IPCC Fourth Assessment Report

Expert Review of the First-Order Draft

Chapter 7

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
7-1	A	0	0			Consistency should be maintained in the use of "aluminum" or "aluminium" throughout the chapter (Robert Chase, International Aluminium Institute)	Accepted - LB to ensure in editing. Will use "aluminium."
7-2	A	0	0			This chapter gives a good description of technologies but there is need of more assessment expecially in the area of costs as well as comparing what has happened since the TAR with some of the technologies. (John Kessels, Energy Research Centre of the Netherlands)	Noted - We acknowledge the lack of information on costs, but we have been unable to find much literature on the subject. The chapter team will make finding such literature a priority in the development of the SOD.
7-3	A	0	0			Prescriptive languages and opinions are in the text (John Kessels, Energy Research Centre of the Netherlands)	Noted – We will respond to any specific examples in comments,. most of which are in Executive Summary. LB and JR responsible.
7-4	A	0	0			More assessment of costs of technology is needed in comparison with existing technology (John Kessels, Energy Research Centre of the Netherlands)	Noted - We acknowledge the lack of information on costs, but we have been unable to find much literature on the subject. The chapter team will make finding such literature a priority in the development of the SOD.
7-5	A	0	0			It might help to have a CA involved in CDM and JI in the industry related area. (John Kessels, Energy Research Centre of the Netherlands)	Noted - Idea will be evaluated. LB/JR responsible.
7-6	A	0	0			I suggest using the IEA publication entitled Oil, Crises & Climate Challenges: 30 years of Energy Use in IEA Countries which as some excellent analysis on manufacturing trends (John Kessels, Energy Research Centre of the Netherlands)	Noted - LP to evaluate in development of the SOD.
7-7	A	0	0			A very useful review of all pollutants and industries. (Mohan Munasinghe, Munasinghe Institute for Development (MIND))	Noted. No action required
7-8	A	0	0			COMMENT: When referring to pulp and paper in the industry, most commonly, the word "pulp"comes first as in "pulp and paper"and "pulp, paper"This order should be adopted in the chapter where currently "pulp" comes after "paper"(for example, p1-26,P2-38,P4-49,P4-52,P10-36,P22-52,P23-5,6,19,26,33,37, P30-44) (MASAHIRO NISHIO, Ministry of Economy, Trade and Industry)	Accepted - LB will correct in editing.
7-9	A	0	0			COMMENT: regarding "Milling"in "and Milling" as in P1-26□P4-footnote2□7.4.5: The word generally refers to flour-milling industry. In a broad sense, it could mean a facility (of flour-milling or paper manufacturing). In either meaning, the necessity of the reference to "Milling"here is unclear and should be deleted. Reasons are: If "Milling"was supposed to mean the former, it would not make sense because there is no description on the flour milling industry in the chapter; If it was supposed to mean the latter, it would be unnecessary and	Accepted - Milling in this context means the production of board lumber. The term was added in response to a comment on the ZOD. However, since there is nothing in the text about the production of lumber, the term will be dropped and the section will be renamed Pulp and Paper. LB will change in editing.

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						irrelevant to put the word in the title of 7.4.5 as well as in the chapter. (MASAHIRO NISHIO, Ministry of Economy, Trade and Industry)	
7-10	A	0	0			If I'm not mistaken, it is not reflected in the executive summary that so far, emission reductions in the industry sector have not hurt the economies of Annex I countries at the micro or macro level and that the assessment by industry is that overall, reducing GHG emissions increased their competitiveness instead of decreasing it as feared by many before the adoption of emission reduction policies. A reference for that is Brown (2004), Chief executive of BP, who writes in Foreign Affairs: "Counter intuitively, BP found that it was able to reach its initial target of reducing emissions by 10% below its 1990 levels without cost. Indeed, the company added around $650 million of shareholder value, because the bulk of the reductions came from the elimination of leaks and waste. Other firms -- such as electricity generator Entergy, car manufacturer Toyota, and mining giant Rio Tinto -- are having similar experiences. The overwhelming message from these experiments is that efficiency can both pay dividends and reduce emissions. Other Industry data may confirm this assessment but I do not have other reference to suggest. Chapter 11 refers to cost estimates. However, it would be relevant to refer to the negligible to negative observed cost felt so far by the industry in Chapter 7 itslef as well. (Philippe Tulkens, TERI School of Advanced Studies)	Noted – Most of the actions taken by industry prior to the imposition of GHG regulations to meeting Kyoto Protocol targets were "no regrets" measures, most of which had little or no cost. This experience while valid does not predict future costs. LB will acknowledge this "no-regrets" experience in the rewrite of Section 7.5.
7-11	A	0	0			How is emissions trading addressed in the chapter? Point also made the chapter was negative about CDM and JI where there was also a lot of literature that is positive on JI and CDM. Chapter also needs to recognise that CDM, JI and ET are separate tools. (Capetown Industry Expert Meeting, Industry)	Noted - True emissions trading systems, e.g. the EU ETS are just being implemented. We expect more information to be available on impacts for the SOD than was available for the FOD, and will use that information. CDM and JI are different from ET, but similar to each other in that they are both project based. JI was just authorized by COP/MOP-1 and while there is a great deal written on it, actual experience is very limited. CDM has been in operation for several years, but was relatively slow in getting started and again actual experience is limited. LB will ensure in final edit.

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7-12	A	0	0			Concern about the way industry is portrayed in the chapter as a problem. Pointed out that in the case of aluminium and cement emissions are being reduced and going down. However, in other key sectors the same progress is not happening. The chapter needs to state that industry is making progress and also that manufacturing is moving out of regulatory regimes and moving to more voluntary agreements where many are effective. The chapter needs to reflect more up to date views on industry not necessarily being a problem. (Capetown Industry Expert Meeting, Industry)	Accepted - Will attempt to be more specific as to which industry is being discussed. Re: voluntary agreements – experience is mixed – some countries moving to more regulation. LB will ensure in final edit.
7-13	A	0	0			Chapter needs to reassess the issue of insurance where companies were well insured rather than not well insured as it states in the chapter? (Capetown Industry Expert Meeting, Industry)	Accepted - LB will ensure that the statement on insurance is either made more specific and referenced or deleted.
7-14	A	0	0			Chapter needs reflect that voluntary agreements as with other policies have had mixed results. Need also to be careful about what is the definition of legally binding meaning different interpretations for different countries. (Capetown Industry Expert Meeting, Industry)	Accepted - LP to address comments in re-write of section 7.9.2.
7-15	A	0	0			Chapter needs more attention to cement and the investment made on using waste in cement. (Capetown Industry Expert Meeting, Industry)	Accepted – LB will address in rewrite of Section 7.3.2. EW will cross reference if appropriate.
7-16	A	0	0			Instead of examining in 1-2 paragraphs the propects for CCS in each industrial sector / sub-sector, it may be preferable that there is a separate section on CCS, where all this information and assessment is presented, together with major cost figures from the latest IPCC special report on CCS with respect to transport and storage, so that the reader has an (ELENA GEORGOPOULOU, NATIONAL OBSERVATORY OF ATHENS / INSTITUTE FOR ENVIRONMENTAL RESEARCH & SUSTAINABLE DEVELOPMENT)	Accepted - Section 7.3.6 covers CCS in general. LB will ensure that other discussions of CCS in the chapter are limited to references to that section or the SRCCS.
7-17	A	0	0			General Comment : Although the chapter addresses extensively the issue of recycling and better integration of processes, the texte overlooks the key issue of change in supplies by industries : nature of materials (e.g. switch from aluminum to steel in a component), origin of components (including the content in transport emissions), and choice of processes by the subcontractors. The mention of this more global view would reiniforce the whole chapter. (Antoine BONDUELLE, E&E_Consultant)	Accepted - This was the intent of Section 7.4.8. LB will attempt to strengthen the message.
7-18	A	0	0			This is a good chapter, but I suggest it has a couple of significant omissions. One is that it has nothing on the institutional relationships that might improve government-industry understanding and collaboration in relation to climate change. Where and	Noted - LP/JR will look for literature for rewrite of Section 7.9.

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						why has the relationship worked best? I only know the UK example well, but the role of the UK Advisory Council on Business and the Environment throughout the 1990s was very important in setting context for UK clkmate change policy, and the creation of the Carbon Trust has been very important in helping UK industry implement emission reduction goals, in strengthening the low carbon business sector, and in furthering the relationship between government and industry. See eg. Carbon Trust annual report (2005b) for an overview of structure and activities, www.carbontrust.co.uk. (Michael Grubb, Cambridge University)	
7-19	A	0	0			The other significant omission (hope I didn't miss it) is any discussion of competitiveness at specific sector level. On this, needs to coordinate with Chapter 11. (Michael Grubb, Cambridge University)	Rejected – Cannot be taken into account without supporting evidence.
7-20	A	0	0			Easy to read and with a good overview of different sector of industry (Marco Mazzotti, Institute of Process Engineering)	Noted. No action necessary.
7-21	A	0	0			General: where applicable, it should be made clear whether or not that the energy use or CO2 emissions includes the indirect energy use/CO2 related to the electricity used. Now that can be suspected at many places, but is confusing now. (Jos Olivier, Netherlands Environmental Assessment Agency (MNP))	Accepted – LP will try to make it more explicit.
7-22	A	0	0			General: I strongly recommend to take advantage of the information provided in the FOD for the 2006 Guidelines for inventories of the TSU NGGIP. (N.B. This may be valid for other chapters too!) (Jos Olivier, Netherlands Environmental Assessment Agency (MNP))	Accepted – Writing team is already considering The 2006 Guidelines and will recheck. LB will ensure in final edit.
7-23	A	1	26			When referring to pulp and paper in the industry, most commonly, the word "pulp"comes first as in "pulp and paper"and "pulp, paper"This order should be adopted in the chapter where currently "pulp" comes after "paper"(for example, p1-26,P2-38,P4-49,P4-52,P10-36,P22-52,P23-5,6,19,26,33,37, P30-44) (MASAHIRO NISHIO, Ministry of Economy, Trade and Industry)	Accepted - LB will make these changes in editing.
7-24	A	1	26			Regarding "Milling"in "and Milling" as in P1-26□P4-footnote2□7.4.5: The word generally refers to flour-milling industry. In a broad sense, it could mean a facility (of flour-milling or paper manufacturing). In either meaning, the necessity of the reference to "Milling"here is unclear and should be deleted. Reasons are: If "Milling"was supposed to mean the former, it would not make sense because there is no description on the flour milling industry in the chapter; If it was supposed to mean the latter, it would be unnecessary and irrelevant to put the word in the title of 7.4.5 as well as in the chapter.	Noted and decided that since this component has low significance in GHG emissions LB will delete in editing.

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						(MASAHIRO NISHIO, Ministry of Economy, Trade and Industry)	
7-25	A	2	24	2	25	These two lines give the impression that Industy is the main source of ghg emissions (particularly the use of 90%). No mention is made of the contribution that industry has made in reductions (reference: Report of EU Environment Agency, 2004). I would suggest that lines 35-44 are moved up to the head of this Executive Summary). This section does not have the same sense as lines 28-30 on page 4 of the Introduction. (Nick Campbell, ARKEMA SA)	Noted - JR/LB will make approrpiate changes by adding clarity and resequesncing the text.
7-26	A	2	24	4	6	The Executive Summary appears to have no real direction. It takes random pieces of text from the various sections losing any qualifying text. Of particular concern is page 2, line 46-50; which basically give the impression that lack of industry action is to blame for not adopting GHG mitigation technologies, also page 3, lines 29-33 which does not have qualifying text. Page 3, line 50-55 is addressed below. (Nick Campbell, ARKEMA SA)	Noted – LB/JR will be doing appropriate editing after the chapter is revised for the SOD.
7-27	A	2	26	4	6	The executive summary needs to add something about potential benefits and costs of different technologies (John Kessels, Energy Research Centre of the Netherlands)	Noted – The Executive Summary will have to be re-written after the chapter is revised for the SOD. LB and JR have responsibility.
7-28	A	2	30			I can find no evidence that PFCs are released from magnesium production. If anything, magnesium should be included in the next line, under SF6. See US EPA, Inventory of US GHG Emissions and Sinks, 1990 - 2003 Chpt 4, Industry Processes, p 185 (John Nyboer, Energy and Materials Reseach Group, School of Resource and Environmental Management, Simon Fraser Univeristy)	Accepted - LB will correct error in editing.
7-29	A	2	31			You should include magnesium here, even though you do list non-ferrous metal processes. (John Nyboer, Energy and Materials Reseach Group, School of Resource and Environmental Management, Simon Fraser Univeristy)	Accepted - LB will make change in editing.
7-30	A	2	35	2	44	Suggest beginning paragraph with a breakdown of global emissions in terms of sectors e.g. industry, transport, household etc. and then a breakdown by industry sectors showing e.g. 1% for aluminium, 5% for cement, etc. This would put the industry sector as a whole and individual industry sectors into context. It would also be consistent, as there is mention of the percentage of global man made emissions for some industries and not for others. Also for the sake of consistency there should be included a breakdown of energy sources by industry sector. (Robert Chase, International Aluminium Institute)	Noted –Available information is summarised in page 2 line 35-39. LP will consider adding more information in the main text.
7-31	A	2	35			SPMs the give the percentage of the sector in 2000 for transport (chapter 5, page2,	Rejected - It would be nice to have a

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						line 24), in 2004 for buildings (chapter 6, page2, line 36) and in 2002 for industry (chapter 7, page 2, line 35). It would be nice to have the same date everywhere. (Michel Petit, CGTI)	consistent set of data, but each chapter is using the latest data available because substantial changes have taken over recent years.
7-32	A	2	38	2	38	Replace "Developing nations…" with "Industries located at developing nations" (ELENA GEORGOPOULOU, NATIONAL OBSERVATORY OF ATHENS / INSTITUTE FOR ENVIRONMENTAL RESEARCH & SUSTAINABLE DEVELOPMENT)	Accepted - LB will make change in editing.
7-33	A	2	39			In the November 2003 IFADATA (covering the period 1972/73 to 2002-2002/03), developing countries accounted for 49% of TOTAL fertilizer production. The figure of 58% quoted here corresponds to NITROGEN fertilizer production and is drawn from IFA's 2002 statistics. As of 2003, the developing country production represented 57% of NITROGEN fertilizer production. Published at www.fertilizer.org/ifa/statistics/indicators/pocket_production.asp. IFADATA 2005 will be released before the 4AR SOD, so that the latest data can be incorporated in this chapter. We will post the IFADATA cd-rom to Lenny Bernstein. (Kristen Elizabeth Sukalac, International Fertilizer Industry Association (IFA))	Accepted - LB will make change in editing.
7-34	A	2	41	2	43	"…N2O emissions from nitric acid plants are small compared with other sources. Of the total N converted in the nitric acid plants, 0.6%-0.9% is lost as NOx, and 0.4%-1.5% is lost as N2O to the atmosphere." UNIDO (United Nations Industrial Development Organization) and IFDC (International Fertilizer Development Center), 1998: Fertilizer Manual. Kluwer Academic Publishers, Dordrecht, The Netherlands and Norwell, Massachusetts, USA. p. 515. (Kristen Elizabeth Sukalac, International Fertilizer Industry Association (IFA))	Noted – This will not be considered in executive summary but LB will consider in rewriting the main text.
7-35	A	2	43	2	44	Replace last clause with "annual PFC emissions from aluminium manufacture are estimated at 40 MtCO2-eq (11 MtC-eq). The global aluminium industry has been successful in reducing these emissions from about 86 MT CO2-eq since 1990 despite a 50% increase in primary aluminium production." (Robert Chase, International Aluminium Institute)	Accepted - LB will correct numbers in editing. Noted. Numbers will be checked and mentioning of reductions will be considered in over all rewrite of the executive summary.
7-39	A	3	0	3		Table 7.2.1 Oxyfuel furnaces do not always permit to reduce greenhouse gas emissions and there is no use of pre-coupled gas turbine s in the glass industry. Justification can be found in the IPPC BREF document on Glass Industry p156 (Nick Campbell, ARKEMA SA)	Accepted – Will change example to cullet preheating. EW will change table.
7-36	A	3	33	3	33	"Today's choices will, in most cases, have long-term consequences" (ELENA GEORGOPOULOU, NATIONAL OBSERVATORY OF ATHENS / INSTITUTE FOR ENVIRONMENTAL RESEARCH & SUSTAINABLE DEVELOPMENT)	Rejected - Some choices have long-term consequences, many do not.

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7-37	A	3	45	3	45	It is proposed to delete "justice" because "social justice" is a term that has not been defined. Ususally the social dimension relates to absolute (minimum) requirements (e.g. no work for children of a specific age) and not relative ones. (Radunsky Klaus, Umweltbundesamt)	Accepted: JR/LB
7-38	A	3	51	3	54	Also by increasing their self-independence with respect to electricity supply through investments such as cogeneration (ELENA GEORGOPOULOU, NATIONAL OBSERVATORY OF ATHENS / INSTITUTE FOR ENVIRONMENTAL RESEARCH & SUSTAINABLE DEVELOPMENT)	Rejected - This topic is the responsibility of Chapter 4.
7-57	A	4	0			Footnote: it would be more userfriendly to be more specific with regard to the reference to other chapters as those chapters might have a volume of about 100 pages. (Radunsky Klaus, Umweltbundesamt)	Accepted - LB will reference approriate sections in other chapters in editing.
7-58	A	4	0	4		Table 7.2.1 The use of 100% of cullet for glass container is not feasible. It should be 90-95%. Sequestration is as well not economically feasible because of the size of the glass manufacturing installations Justification can be found in the IPPC BREF document on Glass Industry, p76, p79 and p216. For sequestration, no references to provide but this can simply be justified by saying that a glass furnace is not a big installation (maximum size is around 50 MW). (Nick Campbell, ARKEMA SA)	Noted – EW will check 100% cullet. CCS for glass furnaces under study by IEA. JH will mention in Section 7.4.4.3 to provide justifictaion for including in Table.
7-40	A	4	6	4	6	Insert at end of sentence: " and products which contribute to emissions savings through their use, such as lightweight parts for road vehicles." (Robert Chase, International Aluminium Institute)	Rejected - More specificity than justified in Executive Summary. A specific reference to aluminium here will result in a request that high strength steel also be mentioned.
7-41	A	4	10	4	10	It would be helpful to indicate the range of years that relate to the terms "short, medium and long" term from the industrial perspective. (Radunsky Klaus, Umweltbundesamt)	Accepted - LB will add in editing after he checks agreed defintions of short and medium term.
7-42	A	4	16	4	17	Typo error. Check sentence. (Jose Moreira, Institute of Electrotechnology and Energy - University of Sao Paulo)	Accepted - LB will delete “are” in editing.
7-43	A	4	16			"e.g. limestone use in steel production and in cement and lime manufacture and in flue gas desulpurisation units" (Jos Olivier, Netherlands Environmental Assessment Agency (MNP))	Rejected - There is no need for a comprehensive list.
7-44	A	4	17	4	17	Delete "are" (Robert Chase, International Aluminium Institute)	Accepted - LB will delete “are” in editing.

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7-45	A	4	20	4	25	Perhaps the emissions from the use of F-gases could be better grouped in another way. For magnesium prod. and also for aluminium production SF6 is used (not PFCs). HFCs are used *amongst others* for refrigeration and foam blowing; and F-gases, notably PFCs and SF6, are used in semiconductor manufacture. (Jos Olivier, Netherlands Environmental Assessment Agency (MNP))	Noted - LB will correct error about magnesium production in editing. However, there seems no benefit to the other suggestions
7-46	A	4	22			Same comment as #1 (John Nyboer, Energy and Materials Reseach Group, School of Resource and Environmental Management, Simon Fraser Univeristy)	Accepted - LB will correct error in editing.
7-47	A	4	22	4	22	Replace "polyfluorocarbons" with "perfluorocarbons" and insert "as" after "emitted" (Robert Chase, International Aluminium Institute)	Accepted - LB will correct in editing.
7-48	A	4	22	4	22	Please check the name for PFC. Why polyfluorcarbons? (Jose Moreira, Institute of Electrotechnology and Energy - University of Sao Paulo)	Accepted - LB will correct in editing.
7-49	A	4	24			Same comment as #2 (John Nyboer, Energy and Materials Reseach Group, School of Resource and Environmental Management, Simon Fraser Univeristy)	Accepted - LB will correct in editing.
7-50	A	4	25	4	25	Suggest to be more specific than some non-ferrous processes and say instead that SF6 is used as an inert cover gas to prevent metal oxidation in the production of primary magnesium, the casting of some high magnesium content alloys and, to a limited degree, in metal degassing. (Robert Chase, International Aluminium Institute)	Noted - Too much detail, but will change to non-ferrous metals to magnesium
7-51	A	4	26			Should this not be dealt with in the waste chapter? Add: "CH4 is emittted in very small amounts from a few chemical manufacture processes. (Jos Olivier, Netherlands Environmental Assessment Agency (MNP))	Taken into account - Chapter 7 addresses emissions from waste within the plant, Chapter 10, outside the plant. LB will add the reference to CH4 from chemical processes in rewrite of chapter.
7-52	A	4	47	47		100 MW (Nel.2003). The Cook Straight and some places in the south-east of Asia (south Korea) are subject of feasability studies. (MICHEL PAILLARD, IFREMER)	Rejected – Comment is for another chapter. Will refer to TSU.
7-53	A	4	48			Section 7.1.1 This section's focus on SMEs is appropriate; yet, there may be other features of this group of industries that the writers may find convenient to highlight: a) within the manufacturing sector, they pertain to industries with above-average capital intensity, and higher degree of market concentration; b) they manufacture products normally considered as homogeneous, but have in the last decades experiment a strong tendency to product differentiation and intra-industry specialization; c) technologicallly, they are commonly classified as "medium-low,"	Accepted – JR will provide appropriate balanced.

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						and "low technology" intensity, given their R&D expenditure ratio to value added (OECD, 2005, p.). Reference: OECD (Organization for Economic Cooperation and Development), 2005: Science, Technology and Industry Scoreboard, OECD, Paris. (Francisco Aguayo, El Colegio de México)	
7-54	A	4	49			delete "and fert." as this is included in "chemicals" (Jos Olivier, Netherlands Environmental Assessment Agency (MNP))	Rejected - Technically correct, but since the fertilizer industry is a large CO2 emitter, we prefer to mention it.
7-55	A	4	50	5	8	I wonder whether "more than half" that is not far too low. Is electricity included here? If you add food and other non-metallic minerals than cement, than the fraction is much higer (see IEA energy balances). Is electricity included here and if so, accounted as is or on primary energy input basis? Food processing is also a large share in imany ndustrialised countries (see IEA energy balances). (Jos Olivier, Netherlands Environmental Assessment Agency (MNP))	Noted - LP will check literature to see whether a higher fraction is justified.
7-56	A	4	52			I would add to the note that coke production is discussed in this chapter under 7.4.1. (Jos Olivier, Netherlands Environmental Assessment Agency (MNP))	Accepted - LB will add in editing.
7-59	A	5	9	5	14	It should have a reference for Chinese data. Defination of SME is not clear (Yanjia Wang, Tsinghua University)	Accepted – JR will provide a reference for the Chinese data and a definition for SMEs.
7-60	A	5	9	5	14	This is not relevant for fuel combustion emissions which is concentrated in energy-intensive industries mentioned before which are large companies, except for electricity use for cooling (refrig. & airco), and for F-gas use (notably HFCs) for cooling. 2nd, many of these SMEs will refer to commercial services, e.g. retail firms, not to manufacturing industries. (Jos Olivier, Netherlands Environmental Assessment Agency (MNP))	Rejected – OECD view. In developing nations SMEs are an important factor in energy-intensive industries.
7-61	A	5	15	5	17	Furthermore, often SMEs do not have sufficient technical information on the available options and benefits of environmentally sound technologies and lack of human potential with adequate technical expertise in order to assess these. (ELENA GEORGOPOULOU, NATIONAL OBSERVATORY OF ATHENS / INSTITUTE FOR ENVIRONMENTAL RESEARCH & SUSTAINABLE DEVELOPMENT)	Accepted – JR will add thought to existing text.
7-62	A	5	20	5	24	Incorrect, at least for industrialised countries, since most of the SMEs belong to the commerical service sector. (Jos Olivier, Netherlands Environmental Assessment Agency (MNP))	Accepted – JR will clarify differences between industrialized and developing countries.
7-63	A	5	26	5	26	Additionally, it should be noted that, even in developed countries, small firms tend to be at a disadvantage regarding the adoption of new technologies, and may therefore be in greater need of institutional assistance programs. In a study based on	Accepted – JR will check reference and add appropriate text.

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						over 1000 US manufacturing plants, Swamidass (2003) provides conclusive evidence that supports the view that small plants are slower than larger plants to adopt manufacturing innovations. This conclusion can be expected to hold even strongly in the case of capital-intensive technologies. Reference: Swamidass, Paul M., 2003: "Modeling the adoption rates of manufacturing technology innovations by small US manufacturers: a longitudinal investigation," in Research Policy, vol 32(3), March, pp. 351-366. (Francisco Aguayo, El Colegio de México)	
7-64	A	5	38	5	42	Replace with "China is now the world's largest producer of steel (IISI, 2005), aluminium (USGS, 2004) and cement (USGS, 2004). Overall, developing countries accounted for 42% of iron and steel production in 2003 (IISI, 2005), 58% of fertilizer production in 2000 (Swaminathan and Sukalac, 2004), around 50% of primary aluminium production in 2004 (USGS, 2004) and 78% of cement manufacture in 2003 (USGS, 2004)." (Robert Chase, International Aluminium Institute)	Accepted – LB will change in editing.
7-65	A	5	38	5	47	It should be pointed out that China's emissions will exceed those of the USA by 2030. (Robert Chase, International Aluminium Institute)	Rejected – China's total emissions are a subject for Chapter 3, not Chapter 7.
7-66	A	5	39	5	42	I think that this section would be strong if it noted that China by itself used around 30% of the world's steel production as well as 40% of the cement production. Unfortunately, I can't provide a good source from which to cite this. The percentage may be reverse, that is China may have used 40% of the world's steel and 30% of the world's cement. (Jacob Park, Green Mountain College)	Noted – EW will include if a suitable reference can be found.
7-67	A	5	42	5	42	The authors may consider relevant to add: ""USGS, 2004). Increasing shares of developing countries in energy-intensive industries is an expression of a global process of spatial reorganization of production, that accompaniesthe increasing shares of developing countries in manufacturing international trade and the deepening of the industrialization processes in many of them. There is evidence that this process of production relocation is increasing the global environmental burden of developing countries, and probably helps to explain the relative "dematerialization" of developed economies (Muradian and Martínez Alier, 2001). Since many facilities ..." Reference: Muradian, Roldan, Martinez-Alier, Joan (2001) "Trade and the environment: from a 'Southern' perspective," in Ecological Economics 36, p.281-297. (Francisco Aguayo, El Colegio de México)	Rejected – Beyond scope of chapter.

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7-68	A	5	42	5	45	Include an example with actual emissions rates (John Kessels, Energy Research Centre of the Netherlands)	Accepted – LB will add example in editing.
7-69	A	5	49	6	10	Paragraph fails to mention the role of banks, accountancy firms and insurance companies in demanding higher HSE performance standards. (Robert Chase, International Aluminium Institute)	Noted – Good point, but need reference. JH responsible.
7-70	A	5	49	6	5	An example to illustrate an actual SME of losing its market is needed (John Kessels, Energy Research Centre of the Netherlands)	Accepted - JR to add specific example.
7-71	A	6	14	6	46	Tables 7.1.1, 7.1.2,7.1.3 could be better as graphs or pie charts rather than tables (John Kessels, Energy Research Centre of the Netherlands)	Noted – LB/LP will decide how best to present information.
7-72	A	6	15			In North America, since 1997 the Industrial sector has steadily reduced its GHC emissions, and is the only sector showing decline in GHG emissions. Source: Department of Energy, Energy Information Administration (http://www.eia.doe.gov/) (James Bero, BASF Corporation)	Rejected – While it is true that GHGs from the US industrial sector have been roughly constant since 1990, and emissions from the European industrial sector have declined, much of that has been due to shut-down of the industrial base, not to mitigation efforts.
7-73	A	6	19			This must be including CO2 from related electricicity production, but is not mentioned (Jos Olivier, Netherlands Environmental Assessment Agency (MNP))	Taken into account – see response to comment 7 - 22
7-74	A	6	20	6	21	See EDGAR data on global emissions from these sources: see online figures and ref. Olivier, J.G.J. and J.A.H.W. Peters (2005) CO2 from non-energy use of fuels: A global, regional and national perspective based on the IPCC Tier 1 approach. Resources, Conservation and Recycling, 45(3), 210-225. (Jos Olivier, Netherlands Environmental Assessment Agency (MNP))	Noted – CD will check.
7-75	A	7	5	7	13	I am not sure if it is noting in this section. But, I wonder if there should be some reference to the potential role of information and communication technology (ICTs) to reduce or eliminate GHG emissions (e.g. by substituting certain types of economic activities with other; on-line meetings instead of face to face meetings) (Jacob Park, Green Mountain College)	Noted - Issue referred to Chapter 6, who will add some text.
7-76	A	7	5	7	17	Lacks mitigation potential & costs by technology - could add to Table 7.2.1 (Francisco de la Chesnaye, USEPA)	Taken into account – See response to comment 7-4.
7-77	A	7	11	7	11	In the Table 7.2.1, natural pozzolanes, widely used in many countries, should be added as "feedstock change" (Niyazi GUNDOGDU, LAFARGE GROUP)	Rejected – Table 7.2.1 was not meant to be comprehensive. Selected examples given.
7-78	A	7	15	7	15	The cement industry recycles waste heat from the kiln to generate power. Therefore, please add "Waste heat recovery power generation" besides "Cogeneration" at the row of "cement" and the "power recovery" column in Fig.	Rejected – Table 7.2.1 was not meant to be comprehensive. Waste heat recovery already included.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						7.2.1. (Yoshito Izumi, Taiheiyo Cement Corporation)	
7-79	A	7	19			Apart from electric motors and boilers, a large potential for energy savings exists with respect to furnaces and kilns. Especially in SMEs in the non-minerals sector (even in developed counties and especially in Southern Europe), there is a large number of installations that use old-type kilns with high energy losses. (ELENA GEORGOPOULOU, NATIONAL OBSERVATORY OF ATHENS / INSTITUTE FOR ENVIRONMENTAL RESEARCH & SUSTAINABLE DEVELOPMENT)	Noted – kilns and furnaces treated under sector specific technology. EW will consider in rewrite of section
7-80	A	7	25	7	33	There are companies that specialize in maintenance and routine inspections of, say, boiler systems (e.g., Spirax Sarco). Firms like this can provide some information on the relative state of boiler and steam line maintenance and can give a picture of major energy losses in a system. While I don't have any details in a general sense, I have been in communication with this company and had good advice from them on local energy efficiency issues. A bit of research into this might allow you to say a bit more than "Quantification is difficult..." (John Nyboer, Energy and Materials Reseach Group, School of Resource and Environmental Management, Simon Fraser Univeristy)	Noted – LB will look for information and add if appropriate references can be found.
7-383	A	7	41	7	45	The major loss of efficiency in electric drives arises from overly conservative design resulting in motors that are too large being specified. (Nick Campbell, ARKEMA SA)	Rejected – Already covered on Pg. 7, line 46.
7-81	A	7	45	7	48	There have been a lot of DSM studies completed by electric utilities that have looked at various auxiliary activities like compression and pumping where the efficiency improvements there far outweigh what ever one can hope to gain by replacing an inefficient motor with an efficient one. Check out BC Hydro Conservation Potential Review: http://www.bchydro.com/info/reports/reports856.html , Compressed Air Challenge, ACEEE docs (John Nyboer, Energy and Materials Reseach Group, School of Resource and Environmental Management, Simon Fraser Univeristy)	Noted – LB will check website and add appropriate information.
7-82	A	8	13	8	17	What were the selected industries? (John Kessels, Energy Research Centre of the Netherlands)	Accepted – FY to add information.
7-83	A	8	29	8	29	replace at Indian with at an Indian (John Kessels, Energy Research Centre of the Netherlands)	Accepted – LB will correct in editing.
7-382	A	8	35	9	18	There is no mention of the problems arising from use of waste (of generally variable composition), particularly the difficulty of pollution prevention.	Accepted- LB will add in rewrite.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						(Nick Campbell, ARKEMA SA)	
7-84	A	8	48	8	50	What is being written on biomass short to medium term prospects is consistent with what is being mentioned in the chapter on energy supply? (ELENA GEORGOPOULOU, NATIONAL OBSERVATORY OF ATHENS / INSTITUTE FOR ENVIRONMENTAL RESEARCH & SUSTAINABLE DEVELOPMENT)	Noted – LB will ensure consistency with Chapter 4.
7-85	A	9	5	9	10	This section should be modified to make it clear that burning waste materials that are derived from fossil fuels (e.g. plastics) does not result in lower atmospheric CO2, even if they displace fossil fuels since either practice places fossil carbon in the atmosphere. It is only biomass-derived waste material that provide carbon-neutral fuels. (Reid Miner, NCASI)	Noted – RM will provide appropriate explanation.
7-86	A	9	8			You state that you could decrease emissions by reducing both emissions from incineration and the demand for fossil fuels. You need to be careful that you are not implying double counting. You are burning the stuff in both cases so you will release the CO2 in both cases. Actually the only difference is that you reduce your need for fossil fuels. (John Nyboer, Energy and Materials Reseach Group, School of Resource and Environmental Management, Simon Fraser Univeristy)	Noted – RM will provide appropriate explanation.
7-87	A	9	11	9	18	The sections concerning the use of alternative resources (waste or industrial by-products), which is an important lever to reduce CO2 emission from the cement production, could be enriched by some statistics and references. Within the attached files, I am sending a document prepared by Cembureau (the European Cement Association) on the use of alternative raw materials as fuel and additives in the cement production. This synthesis, publicly accessible via European Commission website, has been prepared within the frame of "Thematic strategy on the prevention and recycling of waste" of the EU. It contains some useful statistical data on the use of various wastes or by-products which requires an impact assessment (technical, environmental, product quality and health and safety aspects). I have also added some references used in this synthesis for the impact assessment. Cembureau, 2004, The sustainable use of alternative resources in the European Cement Industry, 12p. http://forum.europa.eu.int/Public/irc/env/waste_strat/library?l=/test&vm=detailed&sb=Title (see 83 Cembureau) Smith, I. 2003. Co-utilisation of coal and other fuels in cement kilns. IEA Clean	Noted – EW to review submitted information and determine its applicability.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						Coal Center, United Kingdom, 63p. Karstensen, K.H., 2004. Formation and release of POPs in the Cement Industry. Draft Report for WBCSD Cement Sustainability Initiative, 167p. http://www.wbcsd.org/web/projects/cement/tf4/Formation-and-Release-of-POPs-in-the-Cement-Industry-Draft-Report-19-March-2004.pdf Roberts et al., 2003. Cement, cancers and clusters: an investigation of a claim of a local excess cancer risk related to cement works. Journal of Public Health Medicine, 25/4, pp. 351-357. Schuhmacher, M. et al., 2004. Pollutants emitted by a cement plant: health risks for the population living in the neighbourhood. Environmental Research, 95, pp. 198-206. Barkman, H. W. et all., 2003. Southeast Kansas Health Study, Final Report, EPA Assistance Agreement X997409-01, the University of Kansas Medical Center, USA, 167p. http://www2.kumc.edu/ceoh/skhs/ WBCSD, 2005. Guidelines for the Selection and Use of Fuels and Raw Materials in the Cement Manufacturing Process (Draft), 38p. http://www.wbcsd.org/DocRoot/cQK5isX3lWMC4PAPJLNg/tf2-guidelines.pdf Loréa C., van Loo, W., 2004. Energy recovery from used tyres in the European Cement Industry. In Sustainable Waste Management and Recycling: Used/Post-Consumer Tyres, M.C. Limbachaya and J.J. Roberts (eds), Thomas Telford Publishing, London, pp 235-242. (Niyazi GUNDOGDU, LAFARGE GROUP)	
7-88	A	9	12	9	18	With respect to waste incineration in industry, it should be mentioned that a potential barrier to their use are environmental regulations related to air emissions, ash disposal etc. (ELENA GEORGOPOULOU, NATIONAL OBSERVATORY OF ATHENS / INSTITUTE FOR ENVIRONMENTAL RESEARCH & SUSTAINABLE DEVELOPMENT)	Accepted – LB will add a general statement that applicable environmental regulations have to be met.
7-89	A	9	18	9	18	What about the toxicity of other emmissions associated with the incineration of toxic wastes? Burning hazardous waste in cement kilns has been challenged as a major source of dioxins and furens, among other toxic emissions, by numerous environmental and public institutions. A recent study by the Center for the Biology of Natural Systems, prepared for the North American Commission for Environmental Cooperation tracks down a set of carcinogenic toxins from point-	Accepted – LB will add a general statement that applicable environmental regulations have to be met, including control of air toxics. .

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						sources in the region, identifying precisely cement kilns burning hazardous waste among them. The authors should consider the possible controversy behind mitigation goals and other environmental concerns regarding this issue. (Francisco Aguayo, El Colegio de México)	
7-90	A	9	20	10	31	Heat and Power Recovery needs to include an example or study from a developing country such as India, China, etc. (John Kessels, Energy Research Centre of the Netherlands)	Noted – JR to supply example from India or other developing country.
7-91	A	9	32			It is unlikely that you can use discsrded heat to preheat incoming steam - do you mean water? (John Nyboer, Energy and Materials Reseach Group, School of Resource and Environmental Management, Simon Fraser Univeristy)	Accepted – LB will correct in editing.
7-92	A	10	0			Mention Industrial Cogeneration. This has been a success and reduces net carbon emissions comparted to separate generation of heat and power. (Steven Freedman, Energy Consultant)	Noted – Topic is discussed on Pg. 10, lines 20-31. LB will add reference to this discussion at begining of section.
7-93	A	10	20	10	30	This section is confused. It notes that cogeneration in Denmark is 50% but does not justify why this is a good thing, in particularly, it does not give any information on cost-effectiveness of CHP (particularly lines 26-31). I would suggest that more information should be included. (Nick Campbell, ARKEMA SA)	Noted – EW will reconsider example.
7-94	A	10	20	10	31	The impact of cogeneration to CO2 emissions depends on the type of fuel used for cogeneration purposes, as well as on the mix of electricity supply. For example, in cases where the majority of electricity supply is from renewables (e.g. hydro) and cogeneration is carried out with use of conventional fossil fuels, the whole CO2 emissions balance may not be necessarily positive. (ELENA GEORGOPOULOU, NATIONAL OBSERVATORY OF ATHENS / INSTITUTE FOR ENVIRONMENTAL RESEARCH & SUSTAINABLE DEVELOPMENT)	Rejected – co-gen is only applicable if heat and power are being generated from the same source. We cannot envision a reasonable case in which the use of co-gen would increase CO2 emissions.
7-95	A	10	26	10	31	There was a large study completed by MK Jaccard and Assocaites for Canada, available from Natural Resources Canada, that indicated significant energy savings and emissions reductions in all Canadian sectors. However, it only provided data on how much energy and CO2 was displaced by existing cogen facilities; no forecasts of potential reductions were made. Called "Strategic Options for Combined Heat and Power in Canada", contact Dave McNabb (DMcNabb@NRCan.gc.ca) for details or a copy. (John Nyboer, Energy and Materials Reseach Group, School of Resource and Environmental Management, Simon Fraser Univeristy)	Noted – EW to check reference.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
7-96	A	10	36	10	39	Apart from paper and pulp, mention also the wood processing industry. With respect to food industry, mention also the use of biomass by-products for energy purposes in the edible oil processing industry. (ELENA GEORGOPOULOU, NATIONAL OBSERVATORY OF ATHENS / INSTITUTE FOR ENVIRONMENTAL RESEARCH & SUSTAINABLE DEVELOPMENT)	Noted – LB will add wood processing in editing. Would need reference before could use edible oils as an energy source.
7-97	A	10	38			We would suggest to drop "for export".Just "electricity" is sufficient. (MASAHIRO NISHIO, Ministry of Economy, Trade and Industry)	Accepted – LB will change in editing.
7-98	A	10	38			We would suggest to drop "for export".Just "electricity" is sufficient. (MASAHIRO NISHIO, Ministry of Economy, Trade and Industry)	Accepted – LB will change in editing.
7-99	A	10	39			Especially for the use of biomass, which is of a particular importance for developing countries, it should be mentioned that perhaps the most severe barrier is the cost of biomass collection, which in fact determines to a large extent the overall cost figure of biomass use. The development of a well-designed, reliable and sustainable biomass collection system is a pre-requisite for the large exploitatipn of biomass in industrial facilities. On the contrary, this problem does not exist in industries where biomass represents the raw material processed. (ELENA GEORGOPOULOU, NATIONAL OBSERVATORY OF ATHENS / INSTITUTE FOR ENVIRONMENTAL RESEARCH & SUSTAINABLE DEVELOPMENT)	Accepted – LB will add in editing.
7-100	A	10	43	10	45	Make this statement more tranparent. In the case of the sugar industry, mainly due the development of ethanol as a fuel, it is expected a significant increase in the use of bagasse and other sugarcane residues. For charcoal and other industrial applications I agree with the text. (Jose Moreira, Institute of Electrotechnology and Energy - University of Sao Paulo)	Accepted – LB will clarify in editing.
7-101	A	10	43	10	44	The phrase "if biomass is grown sustainably" should be removed. Instead it should state, "These applications will reduce CO2 emissions but their sustainability depends on a reliable supply of biomass." (Reid Miner, NCASI)	Noted – The statement has to be clarified. Biomass is usually considered a zero CO2 fuel, but this is only true if new biomass grow to replace the biomass consumed. For example, if the use of biomass results in deforestation or depletion of soil carbon, there will be accompanying CO2 emissions. LB will clarify in editing.
7-102	A	10	43	10	44	Remove the sentence "These applications will reduce co2 emissions if the biomass is grown sustainably". It is unnecessary and potentially causes confusion about the benefits of biomass fuels. If it must be included, a better way to phrase it would be	Noted – The statement has to be clarified. Biomass is usually considered a zero CO2 fuel, but this is only true if new biomass grow

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						"These applications will reduce co2 by replacing fossil fuels, but the benefits can only be sustained if biomass can be supplied on an ongoing basis. (Reid Miner, NCASI)	to replace the biomass consumed. For example, if the use of biomass results in deforestation or depletion of soil carbon, there will be accompanying CO2 emissions. LB will clarify in editing.
7-103	A	10	44	10	45	The negative description here regarding the near future of biomass energy is not really consistent with the sentence in line 23-24, P43, Ch.4.that says: "Overall bioenergy is envisaged to maintain its position as the highest contributor to global renewable energy in the short to medium term (Faaij, 2005; IEA, 2006)". (MASAHIRO NISHIO, Ministry of Economy, Trade and Industry)	Noted – The statement in Chapter 4 is for total use of biomass, only a small portion of which is used in the industrial sector. LB will clarify in editing.
7-104	A	10	44	10	45	The negative description here regarding the near future of biomass energy is not really consistent with the sentence in line 23-24, P43, Ch.4.that says: "Overall bioenergy is envisaged to maintain its position as the highest contributor to global renewable energy in the short to medium term (Faaij, 2005; IEA, 2006)". (MASAHIRO NISHIO, Ministry of Economy, Trade and Industry)	Noted – The statement in Chapter 4 is for total use of biomass, only a small portion of which is used in the industrial sector. LB will clarify in editing.
7-105	A	11	5	11	9	Is this statement from the IAI, 2004 publication, if it is would read better to state at beginning According to the IAI…. (John Kessels, Energy Research Centre of the Netherlands)	Accepted – LB will change in editing.
7-106	A	11	6	11	8	Reword: 'Recycled aluminium from used products and from customers outside of the aluminium industry now constitutes 33% of current world supply and is projected to rise to 40% by 2025. The aluminium industry, through the IAI, monitors recycling tonnage as well as recycling rates and has developed a massflow model to identify future recycling flows, to check the accuracy of statistics and to project future emissions scenarios (IAI, 2006; Martchek 2006)." (Robert Chase, International Aluminium Institute)	Noted – LB will add some, but not all, of this text in editing. Proposed text is too long.
7-107	A	11	18	11	21	This statement incorrectly suggests that the IPCC SRCSS addresses only electric power applications, whereas it also has a full treatent of other industrial applications. Suggest revising these lines as follows: "The IPCC Special Report on CCS (IPCC, 2005a) provides a full description of this technology, including its potential applications in electric power generation and in other industrial processes." (Edward Rubin, Carnegie Mellon University)	Accepted – LB will reword in editing.
7-108	A	11	25	11	34	It is better to mention that oxygen production is an energy consuming process at moment by using air seperation technology.	Noted – LB will rewrite to include impact of energy used for oxygen production.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						(Yanjia Wang, Tsinghua University)	
7-109	A	11	35			I would insert here a) a section on energy savings by capturing and use of by-product gases (e.g. coke oven gas, blast furnace gas, refinery gas and residual chemical gas) and use it for energy purposes instead of venting or flaring; b) a section on CO2 reduction by temporary capturing and re-use (e.g. for beverages or the pure CO2 supply industry), thereby avoiding fuel combusting by those CO2 users/sellers only to generate it themselves. (Jos Olivier, Netherlands Environmental Assessment Agency (MNP))	Noted – The use of by-product gas in the steel industry is covered in Section 7.4.1, and the use of refinery gas will be covered in a section to be added by LB on petroleum refining. The topic of industrial use of CO2 was covered in the SRCCS. LB will add a reference to this discussion in editing.
7-110	A	11	38	18	12	What about other benchmarking agreements such as in Japan and how successful have they been, this section needs to be broader with specific examples of how successful the agreements have been in reducing greenhouse gas emissions, I am also not clear on whether the LTAs finished in 2000 and what replaced them? (John Kessels, Energy Research Centre of the Netherlands)	Noted – Comment about Japan is the result of confusion over definition of benchmarking. There are no benchmarking agreements with the Japanese governments. LP will provide reference on benchmarking in US Energy STAR programs.
7-111	A	11	38			The section on benchmarking should mention the factors that represent potential barriers and incentives to a wider use of benchmarking in industry. Energy supply options, industies' size, environmental regulations, use of new tools for GHG mitigation (e.g. Emissions Trading), current status of technology in some sectors etc. are some of them. Furthermore, it would be useful to summarise the most important litterature sources (including databases) where benchmark-related info and indices can be found. (ELENA GEORGOPOULOU, NATIONAL OBSERVATORY OF ATHENS / INSTITUTE FOR ENVIRONMENTAL RESEARCH & SUSTAINABLE DEVELOPMENT)	Noted – The major expansion of this section requested by this comment is not appropriate in light of the chapter's page limit, but LB will attempt to provide additional data.
7-112	A	12	17	15	34	The ULCOS program(Ultra Low Steel Making), a European industry and research consortium, aims at a 50-70% reduction in emissions per ton. Reference Rynikiewicz, C.(2005), "The Climate Change challence and transisitions for radical changes in the European steel industry", 10th European Rountable on Sustainable Consumption and Production (ERSCP), Antwerp, 5-7 october 2005. (Antoine BONDUELLE, E&E_Consultant)	Accpted – RM/KT will add appropriate information on this topic.
7-113	A	12	19			At the start of section 7.4 an explanation could be included of why certain industries were included in the process specific technologies analysis (e.g. highest emitting industries or biggest incomes, etc). (Spencer Edwards, Australian Greenhouse Office)	Accepted – LB will add in editing.
7-114	A	12	23	15	23	I would suggest that authors get hold of Bert Daniels (2002) thesis entitled Transition Paths Towards CO2 emission reduction in the steel industry	Taken into account by response to 7-112..

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						(John Kessels, Energy Research Centre of the Netherlands)	
7-115	A	12	27			Add: "to iron using mostly coke and coal, which .." (Jos Olivier, Netherlands Environmental Assessment Agency (MNP))	Accepted – LB will make change in editing.
7-116	A	12	31	12	31	CO2 reduction is also a funtion of the fuel used (e.g. natural gas). (ELENA GEORGOPOULOU, NATIONAL OBSERVATORY OF ATHENS / INSTITUTE FOR ENVIRONMENTAL RESEARCH & SUSTAINABLE DEVELOPMENT)	Rejected – This point is made on Pg, 14, lines 16-17.
7-117	A	12	38	12	44	This sentence described specific value of carbon emission factor. But these data calculation required to definition about system boundary conditions. (MASAHIRO NISHIO, Ministry of Economy, Trade and Industry)	Accepted – RM/KT will describe boundary conditions.
7-118	A	12	39			This part is not logical: "specific emissions", does that refer only to primary steel or to all types? Is the figure for Brazil correct, as I believe that most steel in Brazil is/was produced by charcoal instead of coke in the blast furnace and thus having much lower fossil CO2 emissions? (Jos Olivier, Netherlands Environmental Assessment Agency (MNP))	Rejected – Explanation on, Pg. 12, lines 42-45.
7-119	A	12	50	13	50	A section recognizing the steady improvement in energy efficiency by the aluminium industry should be added. "IAI member companies have a voluntary objective to reduce the average energy required for smelting one tonne of metal by 10% from 1990 to 2010 (IAI, 2006). The average electrical energy required for electrolytic production of one tonne of aluminium has been cut by 6% from 1990 to 2004 and by 37% in KWh/kg since 1950. The IAI collects and benchmarks energy usage data annually." (Robert Chase, International Aluminium Institute)	Noted – Assume this comment refers to Section 7.4.2.1. LB will address in rewrite.
7-120	A	12	50	12	50	delete still (John Kessels, Energy Research Centre of the Netherlands)	Accepted – LB will change in editing.
7-121	A	13	8	13	14	Hidaldo and al.(2005) provided marginal abatement curves using the POLES ISIM sectoral model. Reference hidalgo I., Szabo L., Ciscar J.C., Soria A.,(2005), Technological propects and CO2 emission trading analyses in the iron and steel industry: a global model, Energy 30 583-610. (Antoine BONDUELLE, E&E_Consultant)	Noted – KT and EW will evaluate reference and add appropriate information.
7-122	A	13	9	13	9	replace fro with for (John Kessels, Energy Research Centre of the Netherlands)	Accepted – LB will change in editing.
7-123	A	13	9		11	Table 7.4.1 lists emission reduction potentials from the major energy conservation technologies in the steel industry. These values are derived from a methodology developed by Tanaka, et al. (2005). A description of the methodolgy should be provided to clarify how these values were calculated.	Accepted – KT to expand the description of her methodology. Discussion will be moved to section 7.5.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						(Luke Warren, IPIECA)	
7-124	A	13	17			Table 7.4.1. Potential: + = 0-0.1 MtC etc. - What do these mean? (Matti Melanen, Finnish Environment Institute)	Accepted – LB will provide a clearer explanation in editing.
7-125	A	13	19	14	13	More is needed on costs as well as what has happened since the TAR in this sector (John Kessels, Energy Research Centre of the Netherlands)	Taken into account – cost information is covered by response to comment 7-4.
7-126	A	13	19	13	19	change varies plant to changes varies from plant to plant and country to country. (John Kessels, Energy Research Centre of the Netherlands)	Accepted – LB will correct in editing.
7-127	A	13	20	13	33	When discussing the "technical potential" for energy efficiency improvements, it is very important to distinguish between potential improvements with "existing" technology versus potential improvements that may be "theoretically possible." The last study cited (Beer et.al. 200a) makes it clear what the study covers. It should be clarified what some of the other studies are addressing (e.g., Tanaka et al., 2005). (Russell Jones, American Petroleum Institute)	Accepted – KT to clarify their definition of technical potential.
7-128	A	13	24	13	28	This sentence described the widely value of energy efficiency, energy consumption. But these data calculation required to definition about system boundary conditions. (MASAHIRO NISHIO, Ministry of Economy, Trade and Industry)	Rejected – Comment does not relate to text on these lines.
7-129	A	13	35	13	38	It would be interesting to note what the criteria for "economic" was. Social discount rate? Industry or private rate? Hurdle rates? (John Nyboer, Energy and Materials Reseach Group, School of Resource and Environmental Management, Simon Fraser Univeristy)	Accepted – EW to provide appropriate information.
7-130	A	13	35	13	49	It is critical that the economics of "potential" energy efficiency improvements be adequately discussed. This section is a nice start. The Worrell and Biermans, 2005 study cited provides extremely important information on HOW efficiencies are achieved -- i.e., does it involve new investment, capital stock turnover, or retrofitting of existing equipment. This leads to the critical issue of the possible speed of introduction of efficiency improvements which may be more important than "theoretical potential" for efficiency improvements. (Russell Jones, American Petroleum Institute)	Noted – How is treated in policy section, not in technology section. LB responsible.
7-131	A	13	49	13	49	Thus change involves less economy of scale, but may mean plants smaller and less intensive in capital. Reference : Birat J.P. 2002, Innovation parardigm for the steel industry of the 21st cetury, future directions for steel industry and CC. Revue de la Métallurgie, Paris, N 11 (Novembre 2002), pp.957-979. (Antoine BONDUELLE, E&E_Consultant)	Rejected – Required level of detail goes beyond scope of this section.
7-132	A	14	8			In many documents, coke use as a reductant is considered a process emission rather than a fuel. This has some impact on how some countries (like Canada) will set	Rejected – Beyond the scope of discussion in this section.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						targets for industry reductions and should be clarified. (John Nyboer, Energy and Materials Reseach Group, School of Resource and Environmental Management, Simon Fraser Univeristy)	
7-133	A	14	21	14	23	It means the price plays the decisive role in most of time from business point of view. (Yanjia Wang, Tsinghua University)	Noted – this is exactly what the statement means. No further clarification necessary.
7-134	A	14	21	14	23	This does not provide a correct picture. Charcoal is STILL used. Indeed, most large integrated steel plant have now for economic reasons shifted to coke, their share in total production increased from 63% to 74% in the 1983-1999 period (PCF, 2002; Brazil: Sustainable Fuelwood and Charcoal Production for the Pig Iron Industry in Minas Gerais; www.cd4cdm.org/countries%20and%20regions/ Asia/Philippines/Training%20Workshop/day2/plantar_pdd.doc). Since charcoal can become expensive if transported large distances charcoal producers used abundant natural forests -- where available -- rather than more expensive forest plantations. In 1992, 39% of the charcoal came from forest plantations. (F. Rosillo-Calle et al, 1996, The Charcoal Dilemma - Finding a Sustainable Solution for Brazilian Industry; www.ieiglobal.org/ESDVol3No2/charcoalbook.pdf). At present about 25% of the pig iron production is made by small 'independent' producers using charcoal. However, many of these companies are closing down because they cannot use charcoal from native forests (due to legal restrictions) and they don't have the resources to switch to charcoal produced from managed plantations. However, as the PCF reference shows (a CDM project), if the cost of CO2 emissions is being added, perhaps the charcoal option may become economically feasible again. (Jos Olivier, Netherlands Environmental Assessment Agency (MNP))	Rejected – The data used in chapter is more recent that the sources cited in the comment.
7-135	A	14	24			Hidalgo et al. Have a study on propects of steel technology. (Hidalgo et al. Energy 30(2005) 583-610. "Technological prospects and CO2 emission trading analysis in the iron steel industry: A global model. So one should add: at the end of the paragraph: ..and estimated to gain higher shares in the future (hidalgo et al.). (Peter Russ, IPTS, Joint Research Centre, European Commission)	Noted – EW will check paper.
7-136	A	14	25	14	28	Is this the Cyclone Converter Process, on which research was carried out by Hoogovens (now:Corus IJMuiden) in the late '90s? This process does not need to first produce coke for producing pig iron, thereby avoiding amongst other conversion and combustion emissions of coke manufacture in primary steel production? If I am correct, a demo plant has not been made due to lack of investers at the time, but it seems to be technically feasible. With the costs of CO2 included,	Rejected – Reference refers to smelt reduction treated elsewhere in the chapter.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						may be this technology becomes economically feasible? (Jos Olivier, Netherlands Environmental Assessment Agency (MNP))	
7-137	A	14	30	14	37	Hydrogen from carbon-free sources at a reasonable price is a long-term target. If AR4 focus on 2030, it is better to mention this point. (Yanjia Wang, Tsinghua University)	Rejected – The statement is too vague to be of use.
7-138	A	14	30	14	31	What about sustainable production of charcoal to be used instead of coke (as in Brazil) as alternative? (Jos Olivier, Netherlands Environmental Assessment Agency (MNP))	Rejected – No reference provided.
7-139	A	14	34			The phrase "sustainably grown" should be removed because the CO2 emissions from the process do not depend on how the biomass was grown. (Reid Miner, NCASI)	Taken into account – see response ot 7-44.
7-140	A	14	37	14	37	However, mention also that the cost per ton CO2 reduced, under the current cost figures on hydrogen and CCS technology, would be substantially high. (ELENA GEORGOPOULOU, NATIONAL OBSERVATORY OF ATHENS / INSTITUTE FOR ENVIRONMENTAL RESEARCH & SUSTAINABLE DEVELOPMENT)	Accepted – LB will add in editing
7-141	A	14	40	14	40	Please, with metric system 1000kg = 1 tonne (Jose Moreira, Institute of Electrotechnology and Energy - University of Sao Paulo)	Accepted – LB will correct in editing
7-142	A	14	45	15	6	This part mentions only the gains brought by using scrap, one could add that "(Birat, 2000) this path combines with improvements in the electric furnace and in shortening the operational times and may bring gains before 2010". Reference Birat J.P. "futures study analysis of the technological evolution of the EAF by 2010" in La Revue de la Métallurgie Paris (2000) 1347-1363 (Antoine BONDUELLE, E&E_Consultant)	Noted – EW will consider in rewrite.
7-157	A	15	0			Table 7.2.1: Row cement, column Product Changes: blended cement rather than a radical change should be considered here. (Lorea Claude, CEMBUREAU)	Accepted – EW will add blended cement to column in editing.
7-158	A	15	0			Table 7.2.1: Row cement, column Energy Efficiency: In Europe, fluidised bed is considered as an emerging techniques in the cement industry and should not be considered as an industrial existing technology (Reference document on Best Available Techniques in the Cement and Lime Industries, March 2000, European Commission, Directorate General JRC, Institute for Prospective Technological studies (Seville) Technologies for Sustainable development, European IPPC Bureau). (Lorea Claude, CEMBUREAU)	Noted – Table includes both existing and emerging technologies. EW will so label in editing.
7-143	A	15	11	15	11	Replace "roughly 25 Mt" with "roughly 30 Mt". Latest IAI data (2004) indicates	Accepted – LB will correct in editing.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						29.9 million tonnes primary production. (Robert Chase, International Aluminium Institute)	
7-144	A	15	13	15	13	Replace Kt by kt (Jose Moreira, Institute of Electrotechnology and Energy - University of Sao Paulo)	Accepted – LB will correct in editing.
7-145	A	15	17			Overall, I miss interest in the topic 'material efficiency'. There is some attention for material recycling, but the whole range of options, including product recycling, material substition, material-efficient product design, bio-materials, etc. could be covered better (I am not sure whether there is much new literature) (Blok Kornelis, Ecofys)	Noted – Writing team will look for new litertaure on these topics and a sub-section will be added to Section 7.3 if new sufficient information is abailable. If not, the TAR discussion will be referenced. LB will take responsibility.
7-146	A	15	18	15	20	Strike: "Finally, the primary production of these metals tends to be concentrated in only a few countries." This statement is not true for aluminium and not true overall since aluminium is the highest volume of these metals. (Robert Chase, International Aluminium Institute)	Accepted – LB will delete in editing
7-147	A	15	32	15	34	Replace "sustainability model" with "massflow model" (Robert Chase, International Aluminium Institute)	Accepted – LB will make change in editing.
7-148	A	15	32	15	32	2004 PFC survey showed 29.9 million tonnes rather than 29.2. (Robert Chase, International Aluminium Institute)	Accepted – LB will make change in editing.
7-149	A	15	32	15	36	Add: There are a very limited number of manufacturers in 44 countries (Gibbs et al, 1999, PFC Emissions from Primary Aluminium Production; in: NGGIP, Background Papers - IPCC Expert Meetings on Good Practice Guidance and Uncertainty Management in National Greenhouse Gas Inventories; http://www.ipcc-nggip.iges.or.jp/public/gp/bgp/3_3_PFC_Primary_Aluminium_Production.pdf). (Jos Olivier, Netherlands Environmental Assessment Agency (MNP))	Rejected – There are a large number of companies in both China and India.
7-150	A	15	33	15	33	Replace 3% with 5% growth rate over last 10 years. (Robert Chase, International Aluminium Institute)	Accepted – LB will make change in editing.
7-151	A	15	34	15	35	Replace "Secondary aluminium production (from recycled metal)" with "Recycled aluminium production from used products and from customers outside of the aluminium industry" (Robert Chase, International Aluminium Institute)	Accepted – LB will make change in editing.
7-152	A	15	36	15	36	Insert at end of paragraph: "The industry's massflow model predicts that global recycled metal supply from post-consumer scrap will double by 2020 from 2004 levels (Martchek, 2006)." (Robert Chase, International Aluminium Institute)	Accepted – LB will make change in editing.
7-153	A	15	44	15	44	Recommend replacing terminology "smelter pot" with "electrolysis cell." The	Accepted – LB will make change in editing.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						smelter pot terminology is typically used by people closely associated with the industry however the suggested term is correct and will be more meaningful to most readers. (Robert Chase, International Aluminium Institute)	
7-154	A	15	46	15	46	replace "accounts for about 9% of the mix," with "accounts for about 10% by weight of the mix,". (Source, IAI 2004 Anode Effect Survey). (Robert Chase, International Aluminium Institute)	Noted – LB will consider wording in light of next comment.
7-155	A	15	46			Easier to read is: "which emission factor is about 10% of the CF4 factor, .. (Jos Olivier, Netherlands Environmental Assessment Agency (MNP))	Noted – LB will consider wording in light of above comment.
7-156	A	15	49			Replace: "Beyond this, major.." by: "However, even larger reductions .." (Jos Olivier, Netherlands Environmental Assessment Agency (MNP))	Accepted – LB will make change in editing.
7-159	A	16	7			Add: ".., but its use is much smaller than SF6 used in magnesium production. (Jos Olivier, Netherlands Environmental Assessment Agency (MNP))	Accepted, with modification - LB will add, "but it is believed to be smaller than SF6 used in magnesium production."
7-160	A	16	10			"art (pointfeed) prebake smelter .." (Jos Olivier, Netherlands Environmental Assessment Agency (MNP))	Accepted – LB will change in editing.
7-161	A	16	13	16	13	a. Insert at end of paragraph: "The IAI has developed a four-pronged strategy to meet the challenges of climate change encompassing the full lifecycle of the metal, from production and use, to recycling and reuse (IAI, 2006). These are: 1. To reduce greenhouse gas emissions per tonne of metal produced through adoption of technology and good practice; 2. To increase energy efficiency in aluminium production; 3. To maximize the collection and recycling of used products; 4. To promote the lightweighting of vehicles." (Robert Chase, International Aluminium Institute)	Rejected – Far too much detail and too blatant an endorsement of IAI.
7-162	A	16	19			Add at end: "and when casting the primary metal into ingots." (Jos Olivier, Netherlands Environmental Assessment Agency (MNP))	Accepted – LB will add in editing.
7-163	A	16	20			I wonder what the basis is of the EPA estimate of 16 Mt for diecasting. RAND reports annual sales to the magnesium industrie in the 1990-2003 period normally between 150 and 400 ton, which corresponds to 3 to 9 Mton CO2-eq. (Jos Olivier, Netherlands Environmental Assessment Agency (MNP))	Accepted – 2006 report gives 9 Mt CO2-eq. Ref.: EPA (2006) forthcoming. LB will change in editing.
7-164	A	16	32	16	32	Table 7.4.3, Use most recent IAI data for CO2 and PFCs from 2004 survey data. CO2 emissions from anode consumption are 48 million tonnes (29.9 million tonnes Al times 1.6 tonnes CO2/t Al). PFC emissions are 35 million tonnes CO2-eq calculated using SAR GWPs, or, 32 million tonnes using TAR GWPS. (Robert Chase, International Aluminium Institute)	Accepted – LB will change in editing.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
7-165	A	16	34	16	35	b. Strike: "The GHG abatement options for the production of most non-ferrous metals are still fairly uncertain" (see a above) (Robert Chase, International Aluminium Institute)	Noted – LB will change statement to exclude aluminium in editing.
7-166	A	16	43			I strongly recommend to take advantage of the information provided in the SOD for the 2006 Guidelines for greenhouse gas inventories by the TSU NGGIP. (Jos Olivier, Netherlands Environmental Assessment Agency (MNP))	Taken into account – see response to comment 7-22.
7-167	A	16	46	16	47	GHG emissions data for the major manufactures under the chemicals sub-sector is largely reported, and publicly available, through numerous Trade Associations and company-specific communications. (James Bero, BASF Corporation)	Noted – LB has requested this information from trade association, but none has been forthcoming.
7-168	A	16	46			"on energy used for heating purposes and used as chemical feedstock and related GHG .." (Jos Olivier, Netherlands Environmental Assessment Agency (MNP))	Accepted – LB will change in editing.
7-169	A	16	49			Add: " by-products (e.g. venting or incineration of off-gases produced)." (Jos Olivier, Netherlands Environmental Assessment Agency (MNP))	Noted – LB will change in editing, but proposed wording is not clear.
7-170	A	16	54			Add: "The number of adipic acid and HCFC-22 manufacturers is very limited." (Jos Olivier, Netherlands Environmental Assessment Agency (MNP))	Rejected - Cannot make this statement without a suitable reference.
7-171	A	17	6			I miss here a clear description that chemical feedstock use often results in CO2 emissions since not all fossil carbon is stored in the products but in by-product gases generated and subsequently vented, flared or used for energetic purposes. The reason to make this distinction is to clarify for the reader that these are characteristically different sources, each with or without technical reduction options. Also the reduction potential is quite different: 1) fuel combustion emissions can be reduced by energy conservation or fuel switching; 2) feedstock emissions can be reduced, by using the by-product gas instead of venting or flaring it. (Jos Olivier, Netherlands Environmental Assessment Agency (MNP))	Noted – LB will consider in rewrite.
7-172	A	17	16	17	34	I understand there is space here to discuss the possibility of replacing ethylene produced from fossil fuel by ethylene produced from biomass. Can one paragraph be added on this issue? (Jose Moreira, Institute of Electrotechnology and Energy - University of Sao Paulo)	Rejected – Have no information on this potential and the comment does not provide any references.
7-173	A	17	22	17	24	Industry commonly uses process integration and co-generation to reduce the energy and feedstock needed for ethylene production, and that a savings of an additional 20% of total energy is an overestimate of potential savings. (James Bero, BASF Corporation)	Rejejcted – The text accurataely reflects the reference. The comment is opinion, unsupported by any references.
7-174	A	17	30	17	35	I also looked at producing ethylene from coal and biomass. The most efficient	Noted – References needed, before any use

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						processes using these energy sources use 30-40% more energy than those processes using natural gas. Biomass-derived ethylene might have potential for reduction of CO2 emissions. However, producing coal-derived ethylene, which China is planning to do in the next 30 years, could lead to a four-fold increase (from the current level on the basis of naphtha steam cracking) of CO2 emissions per unit of ethylene. CO2 sequestration is therefore highly desirable. Lenny and others, I think you did a great job on Chapter 7. Congratulations! (Tao Ren, Utrecht University)	can be made of information. LB will seek references.
7-175	A	17	40			Add after full stop: "The largest fraction is used to produce urea, in which most carbon of the CO2 generated in the ammonia manufacture is stored." (Jos Olivier, Netherlands Environmental Assessment Agency (MNP))	Noted – LB will check accuracy and change text if comment is supported.
7-176	A	17	44			I don't see the relevance of including the words after the comma "....,approaching the thermodynamic limit of about 19 GJ per tonne of ammonia."This could give the reader the false impression that much can still be gained in energy efficiency of ammonia plants, which is not the case. (Tore Jenssen, Yara Hesq)	Noted – The point of this wording is just the opposite – since state-of-the-art NH3 plants are operataing at close to the thermodynamic limit, there is little opportunity for addiitonal efficiency gain. See next comment.
7-177	A	17	44	17	44	To prevent misinterpretation of the reference to the thermodynamic limit, please consider rephrasing the end of this sentence to read "…latest design plants, which means that there is little scope for further increasing the efficiency of this process. (Kristen Elizabeth Sukalac, International Fertilizer Industry Association (IFA))	Accepted – LB will change in editing.
7-178	A	17	46	17	50	For both grammatical and technical reasons, we suggest redrafting this sentence: "The most recently constructed nitrogen fertilizer plants tend to have the best energy performance, and many of them are located in developing countries, which now account for 57% [again to be updated by IFADATA 2005] of nitrogen fertilizer production [N.B. includes non-ammonia N fertilizer production]. Individual differences in energy performance are mostly determined by feedstock (natural gas vs heavier hydrocarbons) and age of the ammonia plant (PSI, 2004, Phylipsen, et al. 2002). National and regional averages are strongly influenced by whether the sector has yet undergone restructuring, which tends to drive less efficient producers out of the market." (Source: Sukalac, K.E., 2005: Technology Transfer to Reduce Climate Change Impacts from the Fertilizer Industry. Presented at UNFCCC COP11/MOP1 side event "Knowledge Transfer to Reduce Greenhouse Gas Emissions: Lessons from the Fertilizer Industry", Montreal, QC, Canada, 6 December 2005.) (Kristen Elizabeth Sukalac, International Fertilizer Industry Association (IFA))	Accepted. LB will use a modified version of this text in editing.
7-179	A	18	13	18	14	"Atmospheric emissions of carbon dioxide [from ammonia production] are	Accepted – LB will include in rewrite

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						decreased by nearly one-half by its use in urea or nitrophosphate plants." UNIDO (United Nations Industrial Development Organization) and IFDC (International Fertilizer Development Center), 1998: Fertilizer Manual. Kluwer Academic Publishers, Dordrecht, The Netherlands and Norwell, Massachusetts, USA. p. 515. (Kristen Elizabeth Sukalac, International Fertilizer Industry Association (IFA))	
7-180	A	18	19	18	20	The text reads, "The Special Report also provides information on the costs of transportation and geological storage, as well as on the challenges in applying this technology." A very nice, up-to-date review on Ammonia from Gosnell, KBR starting with slide 46, the process details may be seen (this presentation may be found at energy.iastate.edu/renewable/biomass/AmmoniaMtg05.html) What also needs to be considered is that the delivery of carbon-free hydrogen may make possible the complete redesign of these plants. Ammonia facilities in particular spend a great deal of energy on carbon clean-up and would be an excellent first market for carbon-free hydrogen. (Richard Doctor, Argonne National Laboratory)	Noted – LB will evaluate reference and consider in rewrite.
7-181	A	18	24	18	26	I believe that there hae been significant developments in bipolar cells since the TAR. Would suggest references may be obtainable from German manufacturers. Is the statement actually true that 'there have been no significant developments affecting GHG emissions from chlorine production' as adoption of new technology could potentially have reduced emissions (although, conversely, increased production may have offset this). (Nick Campbell, ARKEMA SA)	Noted – LB will seek additional information for use in rewrite.
7-182	A	18	30	44	18	According to the TAR pg 213, it was estimated that 24 plants producing adipic acid worldwide would reduce by 62% by 2000, did this happen or any data on it, perhaps from Reimer? Also, the mitigation option of thermal destruction in boilers is not mentioned as an option? (John Kessels, Energy Research Centre of the Netherlands)	Noted – CD will provide data on emissions reduction for the two industries together in rewrite. Decoupled data not available.
7-183	A	18	30			It should be mentioned that the installation of N2O destruction facilities requires significant investment without additional economic benefits and therefore the investment would not be commercially viable even taking into account the market value of any potential by-product of the N2O destruction technology without any revenues such as from the sales of CERs generated from such a project if registered as a CDM one. (ELENA GEORGOPOULOU, NATIONAL OBSERVATORY OF ATHENS / INSTITUTE FOR ENVIRONMENTAL RESEARCH & SUSTAINABLE DEVELOPMENT)	Noted – LB will consider in rewrite. However, investment has been made in N2O destruction facilities, without any CDM credit.

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7-184	A	18	34	18	36	"…N2O emissions from nitric acid plants are small compared with other sources. Of the total N converted in the nitric acid plants, 0.6%-0.9% is lost as NOx, and 0.4%-1.5% is lost as N2O to the atmosphere." UNIDO (United Nations Industrial Development Organization) and IFDC (International Fertilizer Development Center), 1998: Fertilizer Manual. Kluwer Academic Publishers, Dordrecht, The Netherlands and Norwell, Massachusetts, USA. p. 515. (Kristen Elizabeth Sukalac, International Fertilizer Industry Association (IFA))	Noted – LB will consider in rewrite. The comment is not at odds with the FOD text, but a statement putting industrial N2O emission into a larger context will be useful.
7-185	A	18	38			The statement that "...catalytic reduction can eliminate 89% of the N2O emitted from nitric acid manufacture" is overly optimistic. The variety of plant designs and operating conditions call for a more realistic figure of 70%. (Tore Jenssen, Yara Hesq)	Noted – CD will add uncertainty range to average values in rewrite.
7-186	A	18	38			The assertion by Delhotal, et al. (2005) seems extremely optimistic. Benchmarking of nitric acid production by European fertilizer manufacturers revealed that, due to a variety of plant designs and operating conditions, 70% is a more realistic figure. -- Comment by T. Jenssen (Kristen Elizabeth Sukalac, International Fertilizer Industry Association (IFA))	Noted – CD will add uncertainty range to average values in rewrite.
7-187	A	18	38	18	38	Or more than 89% (see, for example, the proposed baseline methodology FS-5934822639 ("Catalytic N2O destruction project in the tail gas of the Nitric Acid Plant of Abu Qir Fertilizer Co.'") to the CDM-EB, where the proposed project activity is expected to reduce more than 90% of the N2O emissions that would be emitted without the project. According to the same source, under related project circumstances at the nitric acid of AMI in Austria, the particular catalytic reduction system reduces more than 98% of all N2O emissions of the nitric acid plant. (ELENA GEORGOPOULOU, NATIONAL OBSERVATORY OF ATHENS / INSTITUTE FOR ENVIRONMENTAL RESEARCH & SUSTAINABLE DEVELOPMENT)	Noted – CD will add uncertainty range to average values in rewrite.
7-188	A	18	40	18	41	Global total emissions of N2O from caprolactam production in 2000 is estimated at about 10 to 15 Mt CO2-eq. (EDGAR 4) using production estimates from SRIC and IPCC default emission factors. (Jos Olivier, Netherlands Environmental Assessment Agency (MNP))	Noted – CD will check reference and add information in rewrite if appropriate.
7-189	A	18	40			Add: "In the late '90 the adipic acid manfacturing industry in North America, Europe and Japan has reduced their N2O emissions significantly by applying these control technologies." (Jos Olivier, Netherlands Environmental Assessment Agency (MNP))	Taken into account. See response to comment 7-182.
7-190	A	18	46	18	54	Distruction of HFC-23 has been object of a few very large CDM projects. It would be useful to include this information here. Please, check the web site unfccc.int and	Noted – LB will consider in rewrite.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						search for CDM Project to collect further information on these monster-size CDM projects. (Jose Moreira, Institute of Electrotechnology and Energy - University of Sao Paulo)	
7-191	A	18	48	55	48	Mention that HCFC-22 for commercial use is intended to be phased out between 2005-2040. (John Kessels, Energy Research Centre of the Netherlands)	Accepted – LB will add in editing.
7-384	A	18	48	18	55	This is an excellent and succinct summary of the HFC-23 situation and should be a model for the rest of the report. (Nick Campbell, ARKEMA SA)	Noted – No response needed
7-192	A	18	49			Add after 1st full stop: "There are a limited number of HCFC-22 manufacturers. Global HFC-23 emissions from HCFC-22 manufacture were estimated at 85 Mton CO2-eq. in 1995 (Olivier and Berdowski, 2001). Since then, global HFC-23 emissions decreased about 20% by 2000 (Olivier, J.G.J., Van Aardenne, J.A., Dentener, F., Pagliari, V., Ganzeveld, L.N. and J.A.H.W. Peters, 2005, Recent trends in global greenhouse gas emissions: regional trends 1970-2000 and spatial distribution of key sources in 2000. Env. Sc., 2 (2-3), 81-99. DOI: 10.1080/15693430500400345). (Jos Olivier, Netherlands Environmental Assessment Agency (MNP))	Noted – All of this information is covered by SROC. In the interest of space, LB will edit section to refer to this report rather than repeating the information.
7-193	A	19	5	19	53	same comment as 7,9,11,9,18 (Niyazi GUNDOGDU, LAFARGE GROUP)	Noted – Assume the reviewer is referring to comment 7-87. EW to review submitted information and determine its applicability.
7-194	A	19	7			I miss here the remark that there are 2 distinctively different production processes: wet and dry, having different specific energy uses. (Jos Olivier, Netherlands Environmental Assessment Agency (MNP))	Rejected – See text on Pg. 19, line 27.
7-195	A	19	13	19	13	"591 MT" instead of "594 MT", "2120 MT" instead of "1950 MT" (Lorea Claude, CEMBUREAU)	Rejected – USGS is a generally available, highly respectd source. CEMBUREAU data is not easily accessible.
7-196	A	19	14	19	14	It should read, "411 MT" instead of "400 MT", "20%" and instead of "22%" (Lorea Claude, CEMBUREAU)	Same as response to Comment 7-196.
7-197	A	19	15	19	15	Instead of "1521 MT (78%) (USGS, 2005)" it should read "1560 MT (80%) (CEMBUREAU)" Composition of the “12 groups” for CEMBUREAU is: Buzzi/Unicem-Dyckerhoff, Cemex, Cimpor, Colacem, CRH, HeidelbergCement, Holcim, Italcementi, Lafarge, Taiheiyo, Titan and Uniland (Lorea Claude, CEMBUREAU)	Same as response to Comment 7-196.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
7-198	A	19	17	19	17	It should read as follows: "Global cement consumption was growing at about 2.5 % year until 2001. Since 2002 the average is about 6.7%" or "average excluding China is about 2.5 % per year" (Lorea Claude, CEMBUREAU)	Same as response to Comment 7-196.
7-199	A	19	21	19	21	It should read "930 MT" instead of "850 MT" (Lorea Claude, CEMBUREAU)	Same as response to Comment 7-196.
7-200	A	19	22	19	22	It should read "120 MT" instead of "110 MT" (Lorea Claude, CEMBUREAU)	Same as response to Comment 7-196.
7-201	A	19	25			Add after 1st full stop: "The use of limestone in cement clinker production is a major non-combustion source of CO2 from cement manufacture, globally accounting for 820 Mton CO2-eq. in 2000 (IEA, 2005) [IEA, 2005: CO2 from fuel combustion 1971-2003; 2005 Edition. International Energy Agency (IEA), Paris. ISBN 9 92-64-10891-2 (paper) 92-64-10893-9 (CD ROM)]" (Jos Olivier, Netherlands Environmental Assessment Agency (MNP))	Noted – EW will consider during rewrite.
7-202	A	19	27	19	27	It should read "clinker and electricity for kilns grinding" instead of "clinker and electricity for grinding" (Lorea Claude, CEMBUREAU)	Reject – Grammatically incorrect.
7-203	A	19	29	19	29	after coal the following should be added "not in Europe, replaced by solid combustible" (Lorea Claude, CEMBUREAU)	Rejected – Globally coal is the most important fuel. Requested level of detail inappropriate.
7-204	A	19	29			Add after full stop: "Due to the high temperatures involved, in cement manufacture often waste (e.g. waste oil, plastics, tires) is co-combusted, of which the fossil-carbon component contributes to fossil CO2 emissions." (Jos Olivier, Netherlands Environmental Assessment Agency (MNP))	Rejected – Discussion is already in Section 7.3.2.
7-205	A	19	35	50	19	Emission intensity confusing referring too either WBCSD or Worrell and some averaging the two? Perhaps just use one reference point and acknowledge there are others out there or a range (John Kessels, Energy Research Centre of the Netherlands)	Rejected – Better to show the range of results in the literature than to pick a single value.
7-206	A	19	37	19	41	COMMENT: It should be deleting one of DATA, for example, WBCSD Report 8, 2000. REASON: The data described seems to be inconsistent, some referring Worrell only, some referring WBCSD only and other averaging the two. And it also is not clear how to calculate the emission intensities for Korea and USA. (MASAHIRO NISHIO, Ministry of Economy, Trade and Industry)	Rejected – Better to show the range of results in the literature than to pick a single value.
7-207	A	19	37	19	41	COMMENT: According to the reference of [Worrell et al.2001b], the lowest intensity is 625kgCO2(170Kg C)/ton cement in Japan. Therefore, we would	Rejected – Suggested numbers not supported by references.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						suggest amending as follows: Emission intensities vary by region from a low of 625 kg CO2 (170 kg C)/ton cement in Japan, 700 kg CO2 (190 kg C) in Western Europe and 800 kg CO2 (219 kg C) in South Korea, to a high of 900, 930, and 935 kg CO2 (245, 253, and 255 kg C) per ton cement in China, India and the United States, respectively (Humphreys and Mahasenan, 2002; Worrell et al., 2001b). (MASAHIRO NISHIO, Ministry of Economy, Trade and Industry)	
7-208	A	19	37	19	41	It should be deleting one of DATA, for example, WBCSD Report 8, 2000. REASON: The data described seems to be inconsistent, some referring Worrell only, some referring WBCSD only and other averaging the two. And it also is not clear how to calculate the emission intensities for Korea and USA. (MASAHIRO NISHIO, Ministry of Economy, Trade and Industry)	Rejected – Better to show the range of results in the literature than to pick a single value.
7-209	A	19	37	19	41	According to the reference of [Worrell et al.2001b], the lowest intensity is 625kgCO2(170Kg C)/ton cement in Japan. Therefore, we would suggest amending as follows: Emission intensities vary by region from a low of 625 kg CO2 (170 kg C)/ton cement in Japan, 700 kg CO2 (190 kg C) in Western Europe and 800 kg CO2 (219 kg C) in South Korea, to a high of 900, 930, and 935 kg CO2 (245, 253, and 255 kg C) per ton cement in China, India and the United States, respectively (Humphreys and Mahasenan, 2002; Worrell et al., 2001b). (MASAHIRO NISHIO, Ministry of Economy, Trade and Industry)	Rejected – Better to show the range of results in the literature than to pick a single value.
7-210	A	19	40	19	40	Please, use metric systems where 1,000kg = 1 tonne. Check this point along all this chapter. (Jose Moreira, Institute of Electrotechnology and Energy - University of Sao Paulo)	Accepted – LB will correct in editing.
7-211	A	19	48	19	50	Another source of difference is also the process method used (wet or dry process). The dry process, which is the one applied in modern plants, has a significantly lower ebnergy consumption compared to the wet process. Furthermore, another source of difference is whether dry process is coupler with a multi-stage preheater and precalciner, which reduce significantly energy consumption. Another factor is the type of coolers, where old plants often use planetary coolers instead of modern and more energy-efficient grate coolers. Old plants (even in the US, as well as Central and Eastern Europe) may not be equiped with all these and therefore in these cases there is a large potential for energy conservation and consequently GHG emissions reduction. (ELENA GEORGOPOULOU, NATIONAL OBSERVATORY OF ATHENS / INSTITUTE FOR ENVIRONMENTAL RESEARCH & SUSTAINABLE DEVELOPMENT)	Rejected - Text already acknowledges on Pg. 19, line 27 that the two processes are different. Change is considered an energy efficiency step.
7-212	A	20	5	20	7	Insert at end of paragraph: "The global aluminium industry has also been successful	Taken into account – This comment was made

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						in reducing both emissions intensity and absolute emissions despite a 50% increase in primary aluminium production." (Robert Chase, International Aluminium Institute)	at the appropriate place in the section on Al.
7-213	A	20	5	20	40	same comment as 7,9,11,9,18 (Niyazi GUNDOGDU, LAFARGE GROUP)	Noted – Assume the reviewer is referring to comment 7-87. EW/LB to review submitted information and determine its applicability.
7-214	A	20	14	20	22	A study commissioned by the European Commission in 1993 concluded that the margin for further improvement was limited to 2.2 % ("Energy Technology in the Cement Industrial Sector" Final Report for Directorate-General for Energy (XVII) Contract NO XVII/4.1 (Lorea Claude, CEMBUREAU)	Rejected – oudated study.
7-215	A	20	23			Add reduction option for CO2 by replacing part of the fossil fuel by sewage sludge. (Jos Olivier, Netherlands Environmental Assessment Agency (MNP))	Noted – Discussion of the use of municipal wastes in cement kilns will be included as per discussion in Capetown. LB/EW have responsibility.
7-216	A	21	51	21	51	The figure of 250 kg CO2 per tonne is little bit high. It is more in the range of 200 kg CO2 per tonne. Justification can easily be deducted by calculation from the data found in the IPPC BREF document on Glass Industry p43, p46 and p73. (Nick Campbell, ARKEMA SA)	Noted – JH will check.
7-217	A	22	0	23		We respectfully suggest that section 7.4.5 on the pulp, paper and wood products industry could have significantly more detail. We sympathize with the authors, however, as much of the needed information is not readily available. Accordingly, we respectfully submit a proposed alternative section 7.4.5 as an attachment to the email transmitting these comments. We would be pleased to answer any questions that the IPCC authors have about the proposed substitute section we are submitting with our comments. (Reid Miner, NCASI)	Noted – LB/RM will evaluate information submitted by reviewer.
7-218	A	23	8	23	10	Production of paper products has not increased in OECD countries over the past decade. The production has considerably increased with economic growth in Asian countries over the past dacade. (Takayuki Okayama, Tokyo University of Agriculture and Technology)	Noted – LB/RM will seek appropriate references.
7-219	A	23	19			COMMENT: It is more accurate to use the word "paper sludge"than "sludge" because the sentence points out "The production of paper and pulp produces--- sludge as by-products, all of which can be used as biomass fuels." (MASAHIRO NISHIO, Ministry of Economy, Trade and Industry)	Accepted – LB will change in editing.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
7-220	A	23	19	23	20	Recently refuse paper and plastic fuel has been developed as biomass fuels, because of its high calorific value and stable qualities. (Takayuki Okayama, Tokyo University of Agriculture and Technology)	Noted – RM will seek references and detail.
7-221	A	23	19			It is more accurate to use the word "paper sludge"than "sludge" because the sentence points out "The production of paper and pulp produces--- sludge as by-products, all of which can be used as biomass fuels." (MASAHIRO NISHIO, Ministry of Economy, Trade and Industry)	Accepted – LB will change in editing.
7-222	A	23	20			Add after 1st full stop: "Apart from the wood products industry, the pulp and paper industry is thus one of ..." (Jos Olivier, Netherlands Environmental Assessment Agency (MNP))	Noted – Additional information available since the FOD provides detail on the use of biomass in the pulp and paper industry and will replace this general statement. LB/RM to address in rewrite.
7-223	A	23	25			While it is true that the use of biomass fuels will lower CO2 intensity, it tends to increase energy consumption per unit product (in spite of the downward trend we do see in intensity) because biomass fired devices tend to be less efficient that those fired by alternative fossil-based fuels. This fuel supply is not very clean and requires more handling and/or preparation than other fuels (ash removal, gasification, etc.). Not that this is a bad thing, but in this case, the trend to reducing CO2 intensity is accompanied by a trend to increase energy intensity. Fortunately for the industry, the increasing efficiency with which the other fuels are used compensates for declines in efficiency in the movement to biomass fuels. (John Nyboer, Energy and Materials Reseach Group, School of Resource and Environmental Management, Simon Fraser Univeristy)	Noted – No action required.
7-224	A	23	36	23	49	These comments include discussion of Table 7.4.4. Table 7.4.4., which may or may not be based on the line 38 reference to Tanaka, et.al. 2005, has the potential to provide useful information, but in its current form is confusing. It leaves the impression, without very careful reading, that the emission reduction potential in 2030 is roughly equivalent to the projected emissions in 2030. Only by carefully reading the small print is it evident that the reduction potential scale (the number of "+"s) is generally one-tenth the scale of emissions. This could be improved simply by replacing the "+"s in the table with the tonnage ranges from the small print at the end of the table. Additionally, the relationship between this table and the Tanaka citation should be clarified. In fact, the Tanaka methodology briefly mentioned needs to be explained. (Russell Jones, American Petroleum Institute)	Noted – KT to consider in rewrite.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
7-225	A	23	37		39	Table 7.4.4 lists the technical potentials for CO2 emission reductions for the paper and pulp industry. These values are calculated from a methodology developed by Tanaka, et al. (2005). A description of the methodolgy is warranted to clarify how these values were reached. (Luke Warren, IPIECA)	Noted – KT to consider in rewrite.
7-226	A	23	42			This bullet on the fuel mix belongs in particular under Cement production, not under Pulp and paper. (Jos Olivier, Netherlands Environmental Assessment Agency (MNP))	Noted – LB will remove phrase in parenthesis in editing.
7-227	A	23	49			Table 7.4.4 - if this table remains, that title needs to make it clear whether the metric is emissions or emissions intensity. (Reid Miner, NCASI)	Accepted – LB will edit title to make clearer.
7-228	A	23	51	23	52	There are two main processes in chemical pulping. One is kraft pulping process and another in sulphite pulping process. Most of chemical pulp are produced by kraft process. But a little amount of sulphite pulp is still produced in the world. Sulphite pulping in acidic process, which is different from kraft process. Usually a mixture of sodium hydroxide and sodium sulphide are used for kraft process. Sodium sulphite is used for neutral sulphite semi-chemical pulping, which is different from chemical pulping. Sodium sulphite is not used for kraft process. (Takayuki Okayama, Tokyo University of Agriculture and Technology)	Accepted – LB will edit footnote to indicate that limited use is made of this process.
7-229	A	24	5	24	28	What about soft drinks, breweries, etc? (John Kessels, Energy Research Centre of the Netherlands)	Noted – FY will ask for references.
7-230	A	24	5	24	28	What about soft drinks, breweries, etc? (John Kessels, Energy Research Centre of the Netherlands)	Noted – FY will ask for references.
7-231	A	24	36	24	36	And its high organic content. (ELENA GEORGOPOULOU, NATIONAL OBSERVATORY OF ATHENS / INSTITUTE FOR ENVIRONMENTAL RESEARCH & SUSTAINABLE DEVELOPMENT)	Accepted – LB will add in editing.
7-232	A	24	40			I know there is some discussion on the actuall GWp of methane to make it 23 but, as far as I know, this is still at 21, unless by the time of publication it will be 23. (John Nyboer, Energy and Materials Reseach Group, School of Resource and Environmental Management, Simon Fraser Univeristy)	Reject – AR4 will use TAR values for GWP, unless even later values are provided by WG I.
7-233	A	24	46	24	48	Please, check the figures. A total annual emission of 90kt CO2 eq for the palm oil industry in Malaysia is "peanuts". With a planted area of 3.5 million há, this is a major agroindustry activity. If the figure is correct it would be useful to add a sentence telling these emissions are quite small to influence climate change. (Jose Moreira, Institute of Electrotechnology and Energy - University of Sao Paulo)	Accepted – FY will provide information on total emissions in rewrite.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
7-234	A	24	46	24	51	Is this relevant here. Instead refer to waste chapter? (Jos Olivier, Netherlands Environmental Assessment Agency (MNP))	Rejected – Chapter 7 discusses waste treatment inside plants. The wastewater treatment discussed in this text would be part of the plant.
7-235	A	24	51			Add: "However, wastewater systems are also a source of N2O (direct from wastewater treatment plants and indirect from wastewater discharged)." (Jos Olivier, Netherlands Environmental Assessment Agency (MNP))	Accepted – LB will add in editing.
7-236	A	25	5			Is info in this section revelant here?? 1. The part on wastewater should refer to the waste chapter. 2. When it refers to general mitigation option like CHP, improved practices etc., this is generic and not specific for the food industry. (Jos Olivier, Netherlands Environmental Assessment Agency (MNP))	Rejected – Chapter 7 discusses waste treatment inside plants. The wastewater treatment discussed in this text would be part of the plant.
7-237	A	25	39	25	43	Here there is space to add some figures from Brazil where electricity sales to the grid has achieved 1.6TWh/yr in 2005, from na installed capacity of 400MW. Also, it is worthwhile to mention the existence of a government induced voluntary program PROINFA, that allows te installation of more 1,100MW of power capacity based in sugarcane bagasse and residues. Present surplus generation potential may exceeds 100kWh/t of sugarcane. Considering the earlier data of 1.26t of sugarcane/yr at world level this yield 120TWh/yr of CO2 free electricity generation. (Jose Moreira, Institute of Electrotechnology and Energy - University of Sao Paulo)	Noted - FY to seek references and add appropriate information in rewrite.
7-238	A	26	8	26	23	Is all info in this section revelant here? (Jos Olivier, Netherlands Environmental Assessment Agency (MNP))	Rejected – Chapter 7 discusses waste treatment inside plants. The wastewater treatment discussed in this text would be part of the plant.
7-239	A	26	25			I miss in this section references to global and regional emissions of individual HFC and PFC compounds available in the EDGAR 3.2 dataset, which contains global and regional trends for HFCs for 1997 and for PFC for 1998 and estimates for all F-gases for 2000. This data is available at the EDGAR site and documented in: Olivier, J.G.J. (2005) Part III: Greenhouse gas emissions: 1. Shares and trends in greenhouse gas emissions; 2. Sources and Methods; Greenhouse gas emissions for 1990 and 1995. In: "CO2 emissions from fuel combustion 1971-2003", 2005 Edition, International Energy Agency (IEA), Paris; Olivier, J.G.J. and J.J.M. Berdowski (2001) Global emissions sources and sinks. In: Berdowski, J., Guicherit, R. and B.J. Heij (eds.) "The Climate System", pp. 33-78. A.A. Balkema Publishers/Swets & Zeitlinger Publishers, Lisse, The Netherlands. ISBN 90 5809 255 0. Moreover, the IEA book also provides trends upto to 2001. The 2000 data	Noted – JH will consider in rewrite.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						are documented in: Olivier, J.G.J., Van Aardenne, J.A., Dentener, F., Pagliari, V., Ganzeveld, L.N. and J.A.H.W. Peters (2005) Recent trends in global greenhouse gas emissions: regional trends 1970-2000 and spatial distribution of key sources in 2000. Env. Sc., 2 (2-3), 81-99. DOI: 10.1080/15693430500400345. (Jos Olivier, Netherlands Environmental Assessment Agency (MNP))	
7-240	A	26	27	26	36	Given the importance of semiconductors as a leading indicator of technology development around the world, I think it might make sense to devote a bit more space to exploring the increase in GHG emissions that might result from increasing R&D in the semiconductor industry. (Jacob Park, Green Mountain College)	Rejected – Supporting reference not provided.
7-241	A	26	40	26	43	In the case of Japan, the electric utility industry adopted the Voluntary Action Plan to reduce SF6 Emissions in April 1998. Under this plan, the industry has worked to reduce emissions by 2005 to 3% of SF6 contained when devices are inspected, and to 1% when they are disposed of. By aggressively applying gas recovery systems and working to recycle the recovered gas, the industry has made substantial progress in containing emissions. Emission ratios in 2004 have already been reduced to 3% during mechanical inspections and 1% during disposal, and the industry aims to meet its targets by continuing its efforts in this area. (Shinichi Nakakuki, Tokyo Electric Power Company)	Noted – JH will include in rewrite.
7-242	A	26	40	26	43	In Japan, by aggressively applying gas recovery systems and working to recycle the recovered gas,the industry has made substantial progress in containing emissions. Emission ratios in 2004 have already been increased to 97% during mechanical inspections and 99% during disposal. (Shigeo Murayama, The Federation of Electric Power Companies)	Noted – JH will include in rewrite.
7-243	A	26	43			COMMENT: the sentenses below be added between "--site(Wartman and Harnish, 2005)." and "Emissions of SF6---" in line 43 of p26: "On the other hand, in Japan,It has been carrying out the similar volunteer action for curtailment of the total amount of SF6-Gas emissions from in 1997.Japanese power electrical industry has been cutting down the SF6-gas emissions in the same efforts as Europe and has achieved the drastic curtailment recently REFERENCE: Hiroshi Yasutake et al., 2002 in EPA meeting. (MASAHIRO NISHIO, Ministry of Economy, Trade and Industry)	Noted – JH will include in rewrite.
7-244	A	26	43			the sentenses below be added between "--site(Wartman and Harnish, 2005)." and "Emissions of SF6---" in line 43 of p26: "On the other hand, in Japan,It has been	Noted – JH will include in rewrite.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						carrying out the similar volunteer action for curtailment of the total amount of SF6-Gas emissions from in 1997.Japanese power electrical industry has been cutting down the SF6-gas emissions in the same efforts as Europe and has achieved the drastic curtailment recently REFERENCE: Hiroshi Yasutake et al., 2002 in EPA meeting. (MASAHIRO NISHIO, Ministry of Economy, Trade and Industry)	
7-245	A	27	9	27	10	These lines imply that solvents use will dominate industry emissions by 2020; this is not true in relation to the IPCC/TEAP Special report through to 2015. (Nick Campbell, ARKEMA SA)	Noted – JH will clarify in rewrite.
7-246	A	27	12			A description of the slag cement made with "Cross-Industry Options" is very good. (MASAHIRO NISHIO, Ministry of Economy, Trade and Industry)	Noted – No action required.
7-247	A	27	14	27	25	Include also the fact that the cement industry uses other wastes such as tyres for energy, eg see E.Onuma et al, 2004 IPCC Proceedings from the Expert meeting in Tokyo. (John Kessels, Energy Research Centre of the Netherlands)	Noted – LB will include in editing.
7-248	A	27	14	27	14	Apart from this type of synery between industries with impacts on energy consumption, the potential synergy between industries - where applicable - with respect to the coverage of energy needs should be mentioned (e.g. one industry has a cogeneration system and sells the heat produced to an adjacent facility with high thermal needs). (ELENA GEORGOPOULOU, NATIONAL OBSERVATORY OF ATHENS / INSTITUTE FOR ENVIRONMENTAL RESEARCH & SUSTAINABLE DEVELOPMENT)	Rejected – The sale of heat or power is not the type of option being discussed. There is no special synergy in such cases.
7-249	A	27	16	27	18	I do not think it is 100% correct to say that "the use of granulated slag in Portland cement may increase energy use in the steel industry". There will be no difference in energy consumption by the steel industry whether the granulated slag is stockpiled, dumped or used as a cement component. Any such energy increase is a result of the granulation process that makes the slag suitable for use in Portland cement. Therefore, I would change the sentence to: "For example, the granulation process used to make slag suitable for use in Portland cement may increase energy use in the steel industry (for granulation), but the use of granulated slag can reduce both energy consumption and CO2 emissions during cement production by about 40%. (Yoshito Izumi, Taiheiyo Cement Corporation)	Noted - Will be considered in rewrite of Section 7.4.8. RM will seek references.
7-250	A	27	18	27	21	Compared to the description of light weight materials, the sentence describing slag cement is too long and too detailed. If the corresponding reference is attached, we	Noted - LB will delete first two sentences, but will retain last sentence.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						may simplify the description. Namely, the following sentence should be deleted: "Approximately 300 kg of blast furnace slag are generated for every tonne of iron produced. Granulated slag becomes blast furnace cement when pulverized and mixed with clinker, reducing the clinker content of the cement. Production of clinker is the most energy- and carbon-intensive step in cement manufacture". (Yoshito Izumi, Taiheiyo Cement Corporation)	
7-251	A	27	23	27	23	An example could be noted that the IAI sustainability model projects that by year 2020 that the continued substitution at the current rate of aluminium for traditional heavier materials in automobiles will result in savings of CO2 emissions from reduced fuel use by an amount that totally offsets the GHG emissions from primary aluminium production. (Robert Chase, International Aluminium Institute)	Noted – LB will consider during rewrite.
7-252	A	27	25	27	26	Since the cement industry also plays a role as a core of industrial ecology, it would be very important to include mention of industrial wastes such as used tires etc. as follows: "In addition, the cement industry also plays a role as a core of industrial ecology to utilize industrial wastes such as tires and plastics as alternative fuels. (E. Onuma et al., 2004)" Reference (E. Onuma et al., 2004): http://arch.rivm.nl/env/int/ipcc/docs/ITDT/ITDT%20Energy%20Intensive%20Industry%20Session.pdf (Page 169) "Consideration of CO2 from Alternative Fuels in the Cement Industry" (Yoshito Izumi, Taiheiyo Cement Corporation)	Rejected – The use of waste material in the cement industry is discussed in Section 7.4.4.1, it does not have to be discussed again in this section.
7-253	A	27	27			Table 7.5.1 demonstrates that the total potential abatement in the Industry sector is small compared to the total abatement potential in the energy supply and transport sectors, and that mitigation of GHG emissions is best served by emphasizing energy conservation rather than implementing technology improvements in Industry. Technology improvements must be economically viable (James Bero, BASF Corporation)	Rejected – All mitigation options will be needed, and it is outside the scope of this chapter to suggest that GHG control in other sectors should be emphasized.
7-254	A	27	27			Section 7.5. No overall potential is given. Anyway a re-assessment of the 2001 estimates should be given. Are these still valid? Also, an assessment of the value of the IEA figures which are low compared to many of the other figures should be provided. (Blok Kornelis, Ecofys)	Noted – Section 7.5 will be significantly expanded in the SOD. EW/CD/LB responsible.
7-255	A	27	29	27	37	Need to find other references on potential for cost of GHG emission reduction aside from IEA	Noted – We're trying.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						(John Kessels, Energy Research Centre of the Netherlands)	
7-256	A	27	32			There have been a number of reports on Canadian costs to reduce GHG emissions to targeted Kyoto levels: Jaccard, M., Loulou, R., Kanudia, A., Nyboer, J., Bailie, A. and M. Labriet. 2003. Methodological Contrasts in Costing GHG Abatement Policies: Optimization and Simulation Modeling of Micro-Economic Effects in Canada. European Journal of Operations Research: 145(1) 148-164. Jaccard, M., Nyboer, J., Bataille, C. and B. Sadownik. 2003. Modeling the Cost of Climate Policy: Disintinguishing Between Alternative Cost Definitions and Long-Run Cost Dynamics , The Energy Journal,: 21(1) 49-73 Jaccard, Mark, John Nyboer and Bryn Sadownik. 2002. The Cost of Climate Policy. UBC Press: Vancouver, B.C. 242 pp. (John Nyboer, Energy and Materials Reseach Group, School of Resource and Environmental Management, Simon Fraser Univeristy)	Noted – LB will evaluate these references during rewrite.
7-257	A	27	40	27	48	Repeats page 18 word for word from line 36-40, suggest rewriting. (John Kessels, Energy Research Centre of the Netherlands)	Accepted – LB will rewrite during editing.
7-258	A	28	10	28	35	I think you need to elaborate a bit more on some of the economic barriers - discount rate and time value, risk issues related to new technologies, longer payback period on more expensive, newer technology options inappropriate analysis of other issues (e.g., lack of multi-attribute analysis), rebound effects, etc. (John Nyboer, Energy and Materials Reseach Group, School of Resource and Environmental Management, Simon Fraser Univeristy)	Noted – will consider comments 7-258 – 7-270, ex. 7-261, during rewrite. LB to rewrite with input from CD/JR.
7-259	A	28	10			Section 7.6 Barriers to Industrial Mitigation. Capital turnover is a crucial driver of technology substitution and replacement in capital-intensive technologies (see references to Ruth, 1995; and Worrell and Biemans in page 13 and elsewhere in this chapter). Excess capacity should therefore be mentioned as a central barrier to new industrial processes deployment and diffusion. (Francisco Aguayo, El Colegio de México)	Taken into account. See response to comment 7-258.
7-260	A	28	10	35	28	7.6 could be rewritten as two or one paragraph. Delete first paragraph, start with A broad range... (John Kessels, Energy Research Centre of the Netherlands)	Taken into account. See response to comment 7-258.
7-261	A	28	10	28	34	Please consider if it is necessary to emphasis GHG mitigation is not the main objective for governmental policy or market driven force. In most of case, GHG mitigation is the by product of many policies such as energy efficiency, energy security. It is not important if it is a main target or by-product. The most important	Noted – LB will show co-benefit of other government policies in rewrite. Will seek references.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						is get the real emission reduction. (Yanjia Wang, Tsinghua University)	
7-262	A	28	10	28	15	Market and governmental incentives are essential before an industry can afford to invest in for GHG mitigation. Lower energy costs through use of process integration and co-generation is currently driving GHG mitigation. (James Bero, BASF Corporation)	Taken into account. See response to comment 7-258.
7-263	A	28	12	28	14	Whilst this statement can be justified, I would suggest that the section would require a better leading paragraph to start to explain the concept of barriers to mitigation of GHGs. (Nick Campbell, ARKEMA SA)	Taken into account. See response to comment 7-258.
7-264	A	28	12			Another barrier is the lack of environmental regulations in many countries which could limit specific energy consumption or GHG emissions. Furthermore, new tools such as emissions trading could serve as incentives in GHG mitigation. In general, apart from barriers the section could mention incentives as well. (ELENA GEORGOPOULOU, NATIONAL OBSERVATORY OF ATHENS / INSTITUTE FOR ENVIRONMENTAL RESEARCH & SUSTAINABLE DEVELOPMENT)	Taken into account. See response to comment 7-258..
7-265	A	28	17			How do you define cost-effective? (John Nyboer, Energy and Materials Reseach Group, School of Resource and Environmental Management, Simon Fraser Univeristy)	Taken into account. See response to comment 7-258.
7-266	A	28	17	28	18	There is no "barrier" mentioned in line 17 but then line 18 starts with "another barrier". (Nick Campbell, ARKEMA SA)	Taken into account. See response to comment 7-258.
7-267	A	28	18			It seems to me you are missing a barrier. You start out the second sentence in this paragraph with "Another barrier" and I don't see a first one. This continues into the next paragraph with "A third barrier…" (John Nyboer, Energy and Materials Reseach Group, School of Resource and Environmental Management, Simon Fraser Univeristy)	Taken into account. See response to comment 7-258.
7-268	A	28	19			Insert the words "sometimes limited" at the beginning of the line. If they have a great ability, this is not a barrier. (Kristen Elizabeth Sukalac, International Fertilizer Industry Association (IFA))	Taken into account. See response to comment 7-258.
7-269	A	28	25	28	34	This paragraph is a gross simplification of the issue of competing for capital within a company. Further text would be beneficial. It should be noted that the competition for capital also applies whetehr or not GHG reduction is a "legal requirement" (line 26). (Nick Campbell, ARKEMA SA)	Taken into account. See response to comment 7-258.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
7-270	A	28	25	28	25	Global competition may also serve as an incentive for energy conservation, especially in energy-intensive industries or industries where energy consumption represents a large share of the unit production cost. (ELENA GEORGOPOULOU, NATIONAL OBSERVATORY OF ATHENS / INSTITUTE FOR ENVIRONMENTAL RESEARCH & SUSTAINABLE DEVELOPMENT)	Taken into account. See response to comment 7-258.
7-271	A	28	38	28	39	First sentence nicely captures the essence of the SD triangle (social, economic and environmental aspects). It is an almost direct quote from (IPCC 2000), and also (MM 2002) -- these citations can provide more details. (IPCC 2000) = IPCC. 2000. "Development, Equity and Sustainability", Cross Cutting Issues Guidance Papers, pp.69-113, IPCC, Geneva. (MM 2002) = Munasinghe, M. 2002. "Sustainomics transdisciplinary framework for making development more sustainable - application to energy issues", Int. Journal of Sustainable Development, Vol.5, pp.125-82. (Mohan Munasinghe, Munasinghe Institute for Development (MIND))	Noted – JR will add reference.
7-272	A	28	38	28	39	Definition of sustainable development that is commonly accepted: "…development that meets the needs of the present without compromising the ability of future generations to meet their own needs" - 1987 Brundtland (James Bero, BASF Corporation)	Rejected – The definition of sustainable development has evolved since the Brundtland Report.
7-273	A	28	38	28	40	If there is a description of sustainable development here then it requires expansion and coordination with the chapter on SD. Line 39-40 has no meaning. (Nick Campbell, ARKEMA SA)	Noted – JR will add cross-reference to Chapter 12.
7-274	A	28	49	28	53	There is a discrepancy between line 49 on developed countries, where you write "could mitigate" and line 53 on developing countries where you describe what actually has happened ("..has decreased"). Would be better to describe also what actually has happened in OECD countries. (Peter Bosch, IPCC TSU WGIII)	Noted. JR will rewrite.
7-275	A	29	32	29	39	Data on green purchasing is a bit outdated and not very comprehensive. You might wish to turn to the information and research materials available on http://www.nagpi.net (Jacob Park, Green Mountain College)	Noted – JR will evaluate reference.
7-276	A	29	50	31	30	Would be good to have an example of a developing country within these sections, possibly in the SME sectionand also to mention that many developing countries use and follow ISO 9000 standards, etc (John Kessels, Energy Research Centre of the Netherlands)	Noted – JR/LB will attempt to find suitable example and add ISO 9000 information in rewrite.
7-277	A	30	9	30	12	The references to insurance and large enterprises may be correct if we're talking	Noted – LB will seek better information on

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						about large state of the art offshore petroleum platforms designed to withstand every 50 years weather/hurriance phenomenons. But, as we have seen in Hurricance Katrina and elsewhere, the size of the enterprise may not matter unless there is good public policy to back it up. (Jacob Park, Green Mountain College)	insurance for rewrite.
7-278	A	30	9	30	17	Many SMEs have both manufacturing and storage facilities; in these circumstances primarily because of the costs of the goods kept in such facilities insurance will be taken out. (Nick Campbell, ARKEMA SA)	Noted – LB will seek better information on insurance for rewrite.
7-279	A	30	19	30	20	Gross simplification and potentially not true for all regions. (Nick Campbell, ARKEMA SA)	Noted – LB will either amplify or delete in rewrite.
7-280	A	30	24	30	24	The constraining of GHGs emissions may not be the "fundamental objective" of all government climate policies. Issues such as development and economic growth may be of more priority within climate policies. (Nick Campbell, ARKEMA SA)	Accepted – LB will limit statement to climate policy in editing.
7-281	A	30	38	30	48	Consider changing the terminology regarding "measurement" to "inventory" and adding a sentence to indicate that some industry sectors have developed actual measurement protocols for the major GHG emissions. The WRI tools referred to are inventory and calculation tools, not direct measurement protocols. The global aluminium industry has developed and published, with USEPA, a specific measurement protocol for PFCs from primary aluminium production.Reference, USEPA/IAI, “Protocol for Measurement of Tetrafluoromethane (CF4) and Hexafluoroethane (C2F6) Emissions from Primary Aluminum Production,” May, 2003. (Robert Chase, International Aluminium Institute)	Noted – LB will rewrite section and move information on management practices to section 7.3.
7-282	A	30	38	30	48	This section uses as its basis the WBCSD/WRI reporting standards. For completeness, and although it is mentioned later in the chapter, the MR&V systems that have been developed under the EU ETS should at least be referenced in this section. (Nick Campbell, ARKEMA SA)	Noted – LB will rewrite section and move information on management practices to section 7.3.
7-283	A	30	48			It is expected that the implementation of recently introduced market-based tools for GHG emissions reduction, such as the EU-ETS which is accompanied by specific guidelines (Decision 156/2004/EC) on GHG emissions monitoring and reporting, will give a further boost to the development of GHG Measurement and Reporting Systems. The future accelerated development of CDM projects, which comprise a monitoring plan, may have similar positive impacts as well.	Noted – LB will rewrite section and move information on management practices to section 7.3.

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						(ELENA GEORGOPOULOU, NATIONAL OBSERVATORY OF ATHENS / INSTITUTE FOR ENVIRONMENTAL RESEARCH & SUSTAINABLE DEVELOPMENT)	
7-284	A	31	14	31	16	I suggest to say something also about studies that demonstrate there is already enough technology to reduce GHG emissions and eventually stabilize their atmospheric concentration. One is IPCC, TAR, WGIII, Chapter 3, where a plot showing potential emission reduction up to 2020 is shown using presently available technologies. The other is Moreira, 2005, Global biomass energy potential. Mitigation and Adaptation Strategies for Global Change(Special Issue, forthcoming). .And a third ones is by Mollersten et al, 2003 showing that carbon capture and storage applied to large scale liquid fuel and electricity generation can yield negative emissions. Probably many other studies can be identified and the paper by Hoogwijk et al, 2005 given the potential for primary energy production from biomass at a level of 1000EJ is another proof. Thus, is not new technologies that are required. All that is needed is the optimization and large scale use of existent methodologies to bring down costs. (Jose Moreira, Institute of Electrotechnology and Energy - University of Sao Paulo)	Noted – LB will rewrite section and move information on management practices to section 7.3.
7-285	A	31	30	31	53	Would it not be better to discuss industrial size proposed projects, their size mitigation potential and the potential cost of the credits from the mechanisms rather than give an overview of the Kyoto Protocol mechanisms which can be covered in Chapter 13. There is a wealth of literature from the World Bank, IETA that lists and discusses large industrial projects. This section could discuss that the effectiveness of JI and CDM is that so many projects with this much potential mitigation in the industry sector have been proposed and the value of the credits and incentive to industry is estimated at .... (John Kessels, Energy Research Centre of the Netherlands)	Noted – LB will rewrite section and move information on management practices to section 7.3.
7-286	A	31	33			Section 7.9.1 on the Kyoto mechanisms is outdated. Due to the fast pace of development of these emerging carbon markets, it would be good to offer links to the appropriate web sites for information on approved CDM methodologies, status of project registration and the current status of the CDM pipeline (already nearly 800 projects), and the text should reflect the deliberations and outcomes of COP11/MOP1 on CDM and JI. The section should also report on the growing literature on the Kyoto CDM/JI potential and performance of individual countries, which is a function of the scope for GHG reductions/sinks, the business climate and implementation capacity in the broadest sense (e.g., World Bank; Point Carbon; Martina Jung 2005; Arquit	Noted – Section to be completely rewritten. LB to edit. JR to contribute.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						Niederberger & Saner 2005; Fankhauser & Lavric 2003....). With respect to capacity to implement CDM, Nondek, L., and A. Arquit Niederberger, Statistical analysis confirms Kyoto capacity building needs, Climate Policy, 4(3), 249-268, April 2005 offers a quantitative analysis and insights for the design of training programs. (Anne Arquit Niederberger, Policy Solutions)	
7-287	A	31	33			A particular point related to GHG emissions reduction in industry combined with the Kyoto mechanisms is the incentive that CDM provides for the reduction of HFCs and N2O in existing industrial facilities. These reductions are very large (since those gases have a high GWP) and become economically attractive through the use of the mechanisms. (ELENA GEORGOPOULOU, NATIONAL OBSERVATORY OF ATHENS / INSTITUTE FOR ENVIRONMENTAL RESEARCH & SUSTAINABLE DEVELOPMENT)	Noted – Section to be completely rewritten. LB to edit. JR to contribute.
7-288	A	31	35	31	46	It is proposed to update that information reflecting the amendments/improvements of the CDM at COP11 in Montreal. (Radunsky Klaus, Umweltbundesamt)	Noted – Section to be completely rewritten. LB to edit. JR to contribute.
7-289	A	31	35	31	35	The Kyoto Protocol did not create the CDM or JI. It has been created under the Kyoto Protocol by the Parties to the Protocol that are nation states. (Nick Campbell, ARKEMA SA)	Noted – Section to be completely rewritten. LB to edit. JR to contribute.
7-290	A	32	5	32	38	The barriers are listed for the success of CDM but what about the successes why have some countries accelerated the use of CDM such as India. What are they doing differently than other countries? Why is India listed for the number of CDM projects? Why not all with a regional breakdown there is literature avaliable on this? (John Kessels, Energy Research Centre of the Netherlands)	Noted – Section to be completely rewritten. LB to edit. JR to contribute.
7-291	A	32	5	32	37	This section requires a "lead-in" paragraph to explain what it is to be dealt with. The section is also unbalanced in that it talks about limited regions/coountries and theerby needs to be more encompassing with further examples. (Nick Campbell, ARKEMA SA)	Noted – Section to be completely rewritten. LB to edit. JR to contribute.
7-292	A	32	5			The section should focus more on the CDM projects registered, seeking registration and under validation (according to the latest - I.e. end of 2005 - info from the UNFCCC web-site) than on AIJ. (ELENA GEORGOPOULOU, NATIONAL OBSERVATORY OF ATHENS / INSTITUTE FOR ENVIRONMENTAL RESEARCH & SUSTAINABLE DEVELOPMENT)	Noted – Section to be completely rewritten. LB to edit. JR to contribute.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
7-293	A	32	5	32	37	This section requires a "lead-in" paragraph to explain what it is to be dealt with. The section is also inbalanced in that it talks about a limited number of regions/countries and thereby needs to be more encompassing with further examples. (Andrei Marcu, IETA)	Noted – Section to be completely rewritten. LB to edit. JR to contribute.
7-294	A	32	31	32	34	It should read: "The Government of India has identified energy efficiency in the power sector and the steel industry as priorities for Indian CDM projects. The Government of Brazil has identified the complimentary use of biomass sources already used for alcohol production as potential source of green electricity generation and created a voluntary program to promote the installation of 1100MWe up to the year 2006. The program (PROINFA) in its 2nd phase should promote production of 3.3% of all electricity used in the country from biomass by 2009 (aprox. 3300MW). As of December, 2004, 44CDM projects have been proposed for India and 40 for Brazil including biomass-based cogeneration and energy efficiency." (Jose Moreira, Institute of Electrotechnology and Energy - University of Sao Paulo)	Noted – Section to be completely rewritten. LB to edit. JR to contribute.
7-295	A	32	35	32	38	The sentence This delay and low success rate has diminished hopes about the ability..is an opinion, you could also argue that with over 400 proposed CDM projects there is a likelihood that CDM will accelerate the use of some technologies in the near future if some barriers can be overcome, such as administrative hurdles. (John Kessels, Energy Research Centre of the Netherlands)	Noted – Section to be completely rewritten. LB to edit. JR to contribute.
7-296	A	33	5	33	15	Include also an example of a developed country or several programmes for comparison such as IEA studies, (John Kessels, Energy Research Centre of the Netherlands)	Noted – LP to consider during rewrite.
7-297	A	33	5	34	10	Do any of the studies mention actual quantities of GHG emission reductions from the agreements compared with not having the agreements. What is an example in numbers of a successful programme? Have their been unsuccessful programmes if so why, what were the problems? Also, what were the reasons behind successful programmes, this is a list of programmes and elements in them but no accessment apart from the first paragraph on page 34 which is in percentages, what also were the benefits in costs by implementing these programmes? (John Kessels, Energy Research Centre of the Netherlands)	Noted – LP to consider during rewrite.
7-298	A	33	11	33	11	Please add at the end: "The Government of Brazil launched in 1998 an energy efficiency program which requires that electric utilities invest 1% of their annual revenue in projects that reduces energy demand. Such program is underway since them and has suffered some changes mainly the sharing of the total investment for	Rejected – Section has to be shortened and cannot include all specific examples.

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						R&D and for demand side energy efficiency." (Jose Moreira, Institute of Electrotechnology and Energy - University of Sao Paulo)	
7-299	A	33	17	33	18	Give an example of a roadmap or vision (John Kessels, Energy Research Centre of the Netherlands)	Noted – LP will consider during rewrite.
7-300	A	33	38	33	38	Although this statement is referenced, I would suggest that this is too subjective from a single source and could probably be refuted through information sourced from the French government. (Nick Campbell, ARKEMA SA)	Rejected – LP will add more references during rewrite
7-301	A	33	41			Rietbergen et al. do not conclude a doubling but about a 50% increase. (Blok Kornelis, Ecofys)	Accepted – LP will correct during rewrite.
7-302	A	34	5	34	9	It is interesting to note that these targets of the Climate VISION program amount to less than 1% per year, which is what many (Manne and Richels, for example) suggest is the autonomous rate of efficiency improvement in most industry. In Canada, under the CIPEC program, such rates were also defined by many industry associations and, while I cannot verify this, the rate of improvement in efficiency (defined incorrectely as reduced intensity per unit product) hasn't changed much from pre Kyoto times. It might be helpful to the reader to do a bit of a critique on changes in intensity over the last 30 years to see if we see more improvement recently. (John Nyboer, Energy and Materials Reseach Group, School of Resource and Environmental Management, Simon Fraser Univeristy)	Noted – LB will remove the discussion of Climate VISION in editing.
7-303	A	34	9	34	9	Insert at end of paragraph: "Using a year 1990 baseline, the US Aluminum Association have agreed to a Climate Vision objective to reduce combined direct carbon emission intensity reduction (TCE/tonne) from primary aluminium facilities of 53% from 1990 to 2010, based on PFC reductions and reduced anode carbon consumption. This equates to an additional direct carbon-intensity reduction of 25% since 2000. In 2004, the US Aluminum Association reported to the Climate Vision programme that they were the first sector to achieve their objective, reducing direct emissions by 54% since 1990 and 25% since year 2000." (Robert Chase, International Aluminium Institute)	Noted – LB will remove the discussion of Climate VISION in editing.
7-304	A	34	9	35	29	It would be useful to add a statement in the context of this paragraph that notes that many companies report GHG emissions in corporate environmental reports. (Nick Campbell, ARKEMA SA)	Accepted – LB will include in section on mgt. practices.
7-305	A	34	16	34	20	BASF Group's goal is to reduce specific greenhouse gasses per unit of output by 10% by 2012 based on 2002 data. (James Bero, BASF Corporation)	Rejected – already sufficient examples in text.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
7-306	A	34	17	24	34	These are all interesting programmes with targets for reduction but how much have the companies reduced to date and how successful are their in house energy programmes (John Kessels, Energy Research Centre of the Netherlands)	Noted – LP will consider during rewrite.
7-307	A	34	33	34	37	The Aluminium industry agreements are mentioned in this section and also in the same section on the next page. Shold be rationalised. (Nick Campbell, ARKEMA SA)	Noted – LB will address during editing.
7-308	A	34	33	34	44	Please add CEFIC energy programme VEEP 2005 availalble from pbo@cefic.be. Can be added on Page 35 with the Japanese initiative. (Nick Campbell, ARKEMA SA)	Noted – LP will add if different.
7-309	A	34	34	34	37	Reword: "The International Aluminium Institute initiated the Aluminium for Future Generations sustainability programme in 2003, which initially established 9 sustainable development voluntary objectives and 22 performance indicators (Chase, 2004; IAI, 2004). The number of voluntary objectives rose to 12 in 2006 and the programme provides technical services to Member companies in their quest to improve performance against these objectives." (Robert Chase, International Aluminium Institute)	Noted – LP will consider during rewrite.
7-310	A	34	36			Initial phase ETS is until 2007 (Blok Kornelis, Ecofys)	Accepted – Should be Pg. 36, line 44. LB will correct in editing.
7-311	A	34	42			Given the importance of EU ETS it may deserve some more attention (e.g. allocation methods, level of allocation, price formation, expected effect on emissions). (Blok Kornelis, Ecofys)	Taken into acocunt – See response to comment 7-334.
7-312	A	34	45	34	55	Is there any progress reports produced by any of the companies, does the WBSCD not produce reports on progress of many of its initiatives? (John Kessels, Energy Research Centre of the Netherlands)	Noted – LP will consider in rewrite.
7-313	A	34	46	34	52	International climate business initiatives like the Carbon Disclosure Project (http://www.cdproject.net) should be mentioned here. This section seems to imply that there is no good evaluative mechanism on corporate climate initiatives and while I agree on the number, there are some including the Carbon Disclosure Project (Jacob Park, Green Mountain College)	Noted – LP will consider in rewrite.
7-314	A	34	49	34	49	Additional Literature to support the point, that the German Voluntary Agreement does not go beyond business as usual includes: Jochem E. and Eichhammer W. (1999), 'Voluntary Agreements as an Instrument to Substitute Regulating and Economic Instruments. Lessons from the German Voluntary Agreements on CO2	Noted – LP will consider in rewrite.

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						Reduction', in Carraro C., and Lévêque F. (eds), Voluntary Approaches in Environmental Policy, Kluwer Academic Publisher, Dordrecht, Boston, London. (Joachim Schleich, Fraunhofer Institute Systems and Innovation Research)	
7-315	A	34	54	34	54	Insert at end of paragraph: "Voluntary initiatives on the part of the global aluminium industry have been successful in improving energy efficiency by 37% in KWH/kg since 1950. Industry programmes such as the Aluminium for Future Generations programme, which address wider sustainable development issues are also proving important in encouraging improved health, safety and environmental performance in developing countries, where no comprehensive regulatory frameworks are as yet in place (IAI, 2006)." (Robert Chase, International Aluminium Institute)	Noted – LP will consider in rewrite.
7-323	A	35	0			Refere to "Nippon Keidanren Voluntary Action Plan on the Environment". Almost all Japanese major industrial sector is covered with this plan. Ex. Recent followup report of Iron and steel industries (Japanese) as follows http://www.jisf.or.jp/business/ondanka/sinchoku/docs/04tekkouWG.pdf (MASAHIRO NISHIO, Ministry of Economy, Trade and Industry)	Noted – LP will consider in rewrite.
7-316	A	35	5	35	11	The Japan steel industry initiative is interesting but what is the actual size of the companies involved, what was the actual emission reduction based on the status quo prior to the initiative and is their information on the cost of these initiatives? (John Kessels, Energy Research Centre of the Netherlands)	Noted – LP will consider in rewrite.
7-317	A	35	6	35	11	The reason CO2 emission is decreasing in the Japanese steel industry is presumed the most effect by steel production decrease. It is necessary to indicate CO2 emission decrease in addition to steel production decrease. (Masatake Uezono, Citizens' Alliance for saving the Atmosphere and the Earth)	Noted – LP will consider in rewrite.
7-318	A	35	12	35	24	Replace paragraph with: "The members of the International Aluminium Institute (IAI), which now are responsible for more than 70% of the world's primary aluminium production, have undertaken the Aluminium for Future Generations global sustainability initiative. This initiative includes commitments for the industry as a whole to an 80% reduction in PFC emissions intensity and IAI member companies to a 10% reduction in smelting energy intensity by 2010 compared to 1990. IAI data (IAI, 2005) show a reduction in CF4 emissions intensity from 0.60 to 0.16 kg/tonne Al, and a reduction in C2F6 emissions intensity from 0.058 to 0.016 kg/tonne Al between 1990 and 2004, with best available technology having a median emission rate of only 0.05 kg CF4/tonne in 2004. IAI data (IAI, 2006) also show a 6% reduction in smelting energy use between 1990 and 2004. Overall, PFC emissions from the electrolysis process	Noted – LP will consider in rewrite.

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						dropped from 4.4 to 1.2 metric tonnes of CO2-eq per tonne Al metal produced between 1990 and 2004 (IAI, 2006)." (Robert Chase, International Aluminium Institute)	
7-319	A	35	13	35	24	The International Iron and Steel Institute (IISI) have a similar initiative about Sustainable Development with IAI. We suggest that "ISI initiative" is also should be described in this chapter together with "IAI Initiative". REFERENCE: "The Measure of Our Sustainability - Report of the World Steel Industry 2004" http://www.worldsteel.org/?action=newsdetail&jaar=2005&id=110 (MASAHIRO NISHIO, Ministry of Economy, Trade and Industry)	Noted – LP will consider in rewrite.
7-320	A	35	16			Same comment as above - this is less than 0.5% over the period for the aluminium industry. (John Nyboer, Energy and Materials Reseach Group, School of Resource and Environmental Management, Simon Fraser Univeristy)	Noted – LP will consider in rewrite.
7-321	A	35	21			I think you have a number issue here - it is 7.5 to 3.8 tonnes CO2e (not kg) per tonne aluminium. In fact, in some countries, the number has dropped much more than 3.8. In Canada, the value is much closer to 1t CO2e / t Al (tha actual figure is said to be 0.98, down from 4.02 in 1990) for a 76% drop (calculated from data from Environment Canada Canada's Greenhouse Gas Inventory, 1990 - 2003). (John Nyboer, Energy and Materials Reseach Group, School of Resource and Environmental Management, Simon Fraser Univeristy)	Noted – the data in the draft were global averages. LP will clarify in rewrite.
7-322	A	35	22	35	24	Strike "The steps taken to control these emissions have been mainly low or nocost, and have commonly been connected to smelter retrofit, conversion, or replacements (Harnisch et al., 1998; IEA GHG 2000)." (Robert Chase, International Aluminium Institute)	Rejected – cannot strike without some referenced basis.
7-335	A	36	0	36		Section 7.9.4 is weak. The UK CCL should surely fall under the previous two subsections (financial instruments, and negotiated agreements). The section on trading could perhaps concentrate on the industrial effects of emissions trading (eg. IEA 2005; Carbon Trust 2004, 'The European Emissions Trading System: implications for Industrial Competitiveness', with expanded analysis in Carbon Trust, 'The UK Climate Change Programme: potential evolution for business and the public sector' , Dec 2005, www.carbontrust.co.uk (Michael Grubb, Cambridge University)	Accepted – JH will update within space limitation and will provide cross-refefrence to longer disucsison in Chapter 13.
7-324	A	36	5	36	20	Is it possible to include a developing country programme in the list from China, South America, Africa? (John Kessels, Energy Research Centre of the Netherlands)	Noted – JH will consider in rewrite.
7-325	A	36	22	36	28	There is a lot of evidence that freeridership is much larger than initially noted. It	Noted – JH will consider in rewrite.

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						may be specious to say that evaluations actually show that industry actually does show significant energy efficiency improvements from financial incentives. Our own research (yet unpublished) shows it to be very high (60%-85% - we're checking the numbers). But see F. Sebold and E. Fox, "Realized savings from residential conservation activity," The Energy Journal 6, 2 (1985): 73-88; E. Hirst, "Actual energy savings after retrofit: Electrically heated homes in the Pacific Northwest," Energy 11 (1986): 299-308; G. Metcalf and K. Hassett, "Measuring the energy savings from home improvement investments: Evidence from monthly billing data," Review of Economics and Statistics, 81, 3 (1999): 516-528; D. Loughran and J. Kulick, "Demand side management and energy efficiency in the United States," The Energy Journal 25,1(2004):19-43. (John Nyboer, Energy and Materials Reseach Group, School of Resource and Environmental Management, Simon Fraser Univeristy)	
7-326	A	36	22	36	22	What evaluations? What were the results? How do they compare with industry that do not have fiscal incentives? (John Kessels, Energy Research Centre of the Netherlands)	Noted – JH will consider in rewrite.
7-327	A	36	28	36	28	The retreat of national development banks in some developing countries (derived from both financial liberalisation and financial crisis of federal governments) is definitively a hurdle to stir widespread adoption of mitigation technologies. This poses an urgent need to innovate in financial mechanisms of risk absorption. In Mexico, the Ministry of Energy has linked its energy efficiency programs with Energy Service Companies or ESCOS. These are engineering and financing specialised enterprises that provide integrated energy services with a wide range and flexibility of technologies to the industrial and service sectors, and have rapidly developed in Northe America nad Europe. They central function is to deal with capital scarcity, in cases where the commercial banking system does not finance these projects. Networked to international financial agents (like North American Environmental Fund, Sumitomo Bank, the Mexican Federal Fund for Energy Development, Clean Energy Services Fund, …), Mexican ESCOS work through "Result-based Contracts" that reduce risk to users in the initial phases of installation and maintenance, guaranteeing them with a cash flow to the from the very launching of the project. (Francisco Aguayo, El Colegio de México)	Noted – JH will consider in rewrite.
7-328	A	36	28	36	28	It should be noted as well that developing countries tend to have weak financial institutions. Developmental financial and technological institutions will play therefore a crucial role in mitigation policies in those countries. Their function goes	Noted – JH will consider in rewrite.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						beyond he provision of instruments that foster financial deepening, and may influence strongly technology choice and the direction of innovation by making technology assessment (George and Prabhu, 2003). Reference: George, Gerard and Ganesh N. Prabhu, 2003: "Developmental financial institutions as technology policy instruments: implications for innovation and entrepreneurship in emerging economies," in Research Policy, vol 32(1), January, pp. 89-108. (Francisco Aguayo, El Colegio de México)	
7-329	A	36	30	37	15	Should this description be better placed in Chapter 13 and perhaps it would be better to expand on the costs of the programmes and the impact on industry, for example are companies on track to meet their targets, are new technologies being used because of these trading systems? (John Kessels, Energy Research Centre of the Netherlands)	Rejected – Some background on EU ETS needed to introduce discussion of impacts on industry.
7-330	A	36	32	36	40	There has been at least one assessment carried out on the UK ETS. This should be reported in this text. (Nick Campbell, ARKEMA SA)	Accepted – JH will add in rewrite.
7-331	A	36	42	37	14	It is proposed to update that information reflecting also more recent studies on allocation, new entrants reserves, plant closures and helping understanding the Carbon market. (Radunsky Klaus, Umweltbundesamt)	Accepted – JH will update within space limitation and will provide cross-refefrence to longer disucsison in Chapter 13.
7-332	A	36	44	36	44	Initial phase of EU ETS is from 2005-2007 not from 2005-2008 (Joachim Schleich, Fraunhofer Institute Systems and Innovation Research)	Accepted – LB will correct in editing.
7-333	A	36	52	37	14	Assessments that have been carried out on the EU ETS must be summarised in this section. There are considerably more than the 2 that are referenced. (Nick Campbell, ARKEMA SA)	Accepted – JH will update within space limitation and will provide cross-refefrence to longer disucsison in Chapter 13.
7-334	A	36	53	36	53	Change first sentence and add: The inclusion of all large combustion installations means that the majority of installations in the chemical industry are also included in principle [not the aluminium industry, they are normally very small direct emitters from combustion]. But most EU Member States applied a rather narrow definition of the scope of the scheme in the first 3-year trading period 2005-2007 and therefore most plants of the chemical, food and other industries were left out of the emissions trading scheme. The EU Commission (2005, see page 9 and annex 8) regards this situation highly unsatisfactorily and indicated that chemical and other relevant plants need to be included in the second 5-year trading period 2008-2012; the EU Commission reserves the right to take all neccessary (legal) measures to avoid market distortions.	Accepted – JH will consider in rewrite.

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						EU Commission 2005 = "Futher guidance on allocation plans for the 2008 to 2012 trading period of the EU Emission Trading Scheme", 22 December 2005. (Vianney Schyns, DSM & SABIC)	
7-336	A	37	5	37	14	Reference should be made to the present weakness in the EU Emissions Trading Scheme e.g. its poor liquidity, which results in great volatility and excessively high carbon prices. (Robert Chase, International Aluminium Institute)	Accepted – JH will update within space limitation and will provide cross-refefrence to longer disucsison in Chapter 13.
7-337	A	37	5	37	6	The amount of allowances granted in the EU-25 is collectively 2190.8 Mt CO2 (598 MtC) and not 1,680 Mt CO2 as indicated in the current text. See EU Commission (2005 annex 1). (Vianney Schyns, DSM & SABIC)	Accepted - JH will corect in rewrite.
7-338	A	37	5	37	15	According to a recently (Nov. 2005) published comprehensive survey of all lNational Allocation Plans for the EU 25 by the German Emissions Trading Authority the European Commission has approved the allocation of about 6.57 billion allowances to more than 11,400 installations for the trading period 2005 to 2007 (that is about 2.2 bn allowances p.a.). Almost a quarter of the allowances are allocated to German installations (499 mill. p.a.). Literature: DEHSt (2005) "Implementation of the Emissions Trading in the EU: National Allocation Plans of all EU States", German Emissions Trading Authority (DEHSt) at the Federal Environmental Agency (UBA), Berlin, November 2005. Download under: http://www.dehst.de/cln_007/nn_593634/SharedDocs/Downloads/EN/ETS/EU__NAP__Vergleich,templateId=raw,property=publicationFile.pdf/EU_NAP_Vergleich (Joachim Schleich, Fraunhofer Institute Systems and Innovation Research)	Accepted - JH will corect in rewrite.`
7-339	A	37	5	37	14	The burdens of emissions reductions focus solely on industry (power generation plus energy intensive industries such as the chemical industry) and fail to take account of other sectors like private households and transport. These sectors, however, show the largest increase in emissions in recent years, whereas industry has achieved the greatest emission reductions. To demand from industry to achieve further reductions - while ignoring other sectors - is not a balanced approach but places an unfair burden on industry. (James Bero, BASF Corporation)	Rejected – Comment on the programs outside the industrial sector is beyond the scope of this chapter. Reviewer is stating an opinion, unsupported by references.
7-340	A	37	5	37	14	By introducing absolute quantitative emission reduction targets, a cap and trade emissions trading system sets artificial restrictions on growth, potentially jeopardizing the industry's competitiveness. Furthermore, if the imposed absolute targets are not consistent with technological innovation and capital stock turnover, the scheme sets severe limitations on market liquidity and creates significant	Rejected – Reviewer is stating an opinion, unsupported by references.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						barriers to effective implementation. (James Bero, BASF Corporation)	
7-341	A	37	5	37	14	A regional cap and trade system at the company/installation level like the European emissions trading system might limit economic growth in the regions. An emissions trading system that is not applied globally and harmonized distorts competition and limits growth. (James Bero, BASF Corporation)	Rejected – Reviewer is stating an opinion, unsupported by references.
7-342	A	37	11			On the expected impacts of EU-ETS during 2005-2007 and the stringeness of the allocation during the period 2008-2012 see also: Georgopoulou, E., Sarafidis, Y., Mirasgedis, S., Lalas, D.P., "Next allocation phase of the EU Emissions Trading Scheme: How tough will the future be?", Energy Policy (in print). (ELENA GEORGOPOULOU, NATIONAL OBSERVATORY OF ATHENS / INSTITUTE FOR ENVIRONMENTAL RESEARCH & SUSTAINABLE DEVELOPMENT)	Noted. JH will consider.
7-343	A	37	16	37	38	This section needs to be rewritten with perhaps a focus on examples of energy and technology policies and their mitigative impact on industry. (John Kessels, Energy Research Centre of the Netherlands)	Noted – LB will attempt to find supporting information.
7-344	A	37	16	37	37	This section is weak and requires considerable expansion with global information. (Nick Campbell, ARKEMA SA)	Noted – LB will attempt to find supporting information.
7-345	A	37	18	37	25	Somewhere in this paragraph it would be good to include the results of a study of the US paper industry that found that "an increase in the rate of capital turnover is the most important factor in permanently changing carbon emission profiles and energy efficiency in the pulp and paper industry." (Source: Davidsdottir, B. and M. Ruth, "Capital vintage and climate change policies: the case of the US pulp and paper industry," Environmental Science & Policy 7 (2004) 221-233, Elsevier, 2004) (Reid Miner, NCASI)	Noted – Interesting reference, but probably would be of more use in Section 7.6 on barriers. JR to evaluate.
7-346	A	37	40	38	13	Does this section need to more focus on assessing existing sustainable development policies and their impact on industry in reducting GHG emissions? An example of an industry and how information barriers, capacity building and stimulating tecnological innovation would be useful especially in comparison with a country or region without such policies. It might also help to shorten the Indian example and have a developed country example as well. (John Kessels, Energy Research Centre of the Netherlands)	Noted – JR will evaluate.
7-347	A	37	41	38	12	This section requires further information on other regions in particular those in South America. Further information is also required from China, a country which	Noted – JR will evaluate.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						has a sustainable development policy that has been well referenced in statements from various Ministries. (Nick Campbell, ARKEMA SA)	
7-348	A	37	49	38	12	This example of India's 10 year plan is useful. It would be more effective if more detail could be given about the environmental, economic and social benefits dereived from the project to give a clear idea about how the project is "making development more sustainable development". For example, what were the environmental benefits associated with groundwater, what were the benefits to the communties in the area, and did the project yield any monetary returns? See for example paragraph in chapter 8, starting on pg 23, ln 43. (Mohan Munasinghe, Munasinghe Institute for Development (MIND))	Noted. JR will add if evaluation can be found.
7-349	A	38	15	38	48	Air quality policies section would be better to have examples of policies implemented with a comparison of what was occuring previously. This section is more a description of policies with no assessment of their actual mitigation in the area of GHG. (John Kessels, Energy Research Centre of the Netherlands)	Noted – LB will cross reference to discussion of co-benefits in other chapters.
7-350	A	38	15	38	45	This section and other parts of the report, understate the role that environmental regulation in general can play in opening opportunities for climate change policy. In Europe, for example, the emissions trading scheme is built on Pollution Prevention Control (IPPC). In general environmental regulation policy starts before climate change policy (HEDGER MERYLYN, Environment Agency)	Noted – LB will cross reference to discussion of co-benefits in other chapters.
7-351	A	38	47			However, one should not forget the potential implications from the simultaneous application of different tools for emissions reduction at the same industries. That is the case for example with EU-ETS and the IPPC Directive and for this reason the latter was amended so that it does not reduce the flexibility of the industry to seek GHG emissions reduction where it is mostly economically profitable. (ELENA GEORGOPOULOU, NATIONAL OBSERVATORY OF ATHENS / INSTITUTE FOR ENVIRONMENTAL RESEARCH & SUSTAINABLE DEVELOPMENT)	Noted – LB will cross reference ot discussion in Chapter 13.
7-352	A	38	50	39	29	This section and chapter 10 need to take account of the fact that waste treatment policy in the EU is making waste for energy use more difficult due to definitions and treatment options (HEDGER MERYLYN, Environment Agency)	Noted – JH will consider in rewrite.

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7-353	A	39	9	39	9	What is a prominent example from the packaging sector? (John Kessels, Energy Research Centre of the Netherlands)	Accepted – JH will add in rewrite.
7-354	A	39	12	39	30	Can this paragraph be reduced down and an example from a developing country included? (John Kessels, Energy Research Centre of the Netherlands)	Noted – JH will try to find an example.
7-355	A	39	45		54	The Mestl et al study referred to above is also a most relevant study for China. (Haakon Vennemo, ECON)	Noted – LP will try to find the reference. Not indicataed in any of earlier comments on this chapter.
7-356	A	40	9	40	40	Were their any dollar quantifications from any of the studies mentioned in these paragraphs? If yes, could they be included in order to assess their effectiveness. (John Kessels, Energy Research Centre of the Netherlands)	Noted – LP will check.
7-357	A	40	44	50	44	Rewrite paragraph to only include last two sentences with therefore deleted. (John Kessels, Energy Research Centre of the Netherlands)	Rejected – The thermodynamic ideal is an important concept.
7-358	A	40	50	40	50	Add: Industrial experience and studies show that the exergy efficiency (the theoretical thermodynamic possibility) is typically 10%-20% of most current technologies in the process industry (Schyns, 2005 c). Schyns 2005 c = "How to reduce emissions under PSR", 1 November 2005, pp 7, a paper prepared on request of a French government representative. (Vianney Schyns, DSM & SABIC)	Noted - LB will consider reference in rewrite.
7-359	A	41	5	41	36	This section needs to be rewritten using more input from the IPCC Expert Meeting Report in Tokyo 2004 which involved industry input there are some major gaps with many of the drivers not mentioned until section 7.11.2 including regional differences, competitive advantage, intellecutal property rights, leapfrogging, country characteristics it would be better to perhaps mention these earlier (John Kessels, Energy Research Centre of the Netherlands)	Noted – LB will consider in rewrite.
7-360	A	41	18		36	Consider shortening by taking out general and non-industry statements (e.g. line 18-23 and 30-36). (Peter Bosch, IPCC TSU WGIII)	Noted – LB will consider in rewrite.
7-361	A	41	31	41	36	There was a report in late 2005 that gave a detailed description of R&D spend in a number of countries. I believe that it originated from a UK source. (Nick Campbell, ARKEMA SA)	Noted – Would be a useful refefrence, but need more detail.
7-362	A	41	40	44	18	Your section on policy is very simplistic and make no mention of typical policy approaches that are in common usage. Besides voluntary type actions, it would be good to describe taxation, sector specific market oriented regulation, straight forward regulation and the like and prehaps even give evaluative criteria and	Noted – LP will add a cross-reference ot Chapter 13.

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						critique of these. See chapter 7 and 8 in Jaccard, Mark, John Nyboer and Bryn Sadownik. 2002. The Cost of Climate Policy. UBC Press: Vancouver, B.C. 242 pp. (John Nyboer, Energy and Materials Reseach Group, School of Resource and Environmental Management, Simon Fraser Univeristy)	
7-363	A	42	10			Add a sentence saying - "A study of the U.S. pulp and paper industry found that 'an increase in the rate of capital turnover is the most important factor in permanently changing carbon emission profiles and energy efficiency' ". Source: Davidsdottir, B. and M. Ruth, "Capital vintage and climate change policies: the case of the US pulp and paper industry," Environmental Science & Policy 7 (2004) 221-233, Elsevier, 2004 (Reid Miner, NCASI)	Noted – LB will consider in rewrite.
7-364	A	42	24			Suggestion to add the following paragraph: " Thus, subsidy programmes for low-cost energy audits in small private and public organisations, are likely to be effective even if – as Anderson and Newell (2004) point out for the US based on large sample analyses – energy audits per se are unlikely to lower the hurdle rate for investments. For SMEs in Germany, Schleich (2004) finds - also based on large sample analyses - that energy audits help to overcome several barriers to energy efficiency, including missing information about energy consumption patterns and energy saving measures. In addition, the results also indicate that audits conducted by engineering firms are more effective than those carried out by utilities or industry sector associations. Literature: (1) Anderson S.T. and Newell R.G. (2004): Information programs for technology adoption: The case of energy-efficiency audits, Resource and Energy Economics 2004; 26; 27-50. (2) Schleich J. (2004): Do energy audits help reduce barriers to energy efficiency? An empirical analysis for Germany. International Journal of Energy Technology and Policy 2004; 2; 226-239. (Joachim Schleich, Fraunhofer Institute Systems and Innovation Research)	Noted – LB will evaluate references.
7-365	A	42	32	42	34	Reword: "In addition to such national programs, specific industrial sectors such as the petroleum refining, ethylene and aluminium industries have benchmarking programs." (Robert Chase, International Aluminium Institute)	Noted – LB will include if references can be found.
7-366	A	42	36	42	39	Many analyses of gov't programs are poorly done (if they are done at all). It is often very difficult to attribute anything directly to a program because there are so many interacting events. Just be careful when you make statements like a program claiming xx amount of reduction. (John Nyboer, Energy and Materials Reseach Group, School of Resource and	Noted – Reviewer is stating an opinion without refferences. LB will consdier the warning.,.

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						Environmental Management, Simon Fraser Univeristy)	
7-367	A	43	37	44	9	Several of the drivers at the Tokyo meeting are missing such as leapfrogging, research and development, etc (John Kessels, Energy Research Centre of the Netherlands)	Noted – Question is whether these are "key" drivers. LB will review Tokyo report and make changes, if necessary in rewrite.
7-368	A	44	10	44	12	See attached Word file: "IPRs and mitigation.doc" (Francisco Aguayo, El Colegio de México)	Noted – LB will evaluate reference and make changes if necessary.
7-369	A	44	10	44	12	M:\project\M555555_IPCC_TSU_WG3\IPCC AR4\REVIEWS\FOD REVIEW\Review Comments Batch 2\Intellectualpropertyrightsandmitigation1551011.doc (Francisco Aguayo, El Colegio de México)	Noted – LB will evaluate reference and make changes if necessary.
7-370	A	44	14			Section 7.12. The authors may consider to include some of our remarks contained in the attached Word file "Chapter 7 System Transitions.doc". (Francisco Aguayo, El Colegio de México)	Noted – LB will evaluate reference and make changes if necessary.
7-371	A	44	14			M:\project\M555555_IPCC_TSU_WG3\IPCC AR4\REVIEWS\FOD REVIEW\Review Comments Batch 2\Chapter 7 System transitions.doc (Francisco Aguayo, El Colegio de México)	Noted – LB will evaluate reference and make changes if necessary.
7-372	A	44	22	44	22	Please, explain what is the meaning of functionality based on O and N. (Jose Moreira, Institute of Electrotechnology and Energy - University of Sao Paulo)	Noted – LB will clarify during rewrite.
7-373	A	44	26			Global production of ammonia in 2005 was 143.4 Mt. Source: International Fertilizer Industry Association (IFA), 2005: Summary Report -- World Agriculture and Fertilizer Demand, Global Fertilizer Supply and Trade 2005-2006. Paris, IFA, p. 8. Available at www.fertilizer.org/ifa/publicat/PDF/2005_council_sevilla_ifa_summary.pdf. (Kristen Elizabeth Sukalac, International Fertilizer Industry Association (IFA))	Accpted – LB will update in editing.
7-374	A	44	43	44	44	Shoud read: "Hydrogen, produced from fossil fuels in conjunction with carbon capture and storage can provide low or zero GHG emission energy carrier; when produced from biomass, in conjunction with carbon capture and storage, can provide even negative GHG emission energy carrier. (IPCC Special Report on CCS)." (Jose Moreira, Institute of Electrotechnology and Energy - University of Sao Paulo)	Accepted – LB will correct during editing.
7-375	A	50	14	50	15	Insert at end of reference: "http://www.world-aluminium.org/iai/publications/documents/pfc2000.pdf" (Robert Chase, International Aluminium Institute)	Accepted – LB will correct during editing.
7-376	A	50	16	50	17	Reword: "IAI (International Aluminium Institute), 2004: The Global Aluminium Sustainable Development Initiative. London, 6pp." (Robert Chase, International Aluminium Institute)	Accepted – LB will correct during editing.

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7-377	A	50	18	50	18	Reword: "IAI (International Aluminium Institute), 2005: The International Aluminium Institute's Report on the Aluminium Industry's Global Perfluorocarbon Gas Emissions Reduction Programme - Results of the 2003 Anode Effect Survey. London, 17pp. http://www.world-aluminium.org/iai/publications/documents/aes_pfc_2003.pdf" (Robert Chase, International Aluminium Institute)	Accepted – LB will correct during editing.
7-378	A	50	19	50	19	Insert: "IAI (International Aluminium Institute), 2006: Aluminium for Future Generations - Sustainability Update 2005. London, (in press). (Robert Chase, International Aluminium Institute)	Accepted – LB will correct during editing.
7-379	A	52	23	52	23	Insert: "Martchek, K., 2006: Modelling More Sustainable Aluminium: Case Study. International Journal of LCA 11 (1), 34-37. http://dx.doi.org/10.1065/lca2006.01.231 (in press)" (Robert Chase, International Aluminium Institute)	Accepted – LB will correct during editing.
7-380	A	60	0	60		Table 7.1.3 - The title should read: "Projected GHG Industrial Sector Emissions of Non-CO2 Gases, MtCO2eq./yr". (Jose Moreira, Institute of Electrotechnology and Energy - University of Sao Paulo)	Accepted – LB will correct during editing.
7-381	A	61	31	61	31	Cozijnsen 2005 = "Towards the use of CO2 Capture and Storage in the EU Emissions Trading System", July 19, 2005, Jos Cozijnsen, for SenterNovem and the Netherlands' Ministry for Public Housing, Spatial Planning and the Environment. (Vianney Schyns, DSM & SABIC)	Noted – LB will add if the reference is used.