	8	32	26	-	-	-	"This section has a somewhat negative tone, emphasising some problems or disadvantages which actually have been solved in practice or are well acknowledged and not a real bottleneck (islanding, shading, etc.). Actually, PV can also help to solve grid prob	Arnulf will modify and move relevant info to Integration chapter
Pietzcker (PIK)	3	32	36	-	-	-	-	-	... all systems have tracking arrays to follow the sun's course (')	p31, rewritten
Philibert (International Energy Agecy)	3	32	34	33	2	-	-	-	and vice versa	OK
Twidell (AMSET Centre)	3	32	5	-	-	-	-	-	Delete 'simply'. Nothing is simple	OK
Twidell (AMSET Centre)	3	32	14	-	-	-	-	-	DISAGREE : grid-interconnection issues are HUGE for new large scale,centralised, plant, usually settled by building completely new grid lines. In comparison, PV links are definitely not worse and likley to be much easier.	rewritten
Twidell (AMSET Centre)	3	32	34	-	-	-	-	-	especially in developed countries'. Such statements are CONDESCENDING and unnecessary (often incorrect too)	Palani, remove the entire sentence
Pietzcker (PIK)	3	32	32	-	-	-	-	-	improve formulation/wording	OK
Twidell (AMSET Centre)	3	32	9	-	-	-	-	-	installed NEARER TO the point of CONSUMPTION	rewritten
Twidell (AMSET Centre)	3	32	34	-	-	-	-	-	Replace with 'A disadvantage MAY BE the cost of the installation land, however part of the land may still be usable for grazing and other horticultural and aricultural uses.'	p31, rewritten

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Twidell (AMSET Centre)	3	32	19	-	-	-	-	-	Shading is problematic everywhere, not just urban. Trees, chimneys, roof tops, valley sides etc. Shading is a major difficulty for most installations. The tops and sides of tall buildings in cities are probably the best sites for avoiding shading. BE	deleted
Philibert (International Energy Agency)	3	32	8	32	13	-	-	-	The main advantage seems to be economic: distributed grid-connected PV can compete with the price of distributed electricity, while centralised PV has to compete with the costs of bulk power alternatives.	OK
Drury (NREL)	3	32	5	-	-	-	-	-	typical residential systems are now 4-5 kW in the U.S. [Wiser et al. 2009 Tracking the Sun, LBNL]	OK
Twidell (AMSET Centre)	3	33	24	-	-	-	-	-	'!0s' reads like '10 seconds' at first sight. Use words 'tens of kW'	changed
Rosinski (Electric Power Research Institute)	3	33	23	33	30	-	-	-	"Add bullet - ""Can be easily hybridized with other fuels to provide firm, dispatchable power"""	not added here
Twidell (AMSET Centre)	3	33	5	-	-	-	-	-	"Clarify that 'shading' is not of the PV itself, but of windows underneath, eg. ; window shading beneath the PV structures"	p32, rewrite
Pietzcker (PIK)	3	33	30	-	-	-	-	-	add point: 'waste heat can well be used for desalination (See Aqua-CSP-study)'	rewrite
Kutscher (National Renewable Energy Laboratory)	3	33	28	-	-	-	-	-	Full dispatchability does not necessarily require thermochemical storage. It could come from a combination of molten salt storage and some natural gas co-firing.	OK
HERVAS JATIVA (CONELC NATIONAL ELECTRICITY COUNCIL OF ECUADOR)	3	33	16	-	-	-	-	-	In Andean Region the cook stoves are not used only for cooking also for heating the home that increase the efficiency use of wood. Maybe in Asia or Africa the weather conditions are different.	OK
Philibert (International Energy Agency)	3	33	22	33	30	-	-	-	One key advantage of CSP is its ability to integrate cheap back-up from any combustible fuel, thereby offering full dispatchability even today or, if you prefer, to offer guaranteed electrical capacity. Suggest rewriting the paragraph on storage to integr	OK
Kutscher (National Renewable Energy Laboratory)	3	33	39	-	-	-	-	-	The term HCE was developed for the Luz receiver tubes used in the SEGS plants in California. Receiver or receiver tube is a more generic terminology and is preferred.	rewrite
Twidell (AMSET Centre)	3	33	16	-	-	-	-	-	then used in a THERMAL HEAT ENGINE downstream, e.g for electricity generation'. Introduce the word THERMAL here, because it is used to distinguish from PV generation, as both are 'solar'.	rewrite
Kutscher (National Renewable Energy Laboratory)	3	34	4	-	-	-	-	-	A primary advantage of using a higher temperature fluid in the collector field is that it decreases the required thermal storage volume and thus decreases storage cost.	yes
Pietzcker (PIK)	3	34	3	-	-	-	-	-	please always state what Solar Multiple or storage time you are considering when stating land use or cost data for CSP, else it is impossible to use/compare the data.	OK
Twidell (AMSET Centre)	3	34	-	-	-	33.3.1.2.2	-	-	The reader wants to know if these are 'third generation' cells. If not third, then what?	p28, don't understand
Pinho (Institit of Tecnology)	3	34	-	-	-	-	3.13	-	Difficult to read anything in figure (a).	deleted

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Pietzcker (PIK)	3	34	-	37	-	-	3.13-3.16	-	reduce number of figures: use only 1 photo each for dish, tower and trough (possibly 13b, 15a and 16b). Furthermore, use only 1 schematic to show the power plant setup ? for the setup&storage there is no big difference whether you use trough or tower. (no	Fewer figures, Wes
Pinho (Institut of Tecnology)	3	35	-	-	-	-	3.14	-	Same as in figure 3.13.	deleted
Rosinski (Electric Power Research Institute)	3	36	28	-	-	-	-	-	"Add a Section 3.3.4.1.3 ""Hybridization for CSP"": All CSP technologies have the potential to operate as hybrids. Most commonly, natural gas firing is used during daily startup and during cloud transient. A recent trend is to augment gas turbine or coal	Noted, add, Wes
Philibert (International Energy Agecy)	3	36	22	36	25	-	-	-	Compressed air storage bears no particular affinity with CSP. It is not a form of thermal storage, but allows storing mechanical/electrical energy, so it could work for any source of electricity. Nowhere in the world has a CSP plant be linked with CAES. T	OK
Drury (NREL)	3	36	22	-	-	-	-	-	This section (on CAES) is odd. CAES storage is applicable to all technologies, and running the compressor off CSP heat when the sun is shining is probably not the best (most economic) use of the CAES resource. Also, more importantly, it is far more econo	probably remove
Twidell (AMSET Centre)	3	37	19	-	-	-	-	-	"add ""? and because of the increasing need to install high-voltage transmission line connections - a feature of larger scale of generation and of 'centralisation'. ""	Wes, Dan gives reference
Pietzcker (PIK)	3	37	-	-	-	-	-	-	add subsection 3.3.4.2.3 Desalination shortly describing how the waste heat can well be used for desalination (or at least mention the word and say 'check 3.3.2.2 'desalination'/Aqua-CSP). Somebody interested in CSP will not necessarily read all other sec	Wes, will make ref to other section
de Campos (Petrobras)	3	38	1	-	-	-	-	-	The word 'most' should be supressed, because all the CSP plants listed in Table 3.3 are still in operation.	OK
Halme (Aalto University School of Science and Technology)	3	39	13	-	-	-	-	-	"Replace ""CO2"" with ""CO""."	OK
Twidell (AMSET Centre)	3	39	8	-	-	-	-	-	Clarify the relationship with biofuels (also made by solar radiation). I suggest the wording 'This subsection discusses fuels made from solar conversion technologies OTHER THAN PHOTOSYNTHESIS. As with photosynthesis, transforming the radiant energy of s	OK
Chum (National Renewable Energy Laboratory)	3	39	10	40	45	3.3.5	-	-	Simplify this section by referencing chapter 2 on biomass gasification and all its sunthesis gas products. (Not synthesis oil but synthesis gas). Express the potential in terms of quantity of fuel or energy (J) from that 0.5 terawatt.	Simplify, p37, Wes
Gagnon (Hydro-Quebec)	3	39	5	-	-	-	3.17	-	please indicate the nameplate capacity of the LUZ plant (which is 354 MW) and the plant size (? km2)	deleted table
Pietzcker (PIK)	3	39	-	-	-	-	3.17	-	use only 2 of the 4 figures.	Fewer figures, Wes
Pietzcker (PIK)	3	39	-	-	-	-	-	3.13	is this table really necessary? Maybe state the avergae values for all SEGS plants, or give the lastet one ? not all of them.	Reference Table, Wes

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Coulibaly (International Institute fo Water and Environmental Engineering (2iE))	3	39	-	-	-	-	-	3.3	define SEGS	deleted table
Coulibaly (International Institute fo Water and Environmental Engineering (2iE))	3	39	-	-	-	-	-	3.3	What does turbine efficiency stand for. It is suprising that fossil turbine efficiency is about 30 % whereas the whole efficiency of a vapour engine generator can be as high as 40%.	deleted table
Ogimoto (The University of Tokyo)	3	40	3	40	9	-	-	-	"May need some talks with ""8.2.4 Liquid fuels""."	Wes to review and rewrite
Pietzcker (PIK)	3	40	12	-	-	-	-	-	add a bracket: 'The equivalent of 0.5 terrawattof solar fuel (~ xx% of 2008 transport fuel consumption) can be produced ...'	reworded
Pietzcker (PIK)	3	40	27	40	28	-	-	-	delete this sentence ? you already say 'CSP or PV' in the sentence before.	reworded
Pietzcker (PIK)	3	40	33	40	34	-	-	-	move the lines 1-3 on page 41 here and create a paragraph which gives a more concise picture: which solar fuels can replace which normal fuels, and how easy is this shift? e.g.: 'Methanol can easily replace gasoline without changing the engine or the infr	Wes to review and rewrite
Drury (NREL)	3	40	10	-	-	-	-	-	reference needed	add reference
Drury (NREL)	3	40	37	-	39	-	-	-	Storage is not a requirement for large solar power stations - integrating solar energy becomes a challenge at high penetration, but it is very unlikely that on-site storage will be the least cost solution.	Wes to review and rewrite
Drury (NREL)	3	40	31	-	-	-	-	-	The statement that solar hydrogen and solar fuels can replace conventional gas and diesel is too strong	Wes to review and rewrite
contaldi (ISPRA, Institute for Environmental Protection and Research)	3	40	41	-	43	-	-	-	thermochemical and thermochemistry: the description of the envisaged processes should be added	Wes to review and rewrite
Pietzcker (PIK)	3	40	35	40	38	-	-	-	you could greatly improve this paragraph by adding a few sentences about the numbers. e.g., compare hydrogen with battery storage and compare energy density (h2 wins) with round-trip-efficiency efficiency (battery ~85-95%, h2 maybe 30-50%?? batteries win)	Wes to review and rewrite
Halme (Aalto University School of Science and Technology)	3	41	14	-	-	-	-	-	"Replace ""heat"" with ""heating"" in the section title."	OK
Pietzcker (PIK)	3	41	12	-	-	-	-	-	add a sentence like 'the concepts presented are widely used, but they are rarely the focus of architecture, thus they are still not implemented as comprehensive as could be, and little monitoring exists'. Do you maybe have some numbers on installed capaci	Noted; no relevant numbers are available

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Twidell (AMSET Centre)	3	41	12	-	-	-	-	-	CORRECT AND AMPLIFY THIS SECTION. Suggested wording is 'The absorption of sunshine into buildings for beneficial heat by passive means (e.g. sun-facing windows, conservatories, thermal storage elements) is of extreme importance for the design of buildin	Terry will input the reference from the text Belcomb 1992, PHPP2004 , also Table 3.2
Drury (NREL)	3	41	9	-	-	-	-	-	could reframe as 'the use of passive solar is widespread, but difficult to quantify'	Terry modifies, GWth provide box glossory
contaldi (ISPRA, Institute for Environmental Protection and Research)	3	41	1	-	3	-	-	-	cut the text, it repaeat thing already writte in previous page. Moreover, than fossil fuels have a market is a well known concept.	Wes to review and rewrite
Drury (NREL)	3	41	12	-	13	-	-	-	not clear author is referring to annual installations. Would also be helpful to cite cumulative.	Luisa to change
Renne (National Renewable Energy Laboratory)	3	41	-	-	-	3.4.1	-	-	The reader should be referred back to Section 3.3.1 where some limited estimates are provided for specific regions.	OK
Pietzcker (PIK)	3	41	-	-	-	3.4.1	-	-	I would propose to use subscript or an underdash to denote thermal/electric: GW _{th} , GW _{el}	subscripted
Twidell (AMSET Centre)	3	42	-	-	-	-	3.18	-	As with many figures of this type, extrapolate the trend to, say, 2015. Otherwise when readers see the report they will be biased to think 'out of date'. Trends are scientifically justifiable and so should be included always. Figures catch the eye, so	Noted, no peer reviewed literature available
Pietzcker (PIK)	3	43	15	-	-	-	-	-	how much of the total organic fuel used is '50% of fuel used during the warm season'?	rewrite
contaldi (ISPRA, Institute for Environmental Protection and Research)	3	43	5	-	6	-	-	-	I have no refernces , but Greece too is a huge numbers of solar water heating devices, with mandatory rules. See also para 3.5.3.1.	Noted, Greece is already included
contaldi (ISPRA, Institute for Environmental Protection and Research)	3	44	13	-	-	-	-	-	No references, but regular visits to Greece are enough for me to ask to drop Greece from this list.	OK
Pinho (Institut of Tecnology)	3	44	-	-	-	-	3.19	-	Figure resolution is very bad.	deleted figure
HERVAS JATIVA (CONELC NATIONAL ELECTRICITY COUNCIL OF ECUADOR)	3	45	-	-	-	-	2.4.1	-	The main causes of failure of cookstove programs are the consultants normaly dont take in account that the way to cook is part of the people culture and is linked to their belives and spiritual and religions issues. Please include this situation.	OK
Coulibaly (International Institute fo Water and Environmental Engineering (2iE))	3	45	-	-	-	-	3.20	-	The three stars on unglazed are to be removed. They are not refered to anywhere.	OK
Twidell (AMSET Centre)	3	46	37	-	-	-	-	-	"Add sentence or new paragraph. 'The rate of installation and the cumulative capacities installed relate strongly to the form of institutional support mechanisms used nationally. It is clear that countries with easilly utilised feed-in tariffs dominate i	Arnulf to edit

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Sauerbrey (EnergyRenovable (ENERSIA))	3	46	37	46	37	-	-	-	"recommended to be ""including Germany (5351 MW), Spain (3405 MW), Japan (2619 MW), USA (1173 MW), Korea (352 MW),""	check numbers
Halme (Aalto University School of Science and Technology)	3	46	39	-	-	-	-	-	"Replace ""2619"" with ""2629 MW""	check numbers
Philibert (International Energy Agency)	3	46	14	46	19	-	-	-	"Should we expect that solar heat provides 100% of heating demand in new buildings in Europe ""in the long term""? Maybe. However, very well insulated buildings have small heating demand concentrated during a short heating season which corresponds to the	noted
Halme (Aalto University School of Science and Technology)	3	46	20	-	-	-	-	-	"The abbreviation ""ESTIF"" is not defined"	will define
Pietzcker (PIK)	3	46	10	46	12	-	-	-	are there demonstration projects whose name/link/citation could be given so that interested readers can inform themselves?	luisa to edit
contaldi (ISPRA, Institute for Environmental Protection and Research)	3	46	14	-	19	-	-	-	I suggest to cut all the text. To put upfront such a vision from an interest group is misleading for the reader, the setted goals are too long term with respect to the rest of the para 3.4.	ESTTP is not an interest group, but a stakeholder group initiated by EC
Twidell (AMSET Centre)	3	46	14	-	-	-	-	-	Make a comment about passive solar energy benefit, see below	OK
Drury (NREL)	3	46	28	-	32	-	-	-	need reference	will look for reference
Drury (NREL)	3	46	12	-	17	-	-	-	statements should be toned down, not 'according to...'	Luisa to edi"estimates"
Kruger (South African Weather Service)	3	46	11	46	26	3.4.1 .2.2	-	-	This section has information for Europe only. Mention that there is no information available for other parts of the world. The same applies to other sections where only one or a few countries or regions are discussed.	Luisa to edit
Pietzcker (PIK)	3	46	-	-	-	3.4.1 .2.2.	-	-	to evaluate these potentials it would be helpful to have some capacity factors for solar thermal installations	noted, references welcomed
Coulibaly (International Institute fo Water and Environmental Engineering (2iE))	3	46	-	-	-	3.4.1 .3	-	-	The units MW can be confusing. One need to define the peak Watts (Wp) first, even if W is used afterward for the solar panels installed.	OK
de Campos (Petrobras)	3	46	-	-	-	-	3.19	-	Although it is possible to read the numbers, they are very blurry.	clean up
Dunn (GE Energy)	3	46	36	47	1	-	3.2.1	-	Text describes figure as showing cumulative installed capacity through 2008 but appears to go through 2009.	OK
Dunn (GE Energy)	3	47	22	-	-	-	-	-	"This is called the ""National Solar Mission.""	OK
Dunn (GE Energy)	3	47	15	47	19	-	-	-	China NDRC solar goal is now 20 GW by 2020.	OK
Dunn (GE Energy)	3	47	20	47	21	-	-	-	EU Renewables Directive is 20% by 2020, and electricity is expected to make a larger contribution (30+%).	OK
de Campos (Petrobras)	3	47	26	-	-	-	-	-	It is necessary to add the U.S targets.	done
de Campos (Petrobras)	3	47	20	47	25	-	-	-	Lack of references.	add references

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Halme (Aalto University School of Science and Technology)	3	47	26	-	-	-	-	-	Text missing	added details
Dunn (GE Energy)	3	47	26	-	-	-	-	-	The main US drivers of solar PV are not targets but investment tax credits and state-level RPS set-asides.	OK
Pietzcker (PIK)	3	47	21	-	-	-	-	-	what does the sentence 'is calling for electricity in Europe for up to 12%' mean?	reworded
Kruger (South African Weather Service)	3	47	26	47	26	3.4.1 .3	-	-	Missing information.	added details
Pietzcker (PIK)	3	48	12	-	-	-	-	-	as of the end of 2009'	deleted table
Pietzcker (PIK)	3	48	7	-	-	-	-	-	move lines 2-3, page 49 here.	reworded
Drury (NREL)	3	48	7	-	8	-	-	-	need reference (but not wikipedia from table 3.5)	Delete tables, Wes will provide new references
Kruger (South African Weather Service)	3	48	12	48	12	3.4.1 .4	-	-	There should be other reference(s).	deleted table
contaldi (ISPRA, Institute for Environmental Protection and Research)	3	48	-	-	-	-	-	3.5	Drop the table, no need of historical details, it make the option weaker.	Delete tables, Wes will provide new references
Dunn (GE Energy)	3	48	-	-	-	-	-	3.5	Not sure if project list is desirable. Should offshore wind or other technologies get the same treatment? Is Wikipedia the best source?	Delete tables, Wes will provide new references
Coulibaly (International Institute fo Water and Environmental Engineering (2iE))	3	48	-	-	-	-	-	3.5	The document seems to me so serious that quoting Wikipedia takes off some of its seriousness	deleted table
Twidell (AMSET Centre)	3	48	-	-	-	-	-	3.5	The reference to Wilipedia is not a robust source. The IPCC should know by now that credible 'refereed' sources are needed. Quote other references including official web links by date of access if necessary. The author of the Wikipedia information m	deleted table
SCOWCROFT (EURELECTRIC)	3	49	3	49	6	-	-	-	Especially concerning CSP, the old Royal Decree 436/2004 is cited and outdated today.	OK
Vahrenholt (RWE Innogy GmbH)	3	49	3	49	6	-	-	-	Especially concerning CSP, the old Royal Decree 436/2004 is cited and outdated today.	OK
Dunn (GE Energy)	3	49	3	49	12	-	3.22	-	Does the text and table incorporate 2009 Spain CSP FIT changes?	deleted table
Kruger (South African Weather Service)	3	50	1	50	1	3.4.1 .4	-	-	There should be other reference(s).	deleted table
contaldi (ISPRA, Institute for Environmental Protection and Research)	3	50	-	51	-	-	-	3.6	I suggest to drop this table also, there is no need of a detailed list.	deleted table
Pietzcker (PIK)	3	50	-	-	-	-	-	3.6	remove this table. At most, write a sentence: 'a regularly updated list of planned or rumored csp plants can be found in wikipedia'	Delete tables, Wes will provide new references

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Halme (Aalto University School of Science and Technology)	3	51	2	51	8	-	-	-	Delete or relocate these lines. The cost issues are discussed in the later sections.	rewritten
Pietzcker (PIK)	3	51	2	51	8	-	-	-	delete these sentences or move them to the cost section 3.8.4. Also, giving cost numbers for plants without stating their storage time/solar multiple is useless.	Wes will modify text
Twidell (AMSET Centre)	3	51	2	-	-	-	-	-	Here and in many places. Capital cost per unit of capacity is important, but we also need to know the likely 'capacity factor' (energy generated per year/energy at full capacity' or the equivalent 'full output hours per year'), and, if published, the	Wes will modify text
Halme (Aalto University School of Science and Technology)	3	51	9	51	15	-	-	-	Merge with the text on page 49 and shorten.	Wes will modify text
Rosinski (Electric Power Research Institute)	3	51	10	-	-	-	-	-	more than 9,000 MW of CSP is under power purchase agreement	OK
Drury (NREL)	3	51	2	-	3	-	-	-	need reference for costs	OK, add references
Kruger (South African Weather Service)	3	51	2	51	3	3.4.1.4	-	-	References needed for the amounts.	add references
Drury (NREL)	3	52	21	-	35	-	-	-	and page 53, 4-8: discussion of net zero buildings seems outside the context of this section, and could be cut	Lusia will move to 3.3
Pietzcker (PIK)	3	52	34	52	38	-	-	-	this information would be interesting in 3.3.1, but not here	OK
Pietzcker (PIK)	3	52	-	-	-	3.4.2.1.	-	-	"a world view on production capacity would be helpful, e.g., 'are there just a few or lots of companies manufacturing 3x-glazed windows, phase change materials, xxx; can they be quickly scaled up?', "	noted
Kruger (South African Weather Service)	3	52	28	53	3	3.4.2.1.1	3.23	-	This part can be moved to section 3.3.	Lusia will move to 3.3
HERVAS JATIVA (CONELEC NATIONAL ELECTRICITY COUNCIL OF ECUADOR)	3	53	36	45	-	-	-	-	Please expand this. Up to day is not clear if biofuels reduce de CO2 emissions because the CO2 emitted during all the process (production, harvesting, transport, and thermochemical transformation) produces CO2 maybe more than their apparent reduction.	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.
Pietzcker (PIK)	3	53	13	-	-	-	-	-	the last twenty years' in combination with a citation that is 9 years old seems a bit weird to me.	keep in for now
Kruger (South African Weather Service)	3	53	10	53	12	3.4.2.1.2	-	-	These sentences can be moved to section 3.3.	Luisa will move to 3.3
Kruger (South African Weather Service)	3	53	18	53	20	3.4.2.1.2	-	-	This sentence can be moved to section 3.3.	Luisa will move to 3.3

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Coulibaly (International Institute fo Water and Environmental Engineering (2iE))	3	53	-	-	-	-	3.23	-	Caption : include (Canada) in the caption after Eco Terra.	delete figure
Coulibaly (International Institute fo Water and Environmental Engineering (2iE))	3	53	16	53	17	-	3.24	-	this figure needs more explanation	Luisa, Santa Mares to review
HERVAS JATIVA (CONELEC NATIONAL ELECTRICITY COUNCIL OF ECUADOR)	3	54	31	-	-	-	-	-	Despite the benefits of biofuels are not clear in CO2 net reduction. The socio economics impacts and uncertain environmental impact of intensive use GM crops for bioenergy are big issues not well analyzed yet. Please include and expand.	OK
Kruger (South African Weather Service)	3	54	1	54	2	3.4.2	3.24	-	This figure and discussion thereof can be moved to section 3.3.	delete figure
Twidell (AMSET Centre)	3	55	16	-	-	-	-	-	Check UK exports of solar water heaters (especially vacuum tubes), which is about 90% of UK manufacture and may be significant, e.g. as compared with Greece.	OK
Pietzcker (PIK)	3	55	21	55	23	-	-	-	is this russian production of any significant size compared to the world market or in any other way very noteworthy? If not, delete these lines.	Delete, Luisa
Drury (NREL)	3	56	4	-	10	-	-	-	is there a reference, or was this original work	rewritten
Pietzcker (PIK)	3	56	-	-	-	-	-	-	use the same color scheme in figure 3.25 and figure 3.26	OK
Pietzcker (PIK)	3	56	-	-	-	-	3.26	-	what is the difference between 'production 2008' and 'planned capacity 2008'?	reword
Twidell (AMSET Centre)	3	57	8	-	9	-	-	-	".. worldwide production RATE of capacity manufacture of 48 GW PER YEAR [see above; a very common error that needs careful checking throughout the report]3"	Arnulf to edit (per year)
Twidell (AMSET Centre)	3	57	5	-	-	-	-	-	A common error in stating PV manufacturing and installation is not to give the unit as MW PER YEAR. The 'PER YEAR' is vital to distinguish a rate from a cumulative total. This is a common mistake across all technologies. The IPCC Report should be corre	Arnulf to edit
Pietzcker (PIK)	3	57	20	57	23	-	-	-	are these numbers only for modules? If yes, say so. If no, the main facts are already given in line 1-4	Arnulf to edit
Drury (NREL)	3	57	22	-	-	-	-	-	the importance of manufacturing close to the end use market is overstated.	Arnulf to rephrase
Jennings (Murdoch University)	3	57	1	-	16	-	-	-	there are many unsubstantiated assertions here that need to be supported by references.	Arnulf to check (Mints ref?)
Halme (Aalto University School of Science and Technology)	3	58	29	-	-	-	-	-	"The 5.3 GW does not agree with the 7 GW production in 2008 mentioned in line 29 page 55, but the discrepancy is not mentioed in the text. This makes the purpose of the estimation questionable. Instead of this calculation, shortly mention the key metric	To be explained by Roberto
Pietzcker (PIK)	3	58	17	-	-	-	-	-	also give the normal price so the reader understands whether 500\$/kg are a doubling or a tenfold-increase	OK

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Pietzcker (PIK)	3	58	40	58	41	-	-	-	I have often read that - apart from CSP -, there is almost no demand for large-scale curved high-reflectivity mirrors, thus I am not sure that this sentence is correct.	check for facts
Pietzcker (PIK)	3	58	34	58	35	-	-	-	instead of 'In addition, the possible ...', better write something like 'this silicon production is sufficient for the production of xxx-xxx GW_peak of silicon PV cells.'	OK
Jennings (Murdoch University)	3	58	1	-	29	-	-	-	there are many unsubstantiated assertions here that need to be supported by references.	Amulf to provide references
Pietzcker (PIK)	3	60	10	60	11	-	-	-	what is their capacity? 200MW/year and 800MW/year would make quite a difference, given the ambitious upscaling plans for the next years	check facts
Halme (Aalto University School of Science and Technology)	3	60	9	60	11	-	-	-	"In contrast to what seems to be a general policy in this Chapter, two companies are mentioned by name and a statement of their ""superiority"" compared to others regarding to market status. For example, in the PV sections the market leaders are not menti	Wes to edit to remove company names
HERVAS JATIVA (CONELEC NATIONAL ELECTRICITY COUNCIL OF ECUADOR)	3	60	-	-	-	2.5.2	-	-	Normally the adverse impacts are lowered and the benefits zoomed when there are commercial interests to introduce new masive technologies.	OK
Kruger (South African Weather Service)	3	60	6	60	7	3.4.2	3.29	-	Reference needed.	add references
Halme (Aalto University School of Science and Technology)	3	61	20	61	25	-	-	-	"Delete: ""For example, ? ?independently."" This ""integration"" technology is marginal and of the main topic which is building integration."	keep in for now
Twidell (AMSET Centre)	3	61	35	-	-	-	-	-	Add sentence 'For instance, the steady movement towards the standardisation of net-zero energy and carbon buildings by 2016 is government policy in the UK' (Govt announcement Dec 2006, and see 'The UK Low Carbon Emission Plan' July 2009	OK
Pietzcker (PIK)	3	61	20	61	26	-	-	-	how much will the efficiency be decreased if you put PV (which needs to be as cold as possible) over a thermal system, and how do the costs change?	reword
contaldi (ISPRA, Institute for Environmental Protection and Research)	3	61	-	62	-	-	-	-	I suggest to drop both para 3.5.1 and 3.5.2 and reduce size of 3.5.3, .4. The basic concepts of integration of solar energy with existing networks has already been discussed through the chapter and in para 8.2.5. The architectural integration is not requir	Amulf to review sections 3.5 to determine what stays in 3 vs goes to chpt 8
Kruger (South African Weather Service)	3	61	34	62	4	3.5.1	3.30	-	This section and figure can be moved to section 3.3.	Amulf to review sections 3.5 to determine what stays in 3 vs goes to chpt 8
Drury (NREL)	3	62	16	-	-	-	-	-	"there are significant economies of scale for PV; large systems have lower balance of systems costs, inverter costs and can negotiate module costs directly with the supplier."	OK
Pietzcker (PIK)	3	62	6	62	11	-	-	-	cut these lines. Little informational value.	Amulf to review sections 3.5 to determine what stays in 3 vs goes to chpt 8

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Twidell (AMSET Centre)	3	62	20	-	-	-	-	-	DO NOT BE CONDESCENDING Should be 'In both developed and developing countries, many forms of renewable energy are most appropriate'. WHY DOES THIS REPORT KEEP MAKING THIS SERIOUS ERROR? It is the carbon intensive countries that can and should use renew	Arnulf to review sections 3.5 to determine what stays in 3 vs goes to chpt 8
Pietzcker (PIK)	3	62	17	62	29	-	-	-	I don't understand these paragraphs. Usually, the logic for off-grid systems is that it would be more expensive to build a grid to some remote village than to install local PV/CSP (or that you don't have the required capital for building a grid). Why not	Arnulf to review sections 3.5 to determine what stays in 3 vs goes to chpt 8
Coulibaly (International Institute fo Water and Environmental Engineering (2iE))	3	62	27	62	28	-	-	-	It should be? such as lighting in rural area and especially water pumping?	rewritten
Drury (NREL)	3	62	-	-	-	3.5.2	-	-	section could be removed	Arnulf to review sections 3.5 to determine what stays in 3 vs goes to chpt 8
Sinke (Energy research Centre of the Netherlands (ECN))	3	63	34	64	15	-	-	-	"As part of the chapter on ""Integration into the broader energy system"" I find this paragraph too limited in scope. I suggest to also treat here the existing estimates of the (peak) power that can be integrated into the grids without major modifications	Arnulf to review sections 3.5 to determine what stays in 3 vs goes to chpt 8
Halme (Aalto University School of Science and Technology)	3	63	43	64	15	-	-	-	"The text mentions three references to research papers, but does not discuss the conclusions from these studies. Why are their important to the reader? The sentence in lines 6-7 on page 64 gives an impression that the imbalance of the supply and demand	Arnulf to review sections 3.5 to determine what stays in 3 vs goes to chpt 8
Drury (NREL)	3	63	23	-	33	-	-	-	areas with significant biomass typically have lower DNI. Unclear if author means 'solar thermal electricity' as stated or 'solar thermal'. All of section 3.5.3 should be re-written.	Arnulf to review sections 3.5 to determine what stays in 3 vs goes to chpt 8
Pietzcker (PIK)	3	63	17	-	-	-	-	-	in many countries, peak power plants are gas plants, thus they are not very polluting.	OK
Philibert (International Energy Agecy)	3	63	3	63	4	-	-	-	One may wonder why Australia and the USA are mentioned here, given their low ranking into any classification of using solar water heating systems - but for pools.	Arnulf to review sections 3.5 to determine what stays in 3 vs goes to chpt 8
Drury (NREL)	3	63	16	-	18	-	-	-	peak demand is typically met with natural gas fueled CTs. Natural gas is much less polluting than baseload coal	OK
Drury (NREL)	3	63	3	-	9	-	-	-	peak SWH power output is irrelevant. Energy used from water heat would come from natural gas, fuel oil and electricity, and would be spread over early to mid morning hours when customer demand is typically low.	OK
Pietzcker (PIK)	3	63	6	63	18	-	-	-	the discussion about 'electricity grid benefits from solar thermal' only is valid for countries which supply most of their heat from electricity! This should be explicitly stated, as well as a list of countries for which this is true. For countries using	Arnulf to review sections 3.5 to determine what stays in 3 vs goes to chpt 8
Drury (NREL)	3	63	10	-	15	-	-	-	water heat demand does not match with mid-afternoon air conditioning demand in summer peaking systems	OK

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Smith (PNNL)	3	63	-	64	-	3.5.4	-	-	While the daily smoothing effect discussed here is real enough, even more important are day-to-day or longer variations when PV output over large regions can be low due to large-scale weather patterns. This does not seem to be discussed.	Arnulf to review section 3.5 to determine what stays in 3 vs goes to chpt 8
Coulibaly (International Institute fo Water and Environmental Engineering (2iE))	3	63	-	-	-	-	3.31	-	remove chinese or japanese characters on the X-axis	deleted figure
MANNEH (MINISTRY OF FINANCE AND ECONOMIC AFFAIRS)	3	64	20	87	14	-	-	-	Areas that needs to be looked at for possible reduction or shortened.	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.
Pietzcker (PIK)	3	64	27	64	30	-	-	-	cut these lines, as well as table 3.7. these are just general results, not at all linked to solar technologies.	Dan to Delete lines and table and rewrite
Pietzcker (PIK)	3	64	8	64	15	-	-	-	this paragraph describes what Oozeki does in the paper, but it does not give any results ? the opposite would be better! Give some results. How strong is the variability? How much can it be reduced through combination with spatially distant PV plants?	reword
Kyte (E.ON AG)	3	64	19	70	44	3.6.1	-	-	Very good focus, but need more depth. Compared to what? What are the assumed costs of renewables, how does that compare to doing nothing?	rewrite sections
Woyte (3E sa)	3	64	-	69	-	3.6.1	-	-	Shorten and summarize the key information in the table in one or two overall tables.	Dan to Delete lines and table and rewrite
Chum (National Renewable Energy Laboratory)	3	64	19	66	-	3.6.1	-	-	Suggest replacing with multiple LCA data for the various technologies and specific plots of water use, land use, emissions, etc. Data exist from multiple countries. The text of the chapter is a summary of the European work which is a comparison of multi	Dan reviews and edits supply references
Drury (NREL)	3	64	-	-	-	3.6.1	-	-	It seems beyond the scope of the solar chapter to quantify externalities (and potentially contentious)- this section should be limited to solar-specific environmental considerations	Dan to Delete lines and table and rewrite
Kruger (South African Weather Service)	3	64	31	64	32	3.6.1	-	3.7	Explain the unit of the damgae costs (Euro 2000).	deleted
Halme (Aalto University School of Science and Technology)	3	65	5	-	-	-	-	-	"Where does the word ""this"" refer to?"	add context
Pietzcker (PIK)	3	65	5	-	-	-	-	-	what is meant by 'that this is usually the case' ??	add context
Coulibaly (International Institute fo Water and Environmental Engineering (2iE))	3	67	-	-	-	-	-	-	there are many blank parts like page 67 all over the document. The lenght of the document can be reduced by removing some of these blank parts.	Dan to redraft to reduce blanks

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Philibert (International Energy Agency)	3	68	4	68	14	-	-	-	Although the literature mentioned here is only about PV, it would be necessary to broaden the scope to both solar heating and cooling, and CSP. SHC is likely to occupy even less land area than PV and CSP for similar energy absorbed, given its greater efficacy.	noted
Pálvölgyi (Budapest University of Technology and Economics)	3	68	4	69	9	-	-	-	The possible impacts on landscape should also be assessed.	OK
Coulibaly (International Institute for Water and Environmental Engineering (2iE))	3	68	-	-	-	-	-	3.10	the number of columns is not six as indicated in the caption.	deleted table
Kruger (South African Weather Service)	3	68	1	68	3	3.6.1.1	-	3.10	Explain the abbreviations in the table. The figures in the table will probably improve with the newer technology, as it refers to 1998, 1999?	deleted table
Philibert (International Energy Agency)	3	69	11	69	12	-	-	-	Higher insulation also has downsides, such as increasing the concentration of indoor pollutants, from NOx from natural gas burning to VOC from furniture and some construction material.	OK
Twidell (AMSET Centre)	3	69	20	-	-	-	-	-	Should be 'The NEGATIVE environmental impact of solar water-heating schemes.' The paper accepts the positive impact of energy/carbon abatement from utility energy supplies.	reword
Drury (NREL)	3	69	-	-	-	3.6.1.2	-	-	does not discuss environmental impacts	Lusia to revise
Drury (NREL)	3	69	-	-	-	3.6.1.3	-	-	also does not discuss environmental impacts (could discuss avoided fuel use, avoided emission, etc.)	Lusia to revise
Bilello (NREL)	3	69	18	69	21	3.6.1.4	-	-	Citation needed.	OK
Bilello (NREL)	3	69	11	69	12	3.6.1.4	-	-	Over 20 quality life cycle assessment references exist in the literature from which greenhouse gas emissions could be extracted, but the report cites only one. The value given (40-180 g CO ₂ -eq/kWh) is a very wide range, and at the high end, paints a picture.	Roberto to rewrite
Bilello (NREL)	3	69	13	69	17	3.6.1.4	-	-	This statement that cost-efficiency demands good controls to minimize release of toxic and explosive gas is a cop-out. Anyone with concerns about the hazards of PV cell manufacturing will not likely be appeased with this.	Roberto to rewrite
Kruger (South African Weather Service)	3	69	1	69	9	3.6.1.1	3.32	-	Figure is not referred to in the text.	OK
Kruger (South African Weather Service)	3	69	9	69	9	3.6.1.1	3.32	-	Is reference Fthenakis et al. of Fthenakis and Kim?	checking references
Philibert (International Energy Agency)	3	70	36	70	37	-	-	-	"In the list of appropriate regions for CSP, please include Mexico, Chile, Peru, Central Asian Countries, south-african countries (RSA and neighbours), and above all India. Instead of China write "parts of China", as these parts are likely to be rather	OK, rewrite

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Halme (Aalto University School of Science and Technology)	3	70	27	70	30	-	-	-	"Merge ""For Rankine-cycle? ?without water."" to the paragraph in lines 38 - 44 on the same page."	Wes to Merge
Dunn (GE Energy)	3	70	-	-	-	-	-	-	"PV recycling merits more literature reference if not text. For literature on PV Cycle, an industry voluntary initiative, see www.pvcycle.org and SRREN_Draft1_Review_Dunn_Seth_Material_02.pdf."	Roberto to include more references
Philibert (International Energy Agecy)	3	70	38	70	44	-	-	-	"This paragraph both restates and contradicts the former paragraph. It would be more useful to expand the former paragraph to make sure the reader understand that with dry cooling water needs are reduced to a few percent of what they are with wet cooling	Wes to Merge
Pietzcker (PIK)	3	70	7	70	12	-	-	-	"why are the payback times in Perpignan so much higher than the times in Fthenakis? The CO2 emissions per kWh are on the higher end of the scale compared to other numbers in literature; another good source to reference would be the EU NEEDS project which b	Roberto to rewrite
Chum (National Renewable Energy Laboratory)	3	70	38	71	5	-	-	-	Condense and refer to table 1.5	Table 1.5 is not related
El-Hinnawi (National Research Centre)	3	70	13	-	17	-	-	-	Expand and give quantitative data of different emissions normalized to 1 Mwe	reword
El-Hinnawi (National Research Centre)	3	70	18	-	21	-	-	-	Expand and give quatitative data and examples.	reword
Philibert (International Energy Agecy)	3	70	26	70	26	-	-	-	It is the other way round: line-focus systems, such as troughs and LFR, require flat areas or at least flat lines, while both solar towers and multi-dish power plants can accomodate more uneven terrains.	OK as is (says "does," not "does not")
Woyte (3E sa)	3	70	7	-	12	-	-	-	Please provide reference yield as assumed by Perpignan et al (2009). It's required in order to relate this figure to the 1700h as assumed by Fthenakis and Alsema.	OK
Halme (Aalto University School of Science and Technology)	3	70	20	-	-	-	-	-	Te is mentioned in both categories. Which one is the right?	reword
Kutscher (National Renewable Energy Laboaratory)	3	70	29	-	-	-	-	-	The additional cost for dry cooling should be quantified. A recent study by WorleyParsons commissioned by NREL concluded that for a 100 MW parabolic trough plant, air cooling would increase the levelized cost of electricity 5% compared to water cooling. A	Wes to review and include if possible
Kutscher (National Renewable Energy Laboaratory)	3	70	26	-	-	-	-	-	The land does not necessarily need to be flat for dishes. The heliostat field for a power tower may also be able to accommodate land that is not very flat.	OK
Philibert (International Energy Agecy)	3	70	32	70	33	-	-	-	The reference to wind farms here is irrelevant, as wind turbines have a very low ratio of soil occupancy. Please suppress.	Delete

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Philibert (International Energy Agency)	3	70	25	70	25	-	-	-	The value given of 2 km ² for 100 MW applies to parabolic trough plants. Others (CLFR, Towers) are likely to require smaller land area - although actual comparisons should involve yearly output, not only capacity.	OK
Kutscher (National Renewable Energy Laboratory)	3	70	38	44	-	-	-	-	This is pretty repetitive of the paragraph preceding it. See my previous comment. Note that parallel hybrid cooling provides for some water cooling on the hottest days.	rewritten
Halme (Aalto University School of Science and Technology)	3	70	23	70	37	-	-	-	This paragraph should be compacted.	Wes to Condense
Kyte (E.ON AG)	3	70	7	70	7	3.6.1.4	-	-	I have seen much higher energy payback times (7-10 yr) the production of wafers in c-si is highly energy intensive	OK
Kutscher (National Renewable Energy Laboratory)	3	70	-	-	-	3.6.1.4	-	-	This should distinguish the energy paybacks for thin film vs. crystalline silicon, which differ significantly (silicon is much longer). Because this report is related to climate change, it should discuss carbon payback of life-cycle carbon emissions.	Add
Pietzcker (PIK)	3	71	30	-	-	-	-	-	this reference is quite old ? isn't there more recent work on the use of decentralized PV for development?	Roberto to seek newer references
HERVAS JATIVA (CONELEC NATIONAL ELECTRICITY COUNCIL OF ECUADOR)	3	71	-	-	-	2.5.4	-	-	In many energy crops in Latin America the local farmers was displaced to worst living and working conditions and suffer precarious salaries, abuses and they aren't the owners of the land. They are the new energy slaves. Please be aware of this and include.	OK
Drury (NREL)	3	71	-	-	-	3.6.2	-	-	social impacts focus on electrification for rural poor. While important, there are many other social impacts (jobs, emissions, etc.) that could be discussed.	Dan to include references on jobs (Michael to provide)
Pietzcker (PIK)	3	72	23	72	33	-	-	-	are there any major research projects 'lighthouse projects' which have worked well and overcome these problems? If yes, they should be referenced here so policymakers know where to look when searching for good examples.	Noted
Pietzcker (PIK)	3	72	23	72	33	-	-	-	are there any major research projects 'lighthouse projects' which have worked well and overcome these problems? If yes, they should be referenced here so policymakers know where to look when searching for good examples.	will check
Takeuchi (Advanced Industrial Science and Technology)	3	72	-	85	-	3.7	-	-	Chapter 3.7 Prospects for Technology Improvements and Innovation'	don't understand
contaldi (ISPRA, Institute for Environmental Protection and Research)	3	73	33	-	43	-	-	-	Drop the text, it envisages something controversial, too distant in future and for very rich people only.	Luisa to review (Andreas to help)
Bilello (NREL)	3	73	21	73	29	3.7.1	-	-	Windows that have multiple panes, inert fills, and low-e glazing (as described) prevent the solar gain supposedly gained by the large windows. This paragraph has a false premise.	OK
contaldi (ISPRA, Institute for Environmental Protection and Research)	3	74	-	75	-	-	-	3.11	The table does not add any valuable information, it is a vision for luxury homes in north america only.	Dan deleted

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de Campos (Petrobras)	3	75	19	-	-	-	-	-	The acronym HVAC have already been defined in page 52 line 9.	OK
Hirschhausen von (Workgroup for Economic and Infrastructure Policy)	3	76	44	-	-	-	-	-	""?extremely low-cost materials and processes?"" I suggest to eliminate ""extremely"" and give a benchmark, these low costs are compared to. "	keep "extremely" for now
Sinke (Energy research Centre of the Netherlands (ECN))	3	76	37	77	9	-	-	-	"SEE ALSO PREVIOUS COMMENTS. I suggest to put everything in a more clear perspective by replacing the text with the one following here, taking into account also a shift from pages 29/30 to this section (on ""Emerging technologies""), while changing the var	Palani and Michio to rewrite
Hirschhausen von (Workgroup for Economic and Infrastructure Policy)	3	76	42	76	45	-	-	-	"The differentiation among ""emerging"" technologies, that comprises ""proven"" technologies as well as mid-term options should be clearer. Crystalline Si, thin-film solar cells and dye-sensitized as well as organic solar cells are all mentioned without a	OK
Pietzcker (PIK)	3	76	28	76	30	-	-	-	are the 9% district heating or 'solar district heating'? If the number stands for 'district heating', the next sentence about scandinavia does not make sense	checking facts
contaldi (ISPRA, Institute for Environmental Protection and Research)	3	76	28	-	35	-	-	-	cut the text or rewrite. Text is confused, it is not clear the intention of the author, it seem it like to integrate solar heating in district heating, but it do not say so.	Luisa deleted
Pietzcker (PIK)	3	76	34	76	35	-	-	-	what is meant by 'make the most of large-scale solar heating plants'?	reworded
Pietzcker (PIK)	3	76	31	76	33	-	-	-	why does district heating reduce the cost of solar thermal energy?	Luisa deleted
Pietzcker (PIK)	3	76	6	76	11	-	-	-	why is the SHIP capacity so small? Is it not economical? If yes, what has to/could change to make it economical? Also, this paragraph is missing references.	Luisa to review
HERVAS JATIVA (CONELEC NATIONAL ELECTRICITY COUNCIL OF ECUADOR)	3	76	-	-	-	2.5.5	-	-	An objetive assessment of all the negative social and environmental impacts of intensive agricultural technologies of bioenergy plantations needs to be done in responsible way before promote suchs technologies to avoid CO2 emissions. Please include	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.
Drury (NREL)	3	76	-	-	-	3.7.3	-	-	This section should discuss the tremendous cost reduction potential for proven PV technologies, and not just focus on novel technologies.	Palani and Michio to rewrite
Christophersen (Climate and Pollution Agency)	3	77	34	-	-	-	-	-	"We propose that the word ""very"" is deleted. Generally speaking, charged words like ""very"", ""extremely"" and ""highly"" should be avoided or used with caution."	reworded
Drury (NREL)	3	77	39	-	40	-	-	-	balance of systems does not typically include 'storage, system utilization, and the energy network'. It typically refers to mounting, wiring, sometimes inverter and costs associated with installation.	don't find text
Pietzcker (PIK)	3	77	14	-	-	-	-	-	in a section about 'future technology', it is weird to find main references that are 14-18 years old.	Palani and Michio to rewrite
Drury (NREL)	3	78	22	-	-	-	-	-	good forecasts will decrease the need for, and value of, storage. This section has too much focus on requirements of storage.	Michio to review and rewrite
Drury (NREL)	3	78	2	-	18	-	-	-	highest priority' should not be given to 'inverters, storage devices and BIPV designs'. highest priority should be decreasing BOS, module and inverter costs.	Wes will rewrite

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Sinke (Energy research Centre of the Netherlands (ECN))	3	78	-	83	-	-	-	-	It would be good to also use the very recent IEA PV Roadmap (http://www.iea.org/papers/2009/PV_roadmap_targets_viewing.pdf). It summarizes things nicely and reflects consensus of experts from all over the world (although not in terms of installed capacity)	Michio to review and rewrite
Drury (NREL)	3	78	11	-	13	-	-	-	PV will not require storage unless very high levels of penetration are reached. And, when storage becomes cost effective, it will be most economic as a grid resource, not collocated with a solar plant.	OK
Drury (NREL)	3	78	24	-	28	-	-	-	There is no consensus that very large scale solar systems will be 'required' or even the most economic option. The land area suitable for PV is enormous, and there is a reasonably good solar resource in every inhabited land area. PV will be deployed where	OK
Twidell (AMSET Centre)	3	79	28	-	-	-	-	-	Add here, or elsewhere. 'It is important to stress, that whatever the PV module technology, correct siting is vital, both in optimising orientation and IN MINIMIZING SHADING. Shading of just part of the array causes significant loss of potential output	OK
Hirschhausen von (Workgroup for Economic and Infrastructure Policy)	3	79	1	-	-	-	-	-	What are the foundations / the benchmark that the given technology projections in table 3.12 are needed for? Grid parity (at which time horizon, at what costs), main cost drivers? I suggest a better link between the text and table 3.12.	Michio to review and rewrite
Woyte (3E sa)	3	79	-	81	-	-	-	3.12	Selected issues, needs and time seem to be the authors' opinion. Please provide references to support the different statements (or one references to the source of this table).	Michio to review and rewrite
contaldi (ISPRA, Institute for Environmental Protection and Research)	3	80	-	82	-	-	-	3.12	The table could be eliminated or reduced to very few items. Ideas for the very distant future should be avoided (as a module with integrated storage, it is ridiculous to propose it now).	OK
Rosinski (Electric Power Research Institute)	3	81	2	81	11	-	-	-	This paragraph should also indicate that several new CSP technologies are emerging. Trough has been proven at utility scale, but the other 3 technologies have not. The point should be made that there is great potential for performance improvements and c	OK
Pietzcker (PIK)	3	82	8	-	-	-	-	-	"add at least one newer study, e.g., 'Characterisation of Solar Electricity Import Corridors from MENA to Europe' (DLR 2009) or from the NEEDS project : ""Final report on technical data, costs, and life cycle inventories of solar thermal power plants"" b	add new study
Gagnon (Hydro-Quebec)	3	83	3	-	-	-	-	-	"Please add reference after ""14%"" "	add reference
Drury (NREL)	3	83	-	-	-	3.7.5	-	-	too many subsections with only one sentence - would be better combined.	Wes to rewrite and Combine
Kruger (South African Weather Service)	3	84	5	84	5	3.7.5	-	-	"Explain unit ""bbl""."	p85, OK. barrel
REUTOV (FEDERAL AGENCY FOR SCIENCE AND INNOVATION (RUSSIA))	3	84	36	-	-	3.7.5 .5.	-	-	give proper reference to the project	p85, OK

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Twidell (AMSET Centre)	3	85	17	-	-	-	-	-	? cycles FOR WHAT?...	rewritten
Twidell (AMSET Centre)	3	85	39	-	-	-	-	-	"What does 'Scientific risk mean'? This is a meaningless phrase. Is it the cost, or the time or the chances of success or what? The successful team will have Nobel prizes for sure; what 'scientific risk' is that?"	Dan to change to "technical challenge is great"
Twidell (AMSET Centre)	3	85	24	-	-	-	-	-	? FOR WHAT (hydrogen I assume, but also the oxygen is usable as in most of these processes. Clarify clearly at the start of similar processes)	rewritten
Twidell (AMSET Centre)	3	85	13	-	-	-	-	-	?production OF WHAT will require?	rewritten
Drury (NREL)	3	85	1	-	10	-	-	-	Should mention this is a very costly option - it costs ~\$10,000 to 'ship' one pound to a low earth orbit, let alone a geosynchronous orbit.	p86, OK
Twidell (AMSET Centre)	3	85	5	-	-	-	-	-	Solar electrolysis FOR HYDROGEN FUEL using? OR put the third sentence first in this paragraph.	OK
Twidell (AMSET Centre)	3	85	2	-	-	-	-	-	Solar-driven fuel processing methods FOR WHAT? Need to explain what the purpose of this section is by stating the final products.	Wes to rewrite and Combine
contaldi (ISPRA, Institute for Environmental Protection and Research)	3	85	-	-	-	-	-	-	The entire para 3.7.5 explores concepts too distant from application, it only academic research. No use in this report on my view.	Wes will rewrite and summarize (has long term value)
Drury (NREL)	3	85	-	-	-	-	3.33	-	text and axes are hard to read	deleted figure
Drury (NREL)	3	86	26	-	31	-	-	-	"and page 87, 1-6; Cut - example too specific. "	Luisa to Delete
Gagnon (Hydro-Quebec)	3	86	13	-	14	-	-	-	please elaborate this conclusion, it is not clear to the reader by only looking at figures 3.3.3 and 3.3.4 and the companion text that we can make this conclusion, to the contrary.	rewritten
contaldi (ISPRA, Institute for Environmental Protection and Research)	3	86	-	-	-	-	-	-	same comment as above also for para 3.7.6	Dan to review and revise (reject personal view)
Twidell (AMSET Centre)	3	86	2	-	-	-	-	-	The political implications of the Glaser plan are immense. Some comment should be made. Solar radiation comes to Earth by itself, so why go to the Moon? Of course such a scheme would bring funding to NASA!. Do not leave this outlandish proposal without	Dan to address space solar power's near-time viability omit last sentence see IEEE 1984 reference
Drury (NREL)	3	86	13	-	14	-	-	-	this conclusion is based on very high electricity rate escalation assumptions, loan terms and system lifetimes. If kept, these should be conceded and the statement made with less certainty.	Luisa to review and edit
Kruger (South African Weather Service)	3	86	1	86	2	3.8.1 .1	3.33	-	Reference needed.	OK
Kruger (South African Weather Service)	3	86	10	86	12	3.8.1 .1	3.34	-	Reference needed.	add reference
contaldi (ISPRA, Institute for Environmental Protection and Research)	3	87	-	-	-	-	3.34	-	It is not clear what fuel cost has been used for this picture. Moreover the entire paragraph is concentrated in the US situation. The regulation for building in other parts of the world are different. All cost should also be referred to the cost of crude oil	Luisa to review
Pietzcker (PIK)	3	88	29	-	-	-	-	-	Are there no newer studies than a study from 1991?	Reference updated Luisa

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Pietzcker (PIK)	3	89	6	89	7	-	-	-	A reference is needed for these values. Also, the values seem extremely high (wrong?) ? 20% cost decrease for each 50% capacity increase would equal a learn rate >30%, which is way higher than learn rates of other technologies!	OK
REUTOV (FEDERAL AGENCY FOR SCIENCE AND INNOVATION (RUSSIA))	3	89	11	-	12	-	-	-	give proper reference	OK
Kruger (South African Weather Service)	3	89	1	89	2	3.8.2	-	3.14	Reference needed.	OK
Kimura (Central Research Institute of Electric Power Industry)	3	90	6	-	11	-	-	-	Important information of cost reduction achieved. Source should be explained.	Luisa to put ref in text
Kimura (Central Research Institute of Electric Power Industry)	3	90	-	-	-	-	3.35	-	Basis of the cost projection of solar thermal technology by ESTIF (2009) should be described in order to show that the ESTIF (2009)'s projection is not a mere propaganda by an industry organization but a scientific assessment based on expert judgements.	Luisa to check with TSU for acceptability of reference
Kimura (Central Research Institute of Electric Power Industry)	3	90	-	-	-	-	3.36	-	"The cost reduction trend of this figure seems to be special for some European markets, not universal. For example, cost of solar water heaters in Japan, one of the major markets of solar thermal technology, has not been reduced since the mid 1980s (Kimur	Luisa to review and include Kimura ref
contaldi (ISPRA, Institute for Environmental Protection and Research)	3	90	-	-	-	-	-	3.14	Also for the cost estimate of this figure to report also the projected cost of crude oil will help the reader.	reword
Gagnon (Hydro-Quebec)	3	91	-	-	-	-	3.35	-	Very similar to table 3.14 with slightly different results, I suggest removing one of the two	Delete table or figure review by Luisa
Rosinski (Electric Power Research Institute)	3	93	21	93	23	-	-	-	"4 USD/W should be changed to 2 USD/W. Suggest checking that the next sentence is also current. Reference: ""Engineering and Economic Evaluation of Central-Station Solar Photovoltaic Plants. EPRI, Palo Alto, CA: 2009. 1017600.""	p94, check facts
Kimura (Central Research Institute of Electric Power Industry)	3	93	20	96	19	-	-	-	Add PV learning rates calculations in Japan, one of the largest cumulative production and installation in the world. The followings are PV learning rates in Japan from 1993 to 2008: module 13-16%, inverter 20-25%, other materials 16-20%, construction costs	p95? Don't have info
Drury (NREL)	3	93	25	-	-	-	-	-	in addition to Surek, 2005, Greg Nemet has made significant contributions to our understanding of PV learning rates, showing a range with a median closer to 16%.	p94, OK
Drury (NREL)	3	93	21	-	-	-	-	-	need dollar year for costs	OK
Kimura (Central Research Institute of Electric Power Industry)	3	93	20	96	19	-	-	-	There are theoretical limitations for learning curve analysis. Theoretical analysis shows that 'initial concavity', 'irregularity of improvement' and 'plateau phenomenon' can cause deviation of typical log-log scale learning curves. See: Takahashi, N., 200	OK

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Kimura (Central Research Institute of Electric Power Industry)	3	93	-	96	-	3.8.3	-	-	Definition of BOS need to be clarified. Does it include installation cost (which mainly consists of labor cost)? This point is important because mechanism of cost reduction in manufacturing and that in installation/marketing are different. While manufactu	OK
Kyte (E.ON AG)	3	93	21	93	21	3.8.3	-	-	Total PV System cost are less than \$4/W now. More like 2	check facts
Kruger (South African Weather Service)	3	93	1	93	1	3.8.2	-	3.15	Reference needed.	OK
Kruger (South African Weather Service)	3	93	5	93	5	3.8.2	-	3.16	Reference needed.	OK
Drury (NREL)	3	94	12	-	-	-	-	-	"First solar (CdTe) is now producing PV modules for less than \$1/W; This also needs to be reflected in table 3.17"	OK
Sinke (Energy research Centre of the Netherlands (ECN))	3	94	20	97	19	-	-	-	ALSO OPTION FOR SHORTENING OF TEXT. This section contains a lot of detail (far too much, I think), but does not clearly sketch the overall picture which is so important for the IPCC. We do not really care about projections per technology per region. I sug	Arnulf to review and update market information if possible (Michael to provide relevant references)
Jennings (Murdoch University)	3	94	20	-	25	-	-	-	these costs are out of date	Arnulf to review and update market information if possible (Michael to provide relevant references)
Kimura (Central Research Institute of Electric Power Industry)	3	94	-	-	-	-	3.37	-	"There are methodological limitations for learning curve analysis; assumed system boundaries, e.g. whether production cost or price based analysis, calculated time period, etc. See: Junginger, M. et.al., 2008, Technological learning in the energy secto	OK
Kimura (Central Research Institute of Electric Power Industry)	3	94	-	-	-	-	3.37	-	add other calculations of PV learning rates. See: Junginger, M. et.al., 2008, Technological learning in the energy sector, ECN.	add references/reword
Sugiyama (CRIEPI)	3	94	-	-	-	-	3.37	-	Learning curve analysis needs sensitivity analysis and further discussion.	Arnulf to review and update market information if possible (Michael to provide relevant references)
Woyte (3E sa)	3	94	-	-	-	-	3.37	-	Please provide a more recent experience curve (including 2009 data, if available). Discuss the recent decrease in Pv module prices and the previous stagnation based on technology learning and scale learning.	Arnulf to review and update market information if possible (Michael to provide relevant references)
Drury (NREL)	3	94	-	-	-	-	3.38	-	figure is unclear, needs to be replotted	replotted
Dunn (GE Energy)	3	94	-	-	-	-	3.38	-	This needs updating in light of 2009 price declines.	OK
Coulibaly (International Institute fo Water and Environmental Engineering (2iE))	3	94	-	-	-	-	-	3.37	The peak Watts (Wp) are not defined in the document	OK

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Coulibaly (International Institute fo Water and Environmental Engineering (2iE))	3	94	-	-	-	-	-	3.37	The writing is a bit fuzzy.	rewritten
Coulibaly (International Institute fo Water and Environmental Engineering (2iE))	3	94	-	-	-	-	-	3.38	Writing need to be made clearer	rewritten
Sugiyama (CRIEPI)	3	95	18	95	28	-	-	-	A figure that explains the share of BOS in total costs would be helpful for readers to understand the total cost profile. Reducing module costs alone do not lead PV to competitiveness	p96, OK
Sugiyama (CRIEPI)	3	95	18	95	28	-	-	-	BOS needs more elaboration. What are they exactly (dification)? May we expect BOS to be lowered by learning curve? Module costs may be decreasing quickly but BOS will not. How about BOS of other technologies?	p96, OK
Drury (NREL)	3	95	18	-	28	-	-	-	dollar year for costs	OK
Sinke (Energy research Centre of the Netherlands (ECN))	3	95	-	-	-	-	3.37	-	"Figure is outdated; more recent ones are available (e.g. SET for 2020; Executive Summary, European Photovoltaic Industry Association EPIA (2009), www.setfor2020.eu, and W.G.J.H.M. van Sark, E.A. Alsema, H.M. Junginger , H.H.C. de Moor and G.J. Schaeffer	replace figure
Pinho (Institut of Tecnology)	3	95	-	-	-	-	3.38	-	Figure is unreadable.	fix figure
contaldi (ISPRA, Institute for Environmental Protection and Research)	3	95	-	-	-	-	3.38	-	The figure cannot be read.	fixed
Kimura (Central Research Institute of Electric Power Industry)	3	95	-	-	-	-	-	3.17	Is there any scientific research for future costs estimates of PV? Greentech is a kind of PV industry's information media, not science.	Arnulf to review and update market information if possible (Michael to provide relevant references)
Coulibaly (International Institute fo Water and Environmental Engineering (2iE))	3	95	-	-	-	-	-	3.17	Last column has extra figures. There is some mix-up in the setting. Adjust the figures to fit the column.	p96, fixed table
Drury (NREL)	3	96	4	-	6	-	-	-	cost reductions mostly due to easing of polysilicon constraints (increased supply), and global down turn (decreased demand)	OK
REUTOV (FEDERAL AGENCY FOR SCIENCE AND INNOVATION (RUSSIA))	3	96	11	-	13	-	-	-	poor logical connection to other parts, need rephrasing	rewritten
Drury (NREL)	3	96	9	-	10	-	-	-	wrong units for LCOE - need to express in kWh	p97, reword
Twidell (AMSET Centre)	3	96	-	-	-	-	-	3.17	Third figure significance (implying third figure accuracy) is totally unjustified and discredits the assessments. Change to 2 figure significance. There are probably many other such 'errors' in the total Report. Stating too many significant figures dis	which figure?

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Halme (Aalto University School of Science and Technology)	3	97	13	97	15	-	-	-	"Given that the $\$/Wp$ costs of PV models were discussed above including learning curve predictions, it would be useful for the reader to see estimates how low $\$/Wp$ is necessary to reach these USD/kWh cost targets. I.e. are the goals realistic with respect	OK
Drury (NREL)	3	97	26	-	-	-	-	-	energy stored in batteries and in hydrogen are stored in 'molecules'. Need to reword to make point.	not sure what page
REUTOV (FEDERAL AGENCY FOR SCIENCE AND INNOVATION (RUSSIA))	3	97	18	-	-	-	-	-	specify the program	OK
Kyte (E.ON AG)	3	97	4	97	7	3.8.4	-	-	4 m\$/MW is low. It is more like 6m\$/MW	check facts
Kruger (South African Weather Service)	3	97	1	97	3	3.8.4	3.40	-	Reference needed. Figure not mentioned in text.	Wiser 2009, OK
Drury (NREL)	3	98	44	-	46	-	-	-	"and page 99, 1-25; the author makes good points, but this is beyond the scope of the 'solar potential' section. "	Luisa will rewrite whole section comments will be reviewed after that rewrite
Drury (NREL)	3	98	19	-	-	-	-	-	Hydrogen is acclaimed to be an energy carrier of the future'. Too strong of statement, could be if economical.	Wes to review and edit
Pietzcker (PIK)	3	98	11	-	-	-	-	-	is there a simple reason why the numbers here quite different from the numbers in line 15? if yes, please state	Yutaka Tamaura to add reference (Michael to send reference)
Drury (NREL)	3	98	14	-	-	-	-	-	less than 3 USD' - need dollar year and a citation.	OK
Drury (NREL)	3	98	2	-	3	-	-	-	need to be more specific and add a citation to make this claim.	add reference
Drury (NREL)	3	98	36	-	43	-	-	-	The main driver in solar deployment and potential is cost. Solar is not resource or market limited if these technologies represent the least cost solution.	OK
Coulibaly (International Institute fo Water and Environmental Engineering (2IE))	3	98	44	99	16	-	-	-	There are still some confusing situations. That is when we use CSP to collect the sun radiation and store the heat to be transformed into electricity. This electricity cannot be called primary energy. Then a conversion factor should be used	OK
Lund (Helsinki University of Technology)	3	98	31	105	9	3.9	-	-	P.D. Lund: Exploring past energy changes and their implications for the pace of penetration of new energy technologies. Energy 35 (2010) 647-656	what page?
Lund (Helsinki University of Technology)	3	98	31	105	9	3.9	-	-	The information is interesting in that it shows the spread of possibilities in a more framed way.	OK
Lund (Helsinki University of Technology)	3	98	31	105	9	3.9	-	-	There is available new information on the future penetration of solar energy (and wind as well) and summary of key scenarios for the past. This can be found in the following publication:	OK
HERVAS JATIVA (CONELEC NATIONAL ELECTRICITY COUNCIL OF ECUADOR)	3	98	-	-	-	-	2.7.4	-	The Table is not clear What is n?, R2?, PR?	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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REUTOV (FEDERAL AGENCY FOR SCIENCE AND INNOVATION (RUSSIA))	3	99	38	-	-	-	-	-	delete the line	deleted
Drury (NREL)	3	99	26	-	31	-	-	-	focus should be on costs. incentives help technologies progress down a learning curve.	OK
Drury (NREL)	3	99	35	-	39	-	-	-	should be framed as an example of highly optimistic deployment scenarios.	OK
REUTOV (FEDERAL AGENCY FOR SCIENCE AND INNOVATION (RUSSIA))	3	100	6	-	-	-	-	-	"There were a number of IEA publications under the title ""Energy Technology Perspectives "" in 2006, 2008, one is about to be published; make proper reference "	will do
Halme (Aalto University School of Science and Technology)	3	100	40	-	-	-	-	-	Disconnected sentence.	reworded
Drury (NREL)	3	100	6	-	10	-	-	-	dollar year, discounted?	OK
Pietzcker (PIK)	3	100	1	100	17	-	-	-	good paragraph! It should have an own subsection heading 'energy accounting'	Luisa will rewrite whole section comments will be reviewed after that rewrite
Drury (NREL)	3	100	22	-	23	-	-	-	it's economic, not technical, barriers that matter!	OK
Drury (NREL)	3	100	15	-	21	-	-	-	this is a technical potential, not a plausible deployment target.	OK
Drury (NREL)	3	101	9	-	-	-	-	-	when? 2030?	check facts
Drury (NREL)	3	102	1	-	6	-	-	-	Shell' projections appear in energy, but not capacity. Capacity could be calculated using a mean capacity factor.	reword
Drury (NREL)	3	102	-	-	-	3.9.3	-	-	much of this section is redundant with the social impacts section.	Luisa will rewrite whole section comments will be reviewed after that rewrite
Kammen (University of California, Berkeley)	3	103	-	11	14	-	-	-	"PACE financing could address this high capital cost issue: Property Assessed clean energy (PACE) financing is not discussed in the text. It is an important and new financing mechanism that is growing rapidly in use. A website devoted to this mechanism	OK
Kammen (University of California, Berkeley)	3	103	-	23	-	-	-	-	"PACE financing could address this high capital cost issue: Property Assessed clean energy (PACE) financing is not discussed in the text. It is an important and new financing mechanism that is growing rapidly in use. A website devoted to this mechanism	OK
Drury (NREL)	3	103	38	-	42	-	-	-	dollar year, discounted?	OK
Woyte (3E sa)	3	103	-	-	-	-	3.9.3	2	"Trends in grid-connected PV are as follows: - distributed grid support from PV, for an overview on literature and recent projects, see Woyte A. et al. ""The MetaPV project: photovoltaics in active distribution systems,"" Proc. 24th European Photovoltaic	OK

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Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table Info	Comments	Consideration by writing team
Sinke (Energy research Centre of the Netherlands (ECN))	3	103	-	-	-	-	-	3.19, 3.20	"For PV, IEA 2008 data are obsolete and should not be referred to. Please use the new roadmap: http://www.iea.org/papers/2009/PV_roadmap_targets_viewing.pdf . It is important to note that market volume and installed capacity vs time numbers are political r	Luisa will rewrite whole section comments will be reviewed after that rewrite
Kutscher (National Renewable Energy Laboratory)	3	104	1	11	-	-	-	-	As the comment in the text states, this material is redundant. It is important to make the point that air cooling only increase the levelized cost of electricity on the order of 5%.	OK
Pietzcker (PIK)	3	104	29	104	35	-	-	-	reference is missing	add reference
Gagnon (Hydro-Quebec)	3	105	26	-	-	-	-	-	"should read "" 45 billions"" instead of ""45 millions"". Please verify "	Luisa will rewrite whole section comments will be reviewed after that rewrite
Pietzcker (PIK)	3	105	27	-	-	-	-	-	45 billion, not million!!	OK, rewritten
Drury (NREL)	3	105	5	-	9	-	-	-	dollar year, discounted?	OK
Drury (NREL)	3	105	11	-	16	-	-	-	electrolysis?	what page?
Drury (NREL)	3	105	17	-	21	-	-	-	it is unlikely that efficiency losses in converting heat to a solar fuel, and then burning solar fuel to make heat used in a cycle that has '50% higher efficiency than Rankine cycle' is economically competitive. The niche for solar fuels is likely in tran	OK, reword
Gagnon (Hydro-Quebec)	3	106	11	-	-	-	-	-	"In light of DOE cutbacks on hydrogen R&D funding and the general slow down in the field, maybe ""hydrogen has been attracting "" is a more an exact depiction of the present situation for hydrogen around the world. "	OK
Drury (NREL)	3	106	26	-	-	-	-	-	units consistent with oil as cited above would be more useful.	reword
de Campos (Petrobras)	3	107	-	-	-	-	-	-	The figure is repeated in page 108.	OK
Rybach (Geowatt AG)	3	107	-	-	-	-	3.44	-	Figure caption is missing. It should state that the PV share of global electricity is plotted vs. time.	not sure which page/figure?
Drury (NREL)	3	107	-	-	-	-	3.44	-	this figure should probably not be here (not reference in text & mislabeled). If the fraction of energy use figure is used for PV, it should be included for CSP as well.	Luisa will rewrite whole section comments will be reviewed after that rewrite
contaldi (ISPRA, Institute for Environmental Protection and Research)	3	108	-	110	-	-	-	-	I suggest to cut all par 3.9.6 because is largely repetitive of the concept already exposed in previous para. Moreover to repeat the same figure in 3 different aspects is very strange. It seems that they need to fill up pages.	Luisa will rewrite whole section comments will be reviewed after that rewrite
Hirschhausen von (Workgroup for Economic and Infrastructure Policy)	3	108	-	108	-	-	-	-	The numbering for the first figure in section 3.9.6 is missing and there is no referencing of this figure in the section. Moreover, this figure does not contain a title on the y-axis.	Fig 3.43
Sinke (Energy research Centre of the Netherlands (ECN))	3	108	15	-	-	-	-	-	This statement may no longer be true when numbers from the aforementioned study on VLSPV is considered	Luisa will rewrite whole section comments will be reviewed after that rewrite
Drury (NREL)	3	108	-	-	-	-	3.43	-	why does the stricter CO2 level show less deployment in 2050? also, citations to studies should be included somewhere.	rewritten, add references
Drury (NREL)	3	109	15	-	-	-	-	-	'thermal solar energy' confusing with solar water & space heating. say CSP	OK
de Campos (Petrobras)	3	110	9	-	-	-	-	-	The reference must be completed.	OK

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Sinke (Energy research Centre of the Netherlands (ECN))	3	112	40	-	-	-	-	-	Add the recent Implementation Plan to the SRA, which contains some new numbers as well.	OK
de Campos (Petrobras)	3	115	29	115	30	-	-	-	The references must be completed.	OK
de Campos (Petrobras)	3	116	27	-	-	-	-	-	The reference must be completed.	OK
de Campos (Petrobras)	3	117	34	-	-	-	-	-	The reference must be completed.	OK
de Campos (Petrobras)	3	118	20	-	-	-	-	-	The reference must be completed.	OK
de Campos (Petrobras)	3	119	15	-	-	-	-	-	The reference must be completed.	OK
HERVAS JATIVA (CONELEC NATIONAL ELECTRICITY COUNCIL OF ECUADOR)	3	-	-	-	-	-	-	-	despite severe unclear environmental(land, water, biodiversity), social and health impacts, and competition with food production that will affect billions of people. (continues next line).	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.
Halme (Aalto University School of Science and Technology)	3	-	-	-	-	-	-	-	"I have expertise mainly on PV solar cell technologies. My focus in the review was on Sections 3.1 - 3.5 that were closest to my background. As a general comment, I felt the Chapter 3 rather dispersed and difficult to read. I think the main reason is	major rewriting
Piernavieja (Instituto Tecnológico de Canarias (ITC))	3	-	-	-	-	-	-	-	"It is a pity that this chapter has to be shortened (34 pages!), given its importance. I even wanted to suggest to increase the part dedicated to solar driven desalination technologies (page 26), which I consider of big interest to remote areas suffering	Noted, solar thermal has many applications, desalination is one among of that
Renne (National Renewable Energy Laboratory)	3	-	-	-	-	-	-	-	"Overall comment: the chapter seems to rely heavily on ""grey literature"" for reference material. It would be good to see more references from peer-reviewed literature such as Solar Energy Journal, Advances in Solar Energy, etc. As stated above, this c	we are addressing this
Sims (Massey University)	3	-	-	-	-	-	-	-	"Overall many old references quoted from 1990s - yet the technologies are moving fast. Reads as a bit ""tired"" so need to update refs."	we are addressing this
Smith (PNNL)	3	-	-	-	-	-	-	-	"The chapter lacks references to or discussion of the vast analytic literature on solar technologies in the energy system. Just a few relevant references include: Burch, J., Christensen, C. (2007) 'Towards Development of an Algorithm for Mains Water Tempe	Ask TSU, Luisa

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Name (Institute)	Chapter	From page	From line	To page	To line	Section	Figure	Table Info	Comments	Consideration by writing team
Vahrenholt (RWE Innogy GmbH)	3	0	-	-	-	-	-	-	"The IPCC SRREN FOD represents the current situation of the use of solar energy. Not only electricity production by PV or CSP is described, but also solar heating and cooling as well as passive and active systems for housing. The described systems include flat and vacuum collectors and also energy storage systems for these kinds of heat collectors of up to 250 °C. Several PV cell types are mentioned with their efficiencies and the thin film technology is titled as the "second generation" of PV. The current situation of CSP is presented (trough, Fresnel, tower, dishes and solar fuel production). From our point of view, the short technical descriptions are correct. The market situations for the different technologies are relying on several literature sources and appear to be more or less correct. The future outlook and evaluation also seem to describe possible scenarios and are based on Shell, Greenpeace and IEA studies. Nevertheless, we wonder why district heating and seasonal thermal storage systems are still mentioned in this kind of documentation. From our point of view, these systems are really expensive and have very low efficiencies. Solar reforming can take place in 5 to 10 years, too. Finally, we miss the future perspective for CSP."	Noted
SCOWCROFT (EURELECTRIC)	3	-	-	-	-	-	-	-	"The IPCC SRREN FOD represents the current situation of the use of solar energy. Not only electricity production by PV or CSP is described, but also solar heating and cooling as well as passive and active systems for housing. The described systems include flat and vacuum collectors and also energy storage systems for these kinds of heat collectors of up to 250 °C. Several PV cell types are mentioned with their efficiencies and the thin film technology is titled as the "second generation" of PV. The current situation of CSP is presented (trough, Fresnel, tower, dishes and solar fuel production). From our point of view, the short technical descriptions are correct. The market situations for the different technologies are relying on several literature sources and appear to be more or less correct. The future outlook and evaluation also seem to describe possible scenarios and are based on Shell, Greenpeace and IEA studies. Nevertheless, we wonder why district heating and seasonal thermal storage systems are still mentioned in this kind of documentation. From our point of view, these systems are really expensive and have very low efficiencies. Solar reforming can take place in 5 to 10 years, too. Finally, we miss the future perspective for CSP."	Noted.
de Campos (Petrobras)	3	-	37	-	-	-	-	-	"There is a "MW" missing in the installed capacity of Japan."	where?
Hirschhausen von (Workgroup for Economic and Infrastructure Policy)	3	-	-	-	-	-	-	-	"This chapter does not discuss the "solar chimney" (updraft tower) technology. I recommend to add this technology."	One statement by Wes
Smith (PNNL)	3	-	-	-	-	-	-	-	"This is often overly verbose and non-technical. Too much of the chapter is purely descriptive of the various technologies. This material is readily accessible elsewhere and can be cut back to a few pages, focusing instead on recent developments. The chap	rewriting

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Darras (GDF SUEZ)	3	-	-	-	-	-	-	-	3.3.1: Further element of passive solar architecture can be found in: Alain Liebard, Andr�e Herde, Trait??architecture et d?urbanisme bioclimatiques. Le Moniteur. Paris 2005. Such approach introduces a more global view than only the solar technology in or	OK
Jennings (Murdoch University)	3	-	-	-	-	-	-	-	a comparison of the cost trends of PV and CST including external costs, with grid electricity from conventional sources would be useful to gauge their potential impact on the market or what subsidies may be needed	Noted, to be dealt in CH. 10
Gagnon (Hydro-Quebec)	3	-	-	-	-	-	-	-	A portion of this chapter is dedicated at showing that the future belongs to a hydrogen economy. To arrive at such a conclusion, it is essential to analyse many options and their performance in terms of energy storage and energy distribution. This cannot	To be rewritten by Luisa
Twidell (AMSET Centre)	3	-	-	-	-	-	-	-	CHAPTER TITLE The word 'Direct' needs explanation, especially as in buildings 'direct, and therefore indirect, solar' is used differently. The difficulty arises because in the USA all renewables tend to be called 'solar', whereas elsewhere 'solar' means	To be defined in glossary
Philibert (International Energy Agency)	3	-	-	-	-	-	-	-	Direct solar represents the largest renewable energy resources by several orders of magnitude and includes three technology areas - solar heating and cooling, photovoltaics and concentrating solar power (and fuels), which are each very important. Therefor	I assume he wants to say that the additional pages over the target/limit are justified??, Ask TSU
Woyte (3E sa)	3	-	-	-	-	-	-	-	For PV, the system aspects and balance of system components have not been covered sufficiently. See Chapter 7 Wind energy, where much more effort has been spent into the wind turbine/farm as an energy conversion system rather than on technology and componen	Roberto will provide a short para
HERVAS JATIVA (CONELEC NATIONAL ELECTRICITY COUNCIL OF ECUADOR)	3	-	-	-	-	-	-	-	I recommend better balance between the afirmations about the use of the bioenergy resources in developed and developing countries because the developed countries are responsible of huge part of the CO2 emissions. In teother hand teh emissions/ per capita	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.
Pietzcker (PIK)	3	-	-	-	-	-	-	-	In general, the report has much improved since the zero order draft. However, many changes need to be made, and most of the text could be shortened by reducing redundancies and 'commonplaces'	being done
Takeuchi (Advanced Industrial Science and Technology)	3	-	-	-	-	-	-	-	is very important, but this chapter contains too much technologies which is still under researching. Authors should write more feasible technologies for the actual use. And, the volume of this chapter should be reduced by half.	Will be shortened, PV-Arnulf and Dan, Thermal-low temp - Terry, Thermochemical - Wes, Passive solar -Terry
Raturi (The university of South Pacific)	3	-	-	-	-	-	-	-	It would be nice to have some coverage of stand alone solar systems being used in say Pacific Island Countries for rural electrification.	Already covered in general terms
HERVAS JATIVA (CONELEC NATIONAL ELECTRICITY COUNCIL OF ECUADOR)	3	-	-	-	-	-	-	-	Many data used in the Chapter dont have any reference	fixing this

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HERVAS JATIVA (CONELEC NATIONAL ELECTRICITY COUNCIL OF ECUADOR)	3	-	-	-	-	-	-	-	Maybe the apparent solution have very high hidden cost than the aparent GHG reduction and its supposed net contribution in the mitigation of Climate Change. I recommend include some of this key point in 2.8.6	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.
de Haan (Ernst Basler + Partner AG)	3	-	-	-	-	-	-	-	No comments from this expert to chapter 3 bioenergy	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.
Kutscher (National Renewable Energy Laboaratory)	3	-	-	-	-	-	-	-	One reason this chapter is so long is that different sections are repetitive of each other. Consider decreasing the number of main sections and combining them. I recommend decreasing the amount of material on passive solar. This should be part of good bui	rewriting
Kyte (E.ON AG)	3	-	-	-	-	-	-	-	Overall, great content specially in the technical aspects. In the commercial aspects the focus is good but more analysis and depth would be great	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.
Dunn (GE Energy)	3	-	-	-	-	-	-	-	Solar PV integration and CSP transmission needs deserve mention in the ES and internal text, even if they are treated more at length in Chapter 9.	This is an integration issue
Dunn (GE Energy)	3	-	-	-	-	-	-	-	Suggestions for shortening chapter: remove overlap, tighten 3.4 (long on CSP, esp. project list), compress 3.8-9.	rewriting
HERVAS JATIVA (CONELEC NATIONAL ELECTRICITY COUNCIL OF ECUADOR)	3	-	-	-	-	-	-	-	The Chapter attempt to convince the lector how the intensive use of new bioenergy technologies is a good alternative to the world for CO2 abatment (continues next line).	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.
Woyte (3E sa)	3	-	-	-	-	-	-	-	The chapter is often very detailed providing a large amount of factual and referenced data. In view of the request from the TSU to shorten it, some detail may be omitted.	rewriting
contaldi (ISPRA, Institute for Environmental Protection and Research)	3	-	-	-	-	-	-	-	The chapter is well done and quite interstinf to read in the first para (1-6). The latter part is repetitive and not always clear, partially also because the scope is quite ambitious.	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.
Philibert (International Energy Agecy)	3	-	-	-	-	-	-	-	Very good part on passive solar heating and cooling	well alright!
Renne (National Renewable Energy Laboratory)	3	-	-	-	-	3.2	-	-	Overall comments (some already provided): the potentials section is much less complete than comparable sections in the other chapters. Sections 3.1 and 3.2 need to draw on many references that are not mentioned here, and need to discuss in detail more r	Valentin, Terry and potential CA to review and rewrite section

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Halme (Aalto University School of Science and Technology)	3	-	-	-	-	3.2.2	-	-	"The sections 3.2.2.1 and 3.2.2.2 should be shortened considerably. They contain data source descriptions that are not useful for the average reader. The user needs, the type of data and their sources should be listed with references in a compact way (M	Valentin, Terry and potential CA to review and rewrite section
Pietzcker (PIK)	3	-	-	-	-	3.3	-	-	boldly state the main message at the beginning (end of line 4): 'These technologies show different levels of maturity and economic competitiveness. Some solar technologies (e.g. solar hot water, passive solar) are being deployed at scale today in some cou	OK
Renne (National Renewable Energy Laboratory)	3	-	-	-	-	3.3.1	-	-	"To repeat an earlier comment: Section 3.2 needs to reflect more the applicaton of passive technologies, and provide relevant data sources (such as TMY's and daylighting data) for these technologies. Currently 3.2.2.2 and 3.2.2.3 tend to focus more on	Luisa, Arnul, Wes and Dan will rewrite sections
Renne (National Renewable Energy Laboratory)	3	-	-	-	-	3.3.1	-	-	Overall, a very well-written section. Do the examples shown in this section provide the most relevant and highest priority passive design capabilities? It appears so, but worth checking one more time.	rewritten
Pietzcker (PIK)	3	-	-	-	-	3.3.2 .1.1. 1	-	-	Later (3.4.1.2) the text uses the 3 differentiations 'unglazed', 'flat-plate' and 'evacuated-tube' collectors. Here the differentiation is not so clear ? the term 'absorber' is used in fig. 3.7., and the subheadings only say 'flat-plate' and 'evacuated-tu	OK
Halme (Aalto University School of Science and Technology)	3	-	-	-	-	3.3.2 .1.2	-	-	"This section is too technical as it is. At least, please explain in lay-mans terms what is ""sorption""."	Luisa, Arnul, Wes and Dan will rewrite sections
de Campos (Petrobras)	3	-	-	-	-	3.3.2 .1.2	-	-	Lack of references	??
de Campos (Petrobras)	3	-	-	-	-	3.3.2 .1.3	-	-	Lack of references	??
Halme (Aalto University School of Science and Technology)	3	-	-	-	-	3.3.2 .1.4	-	-	"The title of this section is ""Direction of research"", yet the text discusses ""design options"", and it is not clear what the research problems are. For example, ""The use of flat-plate collectors for residential and commercial hot water"" is a well-	Luisa, Arnul, Wes and Dan will rewrite sections
Pietzcker (PIK)	3	-	-	-	-	3.3.2 .1.4	-	-	move this section to 3.7.2	Luisa, Arnul, Wes and Dan will rewrite sections
Kutscher (National Renewable Energy Laboratory)	3	-	-	-	-	3.3.2 .2	-	-	An important technology left out is the transpired air collector used for ventilation air preheat and drying applications. The biggest producer is Conserval out of Canada which markets it at the Solarwall. There are numerous papers in the literature by Ku	Luisa, Arnul, Wes and Dan will rewrite sections

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de Campos (Petrobras)	3	-	-	-	-	3.3.2 .2	-	-	Lack of references.	??
Driesen (K.U.Leuven)	3	-	-	-	-	3.3.3 .1	-	-	"In this chapter, the whole PV-chain (cell to grid) should be mentioned: the modules are mentioned, but no word on the necessary PV-converters and their function, efficiency; only in the applications section there is a brief hint."	Luisa, Arnul, Wes and Dan will rewrite sections
Pietzcker (PIK)	3	-	-	-	-	3.3.3 .2	-	-	talk about land requirement somewhere ? what are average land use factors (m ² /kW _{peak})?	Luisa, Arnul, Wes and Dan will rewrite sections
de Campos (Petrobras)	3	-	-	-	-	3.3.3 .2.1	-	-	Lack of references.	??
Philibert (International Energy Agency)	3	-	-	-	-	3.3.3 .2.3	-	-	"Maybe this is where some complementarities between solar thermal heat and distributed PV could be discussed. For example, they are often perceived as competing for available space on roofs; however, PV is best suited for roofs, getting more sun in summer"	what page??
Halme (Aalto University School of Science and Technology)	3	-	-	-	-	3.3.3 .2.3	-	-	This section seems disconnected from the other text and also internally fuzzy. Consider deleting the section altogether.	Luisa, Arnul, Wes and Dan will rewrite sections
de Campos (Petrobras)	3	-	-	-	-	3.3.4 .1	-	-	Lack of references.	??
de Campos (Petrobras)	3	-	-	-	-	3.3.4 .2	-	-	Lack of references.	??
de Campos (Petrobras)	3	-	-	-	-	3.3.5 .1	-	-	Lack of references.	??
Hirschhausen von (Workgroup for Economic and Infrastructure Policy)	3	-	-	-	-	3.3.5 .1.1	-	-	A single subsection does not make sense. At least two different subsections should be given in section 3.3.5.1.	Luisa, Arnul, Wes and Dan will rewrite sections
Philibert (International Energy Agency)	3	-	-	-	-	3.3.5 .1.1	-	-	Solar-assisted reforming is not the only way to produce hydrogen from concentrating solar. At temperature levels above 1200°C, two-step cycles using reversible reduction-oxidation (redox) reactions can be used. They offer interesting properties, inasmuch	OK
Philibert (International Energy Agency)	3	-	-	-	-	3.3.5 .1.2	-	-	Several important ways to using solar fuels seems missing from this description - and to begin with, the mere blending of hydrogen in natural gas, thereby using existing infrastructure for long-range transportation, storage, distribution and final use. Up	Luisa, Arnul, Wes and Dan will rewrite sections
Pietzcker (PIK)	3	-	-	-	-	3.4.	-	-	"add a subsection 3.4.3 'policies/barriers to market development' with some information on how the current market status was hindered/promoted through barriers or policies; such as problems with standardization, bureaucracy, subsidies/feed-in tariffs/quot	Luisa, Arnul, Wes will review and rewrite sections
Pietzcker (PIK)	3	-	-	-	-	3.4.1 .2	-	-	as commented in section 3.3.2.1.1.1.: if you use 'unglazed' here, you need to introduce this term in 3.3.2.1.1.1.	OK

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Pietzcker (PIK)	3	-	-	-	-	3.4.1 .2	-	-	combine table 3.4. and figure 3.20 into one figure or one table.	Luisa, Arnulf, Wes will review and rewrite sections
de Campos (Petrobras)	3	-	-	-	-	3.4.1 .2	-	-	Lack of references.	??
Pietzcker (PIK)	3	-	-	-	-	3.4.1 .2	-	-	most of the numbers are from 2007 ? aren't there some newer ones from 2008? then it would be possible to extend figure 3.18 to 2008 and delete figure 3.19	trying to update
Pietzcker (PIK)	3	-	-	-	-	3.4.1 .2	-	-	this section is too long ? try shortening. e.g., don't discuss as many European countries.	Luisa, Arnulf, Wes will review and rewrite sections
Pietzcker (PIK)	3	-	-	-	-	3.4.1 .2	-	-	you always state power (MW, GW), which is interesting for the installations. It would also be interesting to have some numbers on energy (Mwh) ? how much of the total current (domestic) heat energy is supplied by solar water heaters? What capacity factor	what page??
Pietzcker (PIK)	3	-	-	-	-	3.4.1 .3	-	-	maybe update to 2009 numbers? Not very necessary, but would be nice.	OK, adding data
de Campos (Petrobras)	3	-	-	-	-	3.4.1 .4	-	-	Lack of references.	??
de Campos (Petrobras)	3	-	-	-	-	3.4.2	-	-	Lack of references.	??
Pietzcker (PIK)	3	-	-	-	-	3.4.2	-	-	except for the part about polysilicon (and to some extent 3.4.2.2. as well as parts of the PV and CSP section), this section does not fulfill the expectations raised by the heading. I would expect information about the current industry status (few large	Luisa, Arnulf, Wes will review and rewrite sections
Pietzcker (PIK)	3	-	-	-	-	3.4.2 .1.2	-	-	Most of this information would be interesting in 3.3.1, but not here ? this section is supposed to be about industry capacity and supply chain, not what the advantages or tradeoffs for double insulation are. I am completely missing any useful information	Luisa, Arnulf, Wes will review and rewrite sections
Pietzcker (PIK)	3	-	-	-	-	3.4.2 .1.3	-	-	how many/what are the companies involved? Are any special materials requirede for PCMs which might be scarce? What is the current industry capacity, can it be scaled up?	what page??
Philibert (International Energy Agecy)	3	-	-	-	-	3.4.2 .2.	-	-	"This very eurocentric subsection completely ignores solar heat for agro-industry and industry processes, which can be used throughout the world, notably the developing world (in India, it's being used for large-scale cooking, textile industry, dairies, f	Luisa, Arnulf, Wes will review and rewrite sections
Pietzcker (PIK)	3	-	-	-	-	3.4.2 .2.	-	-	this section manages much better than the previous sections to give information about the production and technology status. What is still missing is any information about the market ? are there a few or many companies producing collectors? Are there any b	Luisa, Arnulf, Wes will review and rewrite sections
Pietzcker (PIK)	3	-	-	-	-	3.4.2 .3	-	-	I am not sure if I understand correctly ? is the split between 3.4.2.3.1-3.4.2.3.4 supposed to be according to the production chain, thus 1 deals with the cell manufacture itself, while 2 deals with the modules? If yes (which I would find logical), why ar	Luisa, Arnulf, Wes will review and rewrite sections

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Pietzcker (PIK)	3	-	-	-	-	3.4.2 .3.2	-	-	(see earlier comment on 3.4.2.3) I would cut the 'wafer-based silicon cell' from the heading and the text ? don't you already talk about the cells in 3.4.2.3.1? then, this section would be focusing on the next part of the production chain, the modules, ma	Luisa, Arnulf, Wes will review and rewrite sections
Pietzcker (PIK)	3	-	-	-	-	3.4.2 .4	-	-	I am missing a subsection/paragraph on storage ? what about the industry required for thermal storage? I heard that the salts required for storage may soon be a bottleneck.	Luisa, Arnulf, Wes will review and rewrite sections
Pietzcker (PIK)	3	-	-	-	-	3.5	-	-	This section is not really satisfying. The main problem/question of integration of solar electricity into the energy system is 'intermittence/variability' and the resulting needs for storage, demand side management and larger spatial interconnection. This	To be taken care of by Chapter 8
Halme (Aalto University School of Science and Technology)	3	-	-	-	-	3.5.2	-	-	"This section is poorly written and seems to be internally conflicting. It does not appear what is the pursopse of this section in the first place. Is the question: wheter small solar energy systems are needed or not? The section seems to be discussing	Charles to review and add references
de Campos (Petrobras)	3	-	-	-	-	3.5.2	-	-	Lack of references.	??
Pietzcker (PIK)	3	-	-	-	-	3.5.2	-	-	some interesting points, but could be improved	what page??
de Campos (Petrobras)	3	-	-	-	-	3.5.3 .2	-	-	Lack of references.	??
Pietzcker (PIK)	3	-	-	-	-	3.5.3 .2	-	-	this section completely lacks references. What is the land used per kWh_el for biomass and for solar electricity? Electricity from solar thermal (aka CSP) requires direct beam, thus it is not usable in areas whith heavy cloud cover ? in such area it is pr	Wes to review and include appropriately in CSP (Michael will review low temp) Luisa will include
Pietzcker (PIK)	3	-	-	-	-	3.5.4	-	-	this section touches the right points, but it does not deliver. What are the results of the studies quoted? Figure 3.31 does not help to clarify the topic.	Arnulf will contact chpt 8 and ensure it is updated
El-Hinnawi (National Research Centre)	3	-	-	-	-	3.6.1 .1	-	-	delete	Dan to shorten
Halme (Aalto University School of Science and Technology)	3	-	-	-	-	3.6.1 .2	-	-	"The text in this section does not match with the upper section title (Environmental impacts). Remove or relocate to the ""social impacts""."	Luisa will review and edit
Halme (Aalto University School of Science and Technology)	3	-	-	-	-	3.6.1 .6.	-	-	Text missing	what page??
Pietzcker (PIK)	3	-	-	-	-	3.6.2	-	-	introduce subsections: 'off-grid PV electricity', 'solar cooking', maybe 'solar desalination'	what page??
Pietzcker (PIK)	3	-	-	-	-	3.7.3 .1	-	-	I would like to see some more sentences on the technologies being deployed over the next 5-10 years ? the 'emerging' technologies, not only the 'novel' ones.	OK

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de Campos (Petrobras)	3	-	-	-	-	3.7.3 .1.3	-	-	Lack of references.	??
Pietzcker (PIK)	3	-	-	-	-	3.7.4	-	-	these sections are quite ok, but they are missing a subsection 'storage' (and maybe 'water desalination'.	what page??
de Campos (Petrobras)	3	-	-	-	-	3.7.4 .1	-	-	Lack of references.	??
de Campos (Petrobras)	3	-	-	-	-	3.7.5	-	-	Lack of references.	??
Hirschhausen von (Workgroup for Economic and Infrastructure Policy)	3	-	-	-	-	3.7.5	-	-	The subsections 3.7.5.1 to 3.7.5.5 are not necessary and its content should be given in bullet points instead.	Wes will review and edit
Drury (NREL)	3	-	-	-	-	3.8	-	-	all costs should be given in the same dollar year, and that dollar year should be cited.	OK
Drury (NREL)	3	-	-	-	-	3.8	-	-	If possible, it would be good to cite technology cost projections for multiple sources.	OK
Pietzcker (PIK)	3	-	-	-	-	3.8.1 .1	-	-	it would be good to have more than 1 reference for the costs	what page??
de Campos (Petrobras)	3	-	-	-	-	3.8.1 .1	-	-	Lack of references.	??
Pietzcker (PIK)	3	-	-	-	-	3.8.2	-	-	this section has to few references, almost none of the figures has a reference.	fixing
Pietzcker (PIK)	3	-	-	-	-	3.8.4	-	-	it does not make sense to give any cost numbers for CSP plants without stating the capacity factors or storage hours or solar multiples for the plant that is described! Please add this necessary bit of information!	OK
de Campos (Petrobras)	3	-	-	-	-	3.8.4	-	-	Lack of references.	??
de Campos (Petrobras)	3	-	-	-	-	3.8.5	-	-	Lack of references.	??
Pietzcker (PIK)	3	-	-	-	-	3.8.5	-	-	the costs stated in this section all need a reference!	OK
Halme (Aalto University School of Science and Technology)	3	-	-	-	-	3.9.3 .2	-	-	Text missing	what page??
Hirschhausen von (Workgroup for Economic and Infrastructure Policy)	3	-	-	-	-	3.9.4	-	-	Discussing DLR (2006) and the integration of large CSP capacities in the electricity grid, this section should also contain plans for the US. See Fthenakis et al (2009): The technical, geographical, and economic feasibility for solar energy to supply the	OK
Pietzcker (PIK)	3	-	-	-	-	3.9.6	-	-	which studies where used to create the figures? A reference list is missing.	what page??

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Halme (Aalto University School of Science and Technology)	3	-	-	-	-	-	3.1	-	"Reference to the data in the figures is missing. Also, being this small, these two figures give only qualitative feeling of the distribution of solar energy. Enlarge the figures to make them more useful as a source of rough reference data in national lev	what page??
Hirschhausen von (Workgroup for Economic and Infrastructure Policy)	3	-	-	-	-	-	3.17	-	reference missing	??
Pietzcker (PIK)	3	-	-	-	-	-	3.24	-	again: this figure belongs to section 3.3.1, not to industry/production	what page??
Hirschhausen von (Workgroup for Economic and Infrastructure Policy)	3	-	-	-	-	-	3.24	-	improve readability of the bubbles	what page?? Probably being deleted
Pietzcker (PIK)	3	-	-	-	-	-	3.27	-	use GW, not MW	what page??
Philibert (International Energy Agency)	3	-	-	-	-	-	3.28	-	This figure is outdated. It misses, in particular, Acciona solar, eSolar and SolarReserve. eSolar has contracted for 500 MW solar towers in the USA, 1 GW in India and 2 GW in China. Solar Reserve has contracted two solar towers plants in Nevada (100-MW),	deleted figure, Wes will rewrite section
Halme (Aalto University School of Science and Technology)	3	-	-	-	-	-	3.29	-	"I express a major concern about this figure. As far as I can see, it places individual CSP project and companies into a relative order of maturity of their technology. Appearing in the IPCC report, this information may have significant commercial value	Figure deleted, Wes will rewrite section
Hirschhausen von (Workgroup for Economic and Infrastructure Policy)	3	-	-	-	-	-	3.29	-	reference missing	??
Halme (Aalto University School of Science and Technology)	3	-	-	-	-	-	3.30	-	Remove this figure as it appears nicely already in figure 3.23	Terry to Delete figure
Pietzcker (PIK)	3	-	-	-	-	-	3.31	-	delete. There should exist some clearer figure to make the point 'combining several systems reduces variability'. Figure is also missing a reference	Michio will delete and replace with new figure
Hirschhausen von (Workgroup for Economic and Infrastructure Policy)	3	-	-	-	-	-	3.31	-	translate skript at the bottom line of the chart in English	deleted figure
Pietzcker (PIK)	3	-	-	-	-	-	3.33	-	reference missing, use better quality figure	??
Pietzcker (PIK)	3	-	-	-	-	-	3.34	-	reference missing, use better quality figure	??
Pietzcker (PIK)	3	-	-	-	-	-	3.35	-	the numbers in table 3.14 and in figure 3.35 do not fit together (e.g.: central europe today: 7-16 vs 7-24 in figure). Check which numbers are correct and then use only either the figure or the table, delete the other.	check facts
Pietzcker (PIK)	3	-	-	-	-	-	3.37	-	isn't there a newer graph showing the development until 2009?	what page??
de Campos (Petrobras)	3	-	-	-	-	-	3.38	-	All numbers and words are not readable.	OK

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Pietzcker (PIK)	3	-	-	-	-	-	3.38	-	bad quality ? it is impossible to read the numbers.	redrawn
Rosinski (Electric Power Research Institute)	3	-	-	-	-	-	3.38	-	Figure is unclear	redrawn
Hirschhausen von (Workgroup for Economic and Infrastructure Policy)	3	-	-	-	-	-	3.38	-	Figure unreadable.	redrawn
Halme (Aalto University School of Science and Technology)	3	-	-	-	-	-	3.38	-	Unclear figure	what page??
P?lv?lgyi (Budapest University of Technology and Economics)	3	-	-	-	-	-	3.4.1.	-	"The basic assumptions of these scenarios ((growth in solar thermal energy use) should be described briefly." "	OK
Drury (NREL)	3	-	-	-	-	-	3.40	-	need citation for this figure. It is surprising that tower systems are more expensive than trough in 2030. Would be better to cite multiple future cost projections.	what page??
Hirschhausen von (Workgroup for Economic and Infrastructure Policy)	3	-	-	-	-	-	3.40	-	No reference to Fig. 3.40 given in the text and for Fig. 3.40 no reference (source) is given.	OK
Pietzcker (PIK)	3	-	-	-	-	-	3.40	-	reference is missing. What year US-cts are depicted? (needs to be recalibrated to 2005 US-cts!)	OK
Hirschhausen von (Workgroup for Economic and Infrastructure Policy)	3	-	-	-	-	-	3.42	-	"Reference given in the figure is insufficient (""Source: PSI"")."	OK
de Campos (Petrobras)	3	-	-	-	-	-	3.42	-	Lack of reference.	?? We are adding references throughout the chapter
Pietzcker (PIK)	3	-	-	-	-	-	3.42	-	this figure should be put in 3.3.5, not here!	what page??
de Campos (Petrobras)	3	-	-	-	-	-	3.43	-	Lack of reference.	??
Pietzcker (PIK)	3	-	-	-	-	-	3.43	-	what percentile is given by the thick bars, what percentile is given by the dashed lines?	?? Figure deleted
de Campos (Petrobras)	3	-	-	-	-	-	3.44	-	Lack of reference.	??
Pietzcker (PIK)	3	-	-	-	-	-	3.44	-	this figure is printed twice.	what page??
de Campos (Petrobras)	3	-	-	-	-	-	3.45	-	Lack of reference.	??
Hirschhausen von (Workgroup for Economic and Infrastructure Policy)	3	-	-	-	-	-	3.5	-	reference missing	??
Kutscher (National Renewable Energy Laboratory)	3	-	-	-	-	-	3.7	-	The y-axis for a collector efficiency curve is usually the difference between collector (or inlet fluid) temperature and ambient with that quantity dividing by the solar radiation, i.e., $\Delta T/I$	OK
de Campos (Petrobras)	3	-	-	-	-	-	3.7	-	There should be numbers in the x-axis.	OK

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Hirschhausen von (Workgroup for Economic and Infrastructure Policy)	3	-	-	-	-	-	3.8	-	reference missing	??
Hirschhausen von (Workgroup for Economic and Infrastructure Policy)	3	-	-	-	-	-	3.9	-	reference missing	??
Halme (Aalto University School of Science and Technology)	3	-	-	-	-	-	-	3.1	"I think the data in this table is not very useful in practice as it does not render itself to estimating the technical potential in national level. Replace the GWh/a data with average GWh/a/km ² , and add a column representing the total land area used in	what page??
Pietzcker (PIK)	3	-	-	-	-	-	-	3.1	use TWh or Pwh	what page??
Halme (Aalto University School of Science and Technology)	3	-	-	-	-	-	-	3.10	"Replace: ""six"" with ""five"" in the table legend"	what page??
Hirschhausen von (Workgroup for Economic and Infrastructure Policy)	3	-	-	-	-	-	-	3.10	reference missing	??
Pietzcker (PIK)	3	-	-	-	-	-	-	3.10	this table requires some explanation, and should be shortened. What is the difference between the different plants? Why is C.R cheaper than LS3, although it has a higher capacity and lower insolation? Why are the balance of plant values 0 for the purely C	deleted table
Hirschhausen von (Workgroup for Economic and Infrastructure Policy)	3	-	-	-	-	-	-	3.11	Does this table summarize the expectations from the references in the previous paragraphs? Are the projected developments the author's (concluded) derivations of possible technology trajectories? Please give some information how you derive the possible sc	what page??
de Campos (Petrobras)	3	-	-	-	-	-	-	3.11	Lack of reference.	??
de Campos (Petrobras)	3	-	-	-	-	-	-	3.12	Lack of reference.	??
Rosinski (Electric Power Research Institute)	3	-	-	-	-	-	-	3.13	"Last line of table (dish), second column (5 years), add ""Demonstration of thermal energy storage"". Infinia is planning to demonstrate phase change material located in the head of the receiver in 2010."	deleting table
de Campos (Petrobras)	3	-	-	-	-	-	-	3.13	Lack of reference.	??
de Campos (Petrobras)	3	-	-	-	-	-	-	3.14	Lack of reference.	??
Pietzcker (PIK)	3	-	-	-	-	-	-	3.14	reference is missing	?? We are adding references throughout the chapter
de Campos (Petrobras)	3	-	-	-	-	-	-	3.15	Lack of reference.	??
Pietzcker (PIK)	3	-	-	-	-	-	-	3.15	what are typical system efficiencies?	what page??
de Campos (Petrobras)	3	-	-	-	-	-	-	3.16	Lack of reference.	??
Pietzcker (PIK)	3	-	-	-	-	-	-	3.16	What does 'solar fraction' and 'solar utilization' mean? What does 'DHW' stand for?	?? Figure deleted

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Halme (Aalto University School of Science and Technology)	3	-	-	-	-	-	-	3.2	"The ""Solar Fraction (%)"" is not defined in the text nor in the table legend."	deleted table
Rosinski (Electric Power Research Institute)	3	-	-	-	-	-	-	3.21	DOE will be issuing a Solar Vision study in April 2010. If IPCC report is not final, suggest incorporating growth curves from this study	Luisa will consider in rewrite of section
de Campos (Petrobras)	3	-	-	-	-	-	-	3.3	Lack of reference.	??
Hirschhausen von (Workgroup for Economic and Infrastructure Policy)	3	-	-	-	-	-	-	3.3	reference missing	??
Ogimoto (The University of Tokyo)	3	-	-	-	-	-	-	3.3	The conversion efficiency is a very important index of the technology. The graph of time vs efficiency should be included for various types of PV cells to understand the development history.	Can't resolve need clarification of Table 3.3 issue from reviewer
Halme (Aalto University School of Science and Technology)	3	-	-	-	-	-	-	3.32	This figure can be removed, since the main thigs are covered in the text.	what page??
Hirschhausen von (Workgroup for Economic and Infrastructure Policy)	3	-	-	-	-	-	-	3.5	"Wikipedia is not a reference that is admitted in the scientific community; thus, another reference than Wikipedia is necessary. I suggest Greenpeace International et al. (2009): CSP Outlook 09. See Appendix 1 for a current overview of existing and planne	deleted table
MANNEH (MINISTRY OF FINANCE AND ECONOMIC AFFAIRS)	3	-	-	-	-	-	-	3.5	Adjust the table to fit on one page if possible.	what page??
de Campos (Petrobras)	3	-	-	-	-	-	-	3.5	Another reference should be used, instead of Wikipedia. I suggest the SolarPaces website, http://www.nrel.gov/csp/solarpaces .	deleted table
Halme (Aalto University School of Science and Technology)	3	-	-	-	-	-	-	3.5	Delete the table. It is not necessary to list individual CSP power stations. Mention the key ones in the text only.	deleted
MANNEH (MINISTRY OF FINANCE AND ECONOMIC AFFAIRS)	3	-	-	-	-	-	-	3.6	Adjust the table to fit on one page if possible.	what page??
de Campos (Petrobras)	3	-	-	-	-	-	-	3.6	Another reference should be used, instead of Wikipedia. I suggest the SolarPaces website, http://www.nrel.gov/csp/solarpaces .	deleted table
Halme (Aalto University School of Science and Technology)	3	-	-	-	-	-	-	3.6	Delete the table. It is not necessary to list individual CSP power stations. Mention the key ones in the text only.	deleted
Hirschhausen von (Workgroup for Economic and Infrastructure Policy)	3	-	-	-	-	-	-	3.6	see comment on table 3.5	??
SCOWCROFT (EURELECTRIC)	3	-	-	-	-	-	-	3.6	There is not any project called Andasol 4. Probably, the new list with preregistered projects in Spain, released in December 2009, would provide accurate data.	deleted table

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Vahrenholt (RWE Innogy GmbH)	3	-	-	-	-	-	-	3.6	There is not any project called Andasol 4. Probably, the new list with preregistered projects in Spain, released in December 2009, would provide accurate data.	deleted table
Pietzcker (PIK)	3	-	-	-	-	-	-	3.7	delete. these are just general results, not at all linked to solar technologies.	what pages??
Pietzcker (PIK)	3	-	-	-	-	-	-	3.9	write something to explain the results you quote ? why are todays costs for CSP so high, why are there no land use figures for CSP?	what page??