IPCC Fourth Assessment Report

Expert Review of the First-Order Draft

Chapter 13

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
0-1	A	0	0			I limit my comments to a few overall observations. My major objection against the report is that the caveats have not been spelled out, which makes the report less than scientific. Its is based on the assumption that anthropogenic GHG, particularly CO2, represent major climate forcings. However, new doubts have arisen whether this is really the case. The ('peer-reviewed') literature which is sceptical of the man-made global warming hypothesis, has been growing quite impressively over de the last few years. It has been completely ignored. Many observations (e.g. on temperatures and CO2 concentrations, and their development over time) do not match the man-made global warming paradigm. They offer a multitude of 'anomalies' (in the vocabulary of Thomas Kuhn). This should be recognised. If not, the whole exercise runs the risk of being dismissed by critics as being biased by 'cherry-picking'. Model-based attribution of the different forcings, influencing the (minor) rise in surface temperatures since the middle of the previous century, cannot be construed as proof of the anthropogenic greenhouse effect, because no single model has ever been validated. The report posits that 450 ppmv CO2 concentration equals 2 degrees warming over the 21 century. In the light of the previous comments on the relationship between the two, this is not proven. It could be argued that these observations do not fit into the Report of Working Group III and that they should be addressed elsewhere. But as far as I know, this has not been done. Anyhow, the authors should make their assumptions explicit in the preamble of the document, so that the reader will be able to form his own opinion in the light of all available views and/or information. Moreover, nowhere reference has been made of the critical report on 'The Economics of Climate Change', which was issued, in early July 2005, by the British House of Lords Select Committee on Economic Affairs, and the discussion ensuing therefrom. Furthermore, at the recent G-8 Summit at Gleneagles and the Montreal Climate Conference, it has become clear that the first phase of the Kyoto (sort of European mini-Kyoto) will not get any follow-up. This is a crucial fact, which will drastically overturn the outlook presented in earlier IPCC reports. Somehow and somewhere, the authors should deal with this issue and its implications in the document. At various places in the report, it is suggested that (man-made?) climate change (if	Not

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						any) will disproportionably hurt the poor (especially in Africa). However, the causal relationship between the two, has not been convincingly substantiated to my mind. It is, furthermore, suggested that mitigation and sustainable development can be realised without impairing the fight against poverty (in the traditional meaning of the words). Undoubtedly there are many examples where this is true. At the same time, there are many opposite examples, where this is not the case. The relationship is simply more complex than the text wants us to believe. Therefore, a more elaborate and balanced presentation of pros and cons is called for. Another element which is missing is the impact of Kyoto (plus, plus) on our (socio)economic system. It is true, this issue has - so far - hardly been addressed in the climate change literature. But it is nevertheless of utmost importance. Emission trading, which, according to the logic of Kyoto, should be progressively extended to more and more sectors of the economy, will fundamentally change the main features of our (socio)economic system: from a basically free enterprise system to an more centrally planned system, with heavy (international) government intervention. This aspect has, so far, been almost totally ignored in the climate change policy literature. For an elaboration of this line of reasoning, see: http://www.tcsdaily.com/article.aspx?id=120304A As regards sea levels, no acceleration in sea level rise has been recorded, which is inconsistent with the statement that there is a discernable human influence on climate since the middle of the previous century. Only very rarely reference has been made to cost/benefit analysis. Where this has been the case, the relevant passages were on the whole overstating the benefits and understating the costs. The PPP approach concerning future real growth cum emissions, has not been covered (allegedly because of the fact that most of the literature is still based on market exchange rates). Let's hope that there is still sufficient time to include the outcome of new OECD work on that score which can be expected in the months to come. ---Leimuiden, 4 January 2006. (Hans H.J. Labohm, 0)	
0-2	A	0	0			It is very good indeed that in the report climate change is being placed in the context of sustainable development (SD) and the Millennium Development Goals	

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						(MDG). What has not been worked out to the full in this repect is the fact that SD and MDGs will not be reached in a reasonable time given the fact that there simply is not and will not be enough money available. In this respect the concept of Global Public Good, which has received a lot of attention of the last couple of years, could play a role (other than what has been denoted in e.g. chapter 1, paragraph 1.5.2.). It has been proposed as a new frontier of finance for international development. See especially Inge Kaul, Isabele Grunsberg, Marc A. Stern, Global Public Goods (International Cooperation in the 21st Century), UNDP and Oxford University Press, 1999, Inge Kaul, Pedro Conceicao, Katell Le Goulven, Ronald U. Mendoza, Providing Global Public Goods, UNDP, Oxford University Press, 2003. On the basis of the notion of Global Public Good innovative mechanisms for dealing with the climate change issue from a world-wide perspective; e.g. a CO2-tax, have been proposed. Through such a tax the environmental and development dimension of climate change could be clearly interlinked. This relates to the concept of the environmental footprint (Wackernagel and Rees, 1996; chapter 12, page 25, line 45) but is a more direct derivation of global warming. The CO2-footprint has been introduced by the World Wildlife Fund. The CO2-footprint of every inhabitant in the world could be related to the intrinsic capacity of the earth to absorb carbon dioxide from the atmosphere (about two tons of CO2 per year). Payment, in preferably an international fund, should start when this threshold is passed. The average emissions per year in most developing countries are still below 2 tons of CO2. They will receive money. Industrialized countries have to pay on the basis of their per capita footprint. Such a system could generate a lot of money for development and at the same time provide an economic incentive to reduce emissions. See in this respect: A, Sandmo, Environmental Taxation and Revenue for Development, in: A.B. Atkinson, 2005, New Sources for Development Finance, UNU-Wider Studies in Development Economics, Oxford University Press. See also D. Bradford, Improving on Kyoto: Greenhouse Gas Control as the Purchase of a Global Good, CEPS Working Paper No. 96, January 2004 (Gert de Gans, Kerkinactie)	
0-3	A	0	0			The units are different among the chapters. For example, the unit of CO2 emissions, GtC in fig.3.17, Mt-CO2 in Fig.5.28. The unit should be uniformed. (Toshihiko Masui, National Institute for Environmental Studies)	
0-4	A	0	0			In general, I found the quality of the report to be very uneven. The chapters that address mitigation potential	

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						in individual sectors that I managed to scan were far superior to the cross-cutting chapters 1, 12 and 13 that I reviewed in greater depth. The latter chapters generally do not constitute a systematic assessment of the state-of-the-art, based on publicly-available information, but are often anecdotal, reflecting only the view of the author or a very limited number of references or examples, even in cases where there is a rich literature on the subject. It will be crucial that these chapters are improved to meet the same standards of rigor that the WG1 report does, or the credibility of the IPCC as an independent assessment panel will be compromised. (Anne Arquit Niederberger, Policy Solutions)	
0-5	A	0	0			General comment: The level of detail of the draft text on co-benefits is uneven across chapters. Some discussions are relatively detailed, and some are very cursory. It would be better to have greater consistency across chapters and sections. (Mark Heil, U.S. Environmental Protection Agency)	
0-6	A	0	0			GENERAL COMMENT: Good treatment of SD linkages. Developing country (DC) literature on sustainable development could be used more, since it provides a different viewpoint. Some recent publications have been left out: e.g., the most up-to-date and comprehensive reference is (MMRS 2005) = Munasinghe, M. and Swart, R. 2005. Primer on Climate Change and Sustainable Development, Cambridge Univ. Press, UK. (Mohan Munasinghe, Munasinghe Institute for Development (MIND))	
0-7	A	0	0			Innovation is present in the whole report, yet how to steer innovation in the desired direction is not clear. How succesfull are policies directed at innovation, when sustainability or CO2-emissions rather than financial succes is the most important criteria? Presently, I am preparing research on this issue, and would like to take topics around climate and energy as a special case. (Tineke van der Schoor, Sustainability Centre Lauwersoog/ RUG-Bedrijfskunde)	Strengthen section on innovation in Ch. 13
0-8	A	0	0			In general, the importance of the public, of education, of changing behavior, could be more worked out as a separate issue. How to reach the public, how to involve consumers, what do consumers want, and then think again about technology, this is being overlooked. Many technological development paths as sketched in this report, but also in a lot of other publications (like the 'energy transition' in the	Add reference to information policies

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						Netherlands, are very technocratic in nature and fail to note people. Human beings seen as subjects, not as objects. As continually choosing, problemsolving, thinking individuals. The same comment goes for the integration of sustainable development in the curricula of schools. Not as a separate topic, but integrated in the normal courses. This issue is taken up in the Centre for Sustainability, mentioned above. (Tineke van der Schoor, Sustainability Centre Lauwersoog/ RUG-Bedrijfskunde)	
0-9	A	0	0	0	0	The developing world need energy for their development. Therefore denying them access to affordable energy sources through imposing policies that will make energy unaccessable will hinder their development and creat an unfair situation. (Mohammed Alfehaid, Saudi Aramco)	
0-10	A	0	0	0	0	In general, I found many of the chapters weak in providing references for key statements. While it is nice to save page length by not providing references and thus no bibliographic citations it does a dis-service to the reader. All chapter should take care to make sure that statements are bettere referenced and the TSU should be aware of this as well. Contrast this with WG2 who may have gone too far the other way in some cases.... (Jeff Price, California State University, Chico)	
0-11	A	0	0			I have not made comments on references, since I assumed this is dealt with by the technical support unit. However, I just want to mention that there are citations given in text here and there that does not appear in the list of references. (Göran Berndes, Chalmers University of Technology)	
0-12	A	0	0			Global climate change is a worldwide challenge and climate protection needs joint efforts by all countries. (James Bero, BASF Corporation)	
0-13	A	0	0			To avoid misunderstandings and errors, it may be helpful to use both Ceq and CO2eq. In most plubications for public and policy makers, greenhouse gas emissions are given in units gCO2eq/kWh or gCO2/kWh, which in itself may be confusing. The chance of wrongly quoted numbers increases with the introduction of two additional units gCeq/kWh and gC/kWh. (Jan Willem Storm van Leeuwen, Ceedata Consulting)	
0-14	A	0	0			Suggestion to use SI units and SI notation throughout the report. For example: 1 Gt (1 gigaton or gigatonne? Metric tonne, short ton, long ton?) is not a SI unit and introduces ambiguities. Suggestion: use 1 Mg = 1 megagram = 1 metric tonne,	

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						1 Gg = 1 gigagram = 10E9 gram = 1000 metric tonnes 1 Tg = 1 teragram = 10E12 gram = 1 million metric tonnes. For example: 0.7 GtC/yr becomes in SI notation: 0.7 Tg(C)/a (Jan Willem Storm van Leeuwen, Ceedata Consulting)	
0-15	A	0	0			General comment: The FAR is a comprehensive, massive and impressive piece of work. Due to its size and depth, however, it is not very easy to digest. (Jan Paul van Soest, Advies voor Duurzaamheid on request of International Gas Union)	
0-16	A	0	0			There seems to have been little communication between the chapters. In particular, there is a good review of the issues of technological change in chapter 2, that is not reflected in chapter 3, where technological change is of vital importance. The material inchapter 2 is also not reflected in chapter 11, although the macroeconomic intersectoral analysis of chpater 11 requires an assessment of technology. (Jonathan Köhler, Tyndall Centre, University of Cambridge)	
0-17	A	0	0			While the Fourth Assessment Report (AR4) of WG III contains a wealth of information, I think it lacks a clear and concise statement (a "vision" if you will) of the mitigation/stabilization problem. While, to be sure, there is much relevant and useful material regarding stabilization throughout the thirteen chapters, it is difficult to find a clear statement of what seems to me the crucial question: What will it take to "stabilize climate" (by which I mean stabilize the atmospheric concentration of GHGs--or at least CO^2)? There are, of course, differing views regarding the answer to that question (the differences mainly centered on the importance, availability, and scaleability of carbon-emission free energy technologies--more on this later). It would be very helpful, therefore, if this question was explicitly posed up front, and, as well, explicitly acknowledged that among experts in the field there are different views and different approaches to answering this key question. I think the appropriate place to pose the "what will it take" question is in the Introductory Chapter (Ch 1), perhaps on p.5 after the conclusion of section 1.2 on article 2 of the FCCC convention. It might also be helpful to briefly set out the differing views about what it will take to "stabilize climate". For example, material in the last paragraph on p.68 of Chapter 2 could be usefully employed in Chapter 1. I think the AR4 report needs to acknowledge, from the outset, an important implication of the SRES emission scenarios, and scenarios that are similar to the SRES. The implication to which I refer is a general tendency to understate (perhaps greatly so) the costs and general difficulty of achieving stabilization. Because many of the 40	

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						individual SRES reference scenarios have already built into them high long term (110 year) rates of global energy intensity decline (the main exception being the A2 family), and large amounts of carbon-free energy, their use in mitigation/stabilization analysis is likely to substantially understate the magnitude and cost of the stabilization task. Although, there is reference in Chapter 3 to other emission scenarios, it is not clear whether any other (than SRES) reference scenarios were used by the very large number of mitigation analyses that are reported in the chapter. Of particular interest here is whether the EMF-21 modelling scenarios used different baselines than those implied by the SRES. The reason for interest is that, as portrayed in chapter 3, including Figures 3.25 and 3.26, the EMF-21 appears to estimate much higher GDP costs of stabilization than do the great body of other mitigation scenarios. An obvious question is whether the difference in GDP costs of stabilization reflects the way in which the reference (or baseline) scenario(s) were constructed. (Another question is why Chapter 11 appears to have overlooked the EMF-21 findings.) To the Report's credit, it does include, in Chapter 2, a set of Figures (2.9.2) that reflect the excellent work, initially carried out by Edmonds for the IS92a scenario, demonstrating how much technology change is already assumed in reference emission scenarios. Figure 2.9.2 makes clear that the SRES reference scenarios incorporate a very large share of the emission-reducing "gains" from future technological change. What is unclear is the degree to which other parts of the Report take the reference scenarios as given (as if the embedded technological change were supplied as manna from heaven) and focus on what extra is needed for stabilization. For example, in Chapters 4-7, how much of the technological improvements from current practice will be required to meet the technological change incorporated in the reference scenarios? Arguably, most, if not all, will be. If so, then little or nothing is left over to achieve stabilization. The implications for interpreting the findings on the cost of mitigation reported in Chapter 11 are important. The relatively low costs estimates reported there for achieving stabilization (often generated by models assuming a carbon-free backstop technology) may be the result of effectively "double counting" the contribution of technological change, first in the reference scenario and second in the mitigation/stabilization scenario. Thus while the reader can find scattered statements about just how difficult it will be to achieve stabilization", the cost estimates reported in Chapter 11 make the economic (GDP) cost of stabilization seem small-and they do so in part because of a lack of clarity on the technology-	

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						mitigation issue in other parts of the report. One result is to continue to leave the false impression, initially generated in WG III TAR, that if we could only overcome socio-economic and institutional inertia, stabilization can be relatively easily achieved in the 21st century. One way to illustrate the nature and importance of reference scenarios for assessments of the difficulty of achieving stabilization is to contrast the paper by Pacala and Socolow (Science, 2004), which is frequently discussed as well as cited in AR4, with Hoffert et.al (Nature, 1998) which does not appear to be cited at all by AR4 (although there are a number of citations to a subsequent Hoffert et al paper (Science, 2002). Pacala and Socolow (P-S) conclude that (given the rate of growth of GDP) the technologies are available to stabilize emissions for the next 50 years (out to 2054), by assuming that energy intensity decline will automatically decline at a global average annual rate of 1.0%, and that the carbon intensity of energy will decline at a 0.5% rate. Thus, in considering the availability and scaleability of carbon-free energy technologies, P-S only consider what is needed over and above a 1.5% rate of decline in the carbon intensity of output. In contrast, Hoffert et al (Nature,1998) ask how much carbon free energy (power) is required to stabilize (given the rate of growth of GDP), and varying rates of decline in energy intensity, and find that the amounts are generally so large that major technological breakthroughs in the supply of carbon-free energy would almost certainly be required for stabilization. The Hoffert, et al, Science, 2002, article attempted to demonstrate that no individual or combination of carbon-emission-free technologies is up to the task. The Caldeira, et al (Science, 2003) article demonstrated the climate sensitivity implications for the speed and amount of carbon-free energy deployment. One disturbing implication, in my view, of the two Hoffert et.al and the Caldeira, et al, papers, taken together, is that if climate sensitivity is on the high side and if the threshold for acceptable temperature change is relatively low (say, 2 C), avoiding DAI may be, for all practical purposes, impossible. The possibility that energy technology cannot be changed fast enough, and in the required magnitudes, in time to avoid DAI should be recognized in the Report. It would be useful if the sector-based chapters (especially 4-7) provided a rough idea of the overall (within sector) increase in energy efficiency that is potentially achievable over the course of the 21st century. As the AR4 now stands, while estimates of energy efficiency are given for some individual users of energy, there is no indication of what these add up to on a global and cross-sectoral basis. But it is arguably very important to know something quantitatively about the	

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						overall potential for energy efficiency improvement, because that improvement, in combination with sectoral shifts in the share of economic activity, determine the overall decline in energy intensity. As Hoffert et al, (Nature, 1998) demonstrated (using the Kaya identity and a carbon cycle model), the rate of growth in GDP, and the rate of decline in energy intensity, determine the amount of carbon-free energy required for stabilization. Having some idea how much carbon-free energy is required for stabilization not only tells us how much technology change will be required on the energy supply side, but it may shed light on whether, as a practical matter, we can avoid a "dangerous anthropogenic interference" (DAI) with climate, given climate sensitivity and some estimate of how much warming is acceptable (say 2C). There is another reason why it would be useful to have some quantitative idea of what can be achieved on a sectoral basis (on a global scale) in terms of energy efficiency. It would help evaluate the plausibility of reference emission scenarios. In my view this is critical because three-quarters of the 40 SRES emission scenarios have pair-wise energy and GDP growth rates that imply 110 year (1990-2100) global average annual rates of energy intensity decline above 1.1%. Century-long, global average annual rates in excess of 1.1% seem implausibly high for the following reasons. The scope for energy efficiency increases in the electricity-generating sector are likely limited by thermodynamic factors to 100% or less. The same is almost surely the case for the heavy transport sub-sector (including boats airplanes railroads and heavy trucks). Together these sectors account for about 45% of energy consumed, and that share is likely to increase as more of the world is hooked up to the electric grid. While, 300% increases in energy efficiency are potentially achievable globally (more in the US), over the course of the 21st century, in the automobile/light truck and residential/commercial sectors, the scope for improvement in the industrial sector is more limited. Even if a 200% improvement in energy efficiency in the industrial sector is achievable, the weighted increase in energy efficiency across all sectors would, at most, be 200%.-and probably substantially less. Given the assumed increase in the relative importance of the electricity generating sector, it can be shown that these numbers imply that at best energy intensity in 2100 would be about 30% of the level in 1990. That works out to a 1.09% average annual rate of decline in energy intensity- a rate that we would have to work very hard to achieve. It is a rate that will require important advances in technology, ones that will require a long term commitment to well-funded R&D, and will not happen as if manna	

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						from heaven. Yet 30 of 40 SRES reference scenarios have imbedded within them 110 year global average annual rates of decline in energy intensity in excess of 1.09%. Moreover, 25 of the 40 SRES reference scenarios incorporate upward of 350 EJ/yr of renewable energy (including "new", but not old, biomass)-an order of magnitude above current levels. Arguably, the plausibility of most of the SRES emission is in doubt, yet they are used to carry out stabilization analyses. 4. In summary, while I would not quarrel with the chapter outline of the report, I believe that the manner in which the mitigation/stabilization issue is framed in the report could be substantially improved. So too, the individual components of the report need to be tied together in a more coherent and relevant manner-and related to what I believe should be the central theme of the Report, "what will it take to stabilize"? As Chapter 11 makes clear, it is now widely accepted that technology and technological change will be crucial to stabilization. How much technological change, and how to assure the necessary research, development and deployment, remains uncertain and in dispute. The answers to these questions are the key to successful stabilization and to whether stabilization can be achieved before the threshold of DAI is breached. The science of climate change, as reported by IPCC WG I, convincingly demonstrates that we face major problems from rising emissions and concentrations of GHGs, especially CO^2. Unfortunately, WG III in its TAR fumbled the ball in failing to make clear just how difficult achieving stabilization short of DAI will be, both technologically and economically. Based on my reading of the First Order Draft of WG III AR4, the fumble has not yet been recovered. It is to be hoped that recovery is still possible before final publication. (Christopher Green, McGill University)	
0-18	A	0	0			I am missing in the report the ugency of the geopolitical dimension of climate change in relation to energy provision. (Even more) serious conflicts could arise as a result of the increased demands for oil and other resources by countries like China en India. (Gert de Gans, Kerkinactie)	Link between climate policy and other policies, such as policy to enhance energy security issue mentioned in Ch. 13
0-19	A	0	0			Congratulations on such an excellent start! The emphasis on sustainable development hits the very heart of the GHG problem in the future. (Tao Ren, Utrecht University)	
0-20	A	0	0			There is much new literature about regional abatement costs of allocation schemes, which are not described in this report. Herewith a brief summary. Studies of energy system-models: Criqui, P. et al.: 2003. Greenhouse gas reduction pathways	Will not be covered by Ch. 13, see Ch. 3

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						in the UNFCCC Process up to 2025; den Elzen, M.G.J. and Lucas, P.: 2005, 'The FAIR model: a tool to analyze environmental and costs implications of climate regimes', Environmental Modeling and Assessment 10(2), 115-134; den Elzen, M.G.J., Lucas, P. and van Vuuren, D.P.: 2005b, 'Abatement costs of post-Kyoto climate regimes', Energy Policy 33(16), pp. 2138-2151; Nakicenovic, N. and Riahi, K.: 2003. Model runs with MESSAGE in the Context of the Further Development of the Kyoto-Protocol. WBGU - German Advisory Council on Global Change, WBGU website, http://www.wbgu.de/, Berlin, Germany; Persson, T.A., Azar, C. and Lindgren, K.: 2006, 'Allocation of CO2 emission permits – economic incentives for emission reductions in developing countries', Energy Policy In Press. Also of macro-economic model analyses (although there are many others as well): Buchner, B. and Carraro, C., 2003. Emissions Trading Regimes and Incentives to Participate in International Climate Agreements. FEEM Working paper 104.03, Fondazione Eni Enrico Mattei (FEEM), Milan, Italy. Böhringer, C. and Löschel, A., 2003. Climate Policy Beyond Kyoto: Quo Vadis? A Computable General Equilibrium Analysis Based on Expert Judgements. ZEW Discussion Paper No. 03-09, Centre for European Economic Research, Mannheim, Germany.; Böhringer, C. and Welsch, H., 1999. C&C - Contraction and Convergence of Carbon Emissions: The Economic Implications of Permit Trading, ZEW Discussion Paper No. 99-13, Centre for European Economic Research, Mannheim, Germany; Bollen, J., C , Manders, A.J.G. and Veenendaal, P.J.J., 2004. How much does a 30% emission reduction cost? Macroeconomic effects of post-Kyoto climate policy in 2020. CPB Document no 64, Netherlands Bureau for Economic Policy Analysis, The Hague. (Michel den Elzen, The Netherlands Environmental Agency)	
0-21	A	0	0			The regional costs implications of post-2012 regimes for the allocation of emission allowances (future commitments) is not described in the overall report. Chapter 3 describes the regional costs of 4 IPCC SRES regions (based on EMF study), based on one (costs-based) regimes based on full IET and marginal costs. This seems rather ad-hoc choice, as there are many allocation schemes based on various equity principles and allocation schemes (i.e. Multi-Stage, Triptych, Contraction & Convergence, costs-allocation etc) (IIASA, WBGU, MNP-RIVM, Chalmers University/Gothenburg, CIRED, University in USA, MIT, etc. etc.). Chapter 13 describes part of these regimes (in fact not the costs-based regimes) as analyzed in the literature, but do not describe the regional costs implications (* see comment-block: in which I have included the some of the new literature in this field). In fact	Will not be covered by Ch. 13, see Ch. 3

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						Chapter 11, discusses only one macro-economic study, i.e. Bollen et al. I would recommend discussing the regional costs in Chapter 3, and in Chapter 13 and Chapter 11. I can deliver some text on this issue. (Michel den Elzen, The Netherlands Environmental Agency)	
0-22	A	0	0			WGIII is not the competent IPCC Working Group to assess vulnerability of systems to temperature rise - that is principally the task of WGII and, to an extent, WGI. Throughout the WGIII report a figure of 2ºC for DAI is used, however, this has very little explanation or underpinning in the literature cited. For consistency the range of values expressed in the WGII report should be reflected in the WGIII report. (Spencer Edwards, Australian Greenhouse Office)	
0-23	A	0	0			Throughout the sectoral chapters there is no consistency in the dates used to report proportions of sectoral emissions (for example in Chapter 5 - Transport - figures for greenhouse gas emissions in 2000 are used; while in Chapter 6 - Residential and Commercial Buildings - 2004 figures are used). If there is no consistent use of dates/figures across sectors in the literature, this should be clearly explained and accounted for in a framework/consolidation chapter. (Spencer Edwards, Australian Greenhouse Office)	
0-24	A	0	0			Throughout the report, mitigation efforts are equated with political instruments (particularly the Kyoto Protocol). For example in Chapter 1 at page 2 it is stated that "The entry into force of the Kyoto Protocol in February 2005 marks a first, though modest step, towards the implementation of Article 2". This statement fails to take into account the significant mitigation efforts already being implemented by Parties under the UN Framework Convention on Climate Change and the plethora of national mitigation measures that have been underway in a host of countries for many years. References in the WGIII report should concern specific mitigation activities rather than to compliance (or otherwise) with any particular political instrument. It is, therefore, submitted that a review be conducted of the report to ensure that references to the Kyoto Protocol are proportionate to its role in the body of mitigation literature. (Spencer Edwards, Australian Greenhouse Office)	Noted
0-25	A	0	0			The use of 2006 references throughout the report, tends to obscure the transparency of the expert review process. If reviewers cannot obtain cited papers, it becomes difficult for an adequate assessment to be made of the literature used to constitute and support the assessment report.	

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						(Spencer Edwards, Australian Greenhouse Office)	
0-26	A	0	0			see my word paper on two proposed Common Methodologies for Priority Assessment of Mitigation Measures (PAMM) and for Priority Assessments of Adaptation (PAA) (Robbert Misdorp, PUM)	
0-27	A	0	0			Each of the sectoral chapters focuses on different regions to provide examples as to mitigation efforts. A more uniform treatment of the regions is necessary to provide a comprehensive summary of each mitigation sector. (Spencer Edwards, Australian Greenhouse Office)	
0-28	A	0	0			Considered as a FOD, the report is in reasonable shape, and may---given progress already made at this stage--be reasonably expected to be up to (if not actually even over) the high standard already set by previous AR's. As advised, comments below concentrate on attempting to add value to specific content in, and the general direction of, AR4 as specified in its TOR. As also advised, therefore, comments made here specifically exclude any grammatical, linguistic and/or syntactic errors (glaring or otherwise) still present in this draft. In view of the time available to me, unfortunately only selected chapters are reviewed here in detail (naturally, without prejudice to the remainder). That said however (based on an initial, somewhat abridged, reading) I have reservations that a number of the most crucial cross-cutting issues have themselves not been adequately synthesised in terms of an overall requirement to get to grips with a global mitigation challenge that many policymakers still appear to be at risk of failing if Article 2 of UNFCCC is to be ultimately fullfilled. The introduction of Art 2 itself as a cross-cutter provides--it seems to me at least--- an opportunity to situate the challenge more firmly (vis a vis previous reports) where it ultimately belongs---i.e. explicitly within the arena of UNFCCC. Therefore one of the biggest problems (familiar to us all) namely the Annex-1 vs NA1 configuration has unfortunately not been adequately tackled throughout the report in my view. This is unfortunate, as I believe it is certainly highly arguable that a synthesis of the decision and policy-making, sustainable development, regional issues and short vs long-term cross cutting drivers could reasonably be summoned up as a strong case to incorporate a much larger and wider-spread review of the plentiful literature concentrating on the A1 vs NA1 dialectic. Subsequent comments below are framed against this context. (Pat Finnegan, Grian)	Participation questions discussed in Ch. 13

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
0-29	A	0	0			Confidence ranges that are used for mitigation technology development could be included. The Working Group II practice of including specific confidence ranges in brackets after a forecast is made (as is done to a small extent in the Executive Summary of Chapter 9) could provide a useful addition to the report. (Spencer Edwards, Australian Greenhouse Office)	
0-30	A	0	0			chapters 5-10 disregard generaly the social and regional differences when addressing the problems and solutions of these sectors as if these problems emanate from only one single society or region. (Mohammed Alfehaid, Saudi Aramco)	
0-31	A	0	0			As former Technical Secretary of the IPCC-WGII-Subgroup Coastal Zone Management 1989 - 1994 and present Netherlands Governmental IPCC Peer Reviewer WGII and III, I strongly suggest to the IPCC - Chair: do not shy away, do not introduce the word uncertainties" unnecessarily too much in the text of the FAR. Replace the word "uncertainty", because the cause you are fighting for is a right cause, and too much use of this word "uncertainties" will shy away the needed future investors. And I assume that that is not the intention of IPCC. Furthermore please come up with clear instructions on systematic mitigation and adaptation for each country so that all the 190 member countries will follow your leadership and enjoy the transfer of knowledge provided by IPCC in an harmonized and effective fashion. • I politely invite the chairman of IPCC to announce the introduction of the hereunder proposed Common Methodologies on PAMM and PAA in the IPCC-FAR, which in my view ought to be developed by IPCC. (Robbert Misdorp, PUM)	
0-32	A	0	0			Discussion(s) of carbon sequestration are difficult to identify in the outline of the entire report. There is a clear inclusion of sequestration in the agriculture and forestry chapters -- but it took me a while to find the discussion of sequestration related to fossil fuels. (Stan Bull, National Renewable Energy Laboratory)	
0-33	A	0	0			Throughout the whole draft report there is almost a total absence of gender analysis in relation to climate change and mitigation. From the limited research done it is clear that different energy and mitigation options have different impacts on men and women and this should be reflected in this report. See for example: Mainstreaming Gender into the Climate Change Regime 14 December 2004 COP10 Buenos Aires http://www.genanet.de/fileadmin/downloads/Stellungnahmen_verschiedene_en/Ge	References to be reviewed and to be considered in equity discussion in Ch. 13. Principles to be discussed in Ch. 3, 12

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						nder_and_climate_change_COP10.pdf and Lorena Aguilar (2004) Climate Change and Disaster Mitigation (IUCN) available on-line: http://www.iucn.org/congress/women/Climate.pdf (Lars Friberg, Climate Action Network (CAN) Europe)	
0-34	A	0	0			The sections on innovation and technological change in chapter 2, 3, 4 and 11 need a common view on how innovation processes work. All of them should include the perspective of the systems of innovation literature and the model of feedbacks between all phases of innovation. Chapters 3, 4, and 11 already imply that climate policies also have important feedbacks on generation of technologies. This view should be more thoroughly discussed in chapter 2, which lays out the foundations on how innovation processes work (see comment on chapter 2 below) (Rainer Walz, Fraunhofer Institute Systems and Innovation Research)	Strengthen section on innovation in Ch. 13
0-35	A	0	0			My general impression is that the report should highlight the changes compared to TAR more specifically. In many chapters, the 'delta' to TAR is hard to conceive. (Fritz Reusswig, Potsdam Institute for Climate Impact Research)	
0-36	A	0	0			It is noted that the terms are not used in a consistent manner throughout the whole report. It is strongly encouraged to better harmonize. (Radunsky Klaus, Umweltbundesamt)	
0-37	A	0	0			It is noted that the scope of the WG3 report should be to provide on a comprehensive, objective, open and transparent basis, the scientific, technical and socio-economic information relevant to understanding the scientific basis of climate change mitigation. However, in its current status not all subchapters of the FOD are consistent with that scope. This is because a) the scope has been interpreted too broad and information clearly goes beyond the scientific basis of climate change mitigation, covering e.g. issues of a primarily political nature as the scientific basis of climate change should be mainly limited to methodological and conceptual issues but clearly shall not include issues related to implementation; b) the literature to be addressed should in general be limited to literature published after 1999 as it has to be assumed that the TAR already covered all relevant literature until 1999, c) the report should also be limited to more robust findings that can be based on more than one publication; d) conclusions included in the TAR need not be replicated but providing detailed reference could also help to keep the report concise and short. (Radunsky Klaus, Umweltbundesamt)	Reject. Pre 1999 references that have not been considered in TAR should be considered!
0-38	A	0	0			It is noted that the length of the FOD (about 1300 pages) is considerable above the	

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						envisaged length. However, there seems to be room to shorten the report, e.g. be limiting the text to the scope as specified by the IPCC plenary (see below) and by streamlining the text by avoiding addressing the same information more than once. (Radunsky Klaus, Umweltbundesamt)	
0-39	A	0	0			It is noted that the FOD includes whole paragraphs without any linkage to other parts of the report or to literature. This clearly is inconsistent with the requirement of providing information on an open and transparent basis but may be interpreted as an indication that the text reflects the views of the authors but not findings identified in the underlying literature. Any text, that cannot be linked to underlying literature therefore should also be deleted in the SOD. If there are gaps in literature that do not allow to provide information based on literature but that should be provided according to the agreed outline than such findings should also be clearly indicated as that could help to guide future research. (Radunsky Klaus, Umweltbundesamt)	
0-40	A	0	0			I am very concerned that the focus of the Report, and particularly Chapters 3 and 4, is predominantly on the next 50 years, and subdominantly on the remainder of this century. The reality illustrated by the analysis of Wigley, Richels and Edmonds (and later analyses provided for example on pages 223-224 of the TAR Climate Change 2001, The Scientific Basis) BUT IGNORED HERE, is that the problem is much longer term than this. Furthermore, the problem is 10x larger in the long term (~50,000 EJ / 50 years) than in the short term (~5000 EJ / 50 years). As part of the resolution of this problem, we need to introduce technologies in the present century that can almost fully replace carbon-emitting technologies in the next century. Thus we need to be advancing new energy technologies with very high total potential, and we need to be moving to energy uses that are consistent with very low CO2 emission. While it is important to pay attention to the near term, this report must absolutely also keep the much larger long term challenge in focus. It is critical that analyses looking to 2200 be included in this report, as they were in the TAR. See the attached analysis of future non-carbon energy needs, labeled "WRE Analysis.pdf". (Robert Goldston, Princeton Plasma Physics Laboratory)	
0-41	A	0	0			Preliminary Comments: My relevant areas of expertise are inverse integrated assessment modeling for climate change decision support and energy system modeling for energy policy support. The integrated assessment modeling is based on the tolerable windows	

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						approach (TWA) (other broadly equivalent terms include the guard-rail approach and safe-landing analysis). I have therefore concentrated on those parts of the WG III AR4 (principally chapters 2, 3, and the glossary), where the tolerable windows approach is discussed. As one of the lead developers of the TWA, I paid particular attention to the consistent usage of TWA-related terminology throughout the entire report. And as the AR4 is intended to provide a comprehensive assessment of scientific progress since the TAR, I took the liberty of adding two publications to the cited literature in order to highlight recent advances in the applicability of the TWA method. I have also proposed a substantial revision to the glossary entry for TWA. (Thomas Bruckner, Technical University of Berlin)	
0-42	A	0	0			IPCC, 2001 and the like are not valid references. The particular chapter of the assessment should be referenced using the lead authors' names. (Nick Campbell, ARKEMA SA)	
0-43	A	0	0			In many of the chapters there should be further reference to relevant sections from WG I and or II FOD report. This would be useful to ensure full consistency of the reported findings and to demonstrate the interactions between the WGs, which do not seem fully optimal at this stage. Such systematic linking work will be time consuming, it is though necessary. (Philippe Tulkens, TERI School of Advanced Studies)	Done
0-44	A	0	0			Do a clear distinction between "Biological carbon sequestration" involving the enhanced uptake of atmospheric CO2 by plants, forest, soils, and ocean fertlisation, and "Carbon dioxide Capture and Storage (CCS) involving the capture of CO2 from industrial and energy-related sources and its long-term storage. This disctinction is very clear in the IPCC Special Report on CO2 Capture and Storage. It never uses the term "sequestration" for the CCS technology, and mentions explicitely that it does not cover "biological carbon sequestration". Such distinction is for instance clear in Chapters 3, 7, 8, 12 but should be made in other Chapters such as Chapters 4, 5, 11 etc. (CZERNICHOWSKI-LAURIOL Isabelle, BRGM)	
0-45	A	0	0			Chapter "GLOSSARY": Page 21: Line 35-40: Please replace the old TWA definition by (see cell above): "The tolerable windows approach (TWA) seeks to identify the set of all climate protection strategies that are simultaneously compatible with (a) prescribed long-	

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						term climate protection goals, and (b) normative restrictions placed on the emissions mitigation burden. These constraints or guard-rails can include limits on the magnitude and rate of global mean temperature change, on the weakening of the thermohaline circulation, on ecosystem type loss, and on economic welfare losses originating from selected climate damages, adaptation costs, and directed mitigation efforts. For a given set of guard-rails, and assuming that a solution exists, the TWA outputs an emissions corridor which delineates all complying emissions paths. Safe-landing analysis is similar in concept and if no particular research line is indicated, then the term guard-rail approach covers both." (Thomas Bruckner, Technical University of Berlin)	
0-46	A	0	0			The Report do not include any section about reserves, resources and prices, as it was not planned, but now under present conditions and the important relation to mitigation and not conventional technologies I suggest to consider some assessment of latest trends. (Juan Llanes, Havana University)	
0-47	A	0	0			The integration of the whole report requires much more work. Particularly in the treatment of costs and benefits of mitigation and technology, there is a lack of integration over chapters 2, 3, 4-10 and 11. My suggestion as to how to divide up the costs literature over chapters 2, 3 and 11 is that concepts should be in 2, numbers for 2050 to 2100 should be in 3 and numbers for 2000 to 2050 in 11. However, Figures in chapter 3 may well need data over history and between 2005 and 2050 to make a point. Dividing up the technology literature is more difficult. My suggestion is that chapter 2 covers concepts and definitions, and explains the main ways that technology has been modelled (e.g. covering Clarke and Weyant, 2002) and later developments in the treatment as in Edenhofer, 2006), 3 covers baseline issues and effects of technology in cost-benefit studies which require a very long-term analysis and cost-effectiveness studies of stabilisation covering 2050 to 2100, and 11 covers technology in cost-effectiveness studies and attempts to integrate them with the technologies discussed in 4 to 10. When covering both cost-benefit and cost-effectiveness studies, it should be made clear in chapter 3 that there is a subsantial different between them as regards costs and effects of induced technological change as brought out in (Goulder and Matthai, 2000). There are so many estimates of GDP costs and carbon permit prices in recent literature that a meta-analysis is worth doing to supplement the tabulated comparison on models and qualitative discussion with some quantitative estimates to sort out the reasons	

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						for the differences. (Terry Barker, 4CMR Centre for Climate Change Mitigation Research, University of Cambridge)	
0-48	A	0	0			References: only 7.6 percent from developing countries in chapters 1,2,3,11,12.!!!!! (Juan Llanes, Havana University)	
0-49	A	0	0			Chapter 1, 2 and 12 dedicate more than 70 pages to Sustainable Development, suggest reviewing chapter 2 and 12 overlaps (Juan Llanes, Havana University)	
0-50	A	0	0			Also overlaps with regards to ancillary benefits within chapter 11 and 4-10 (Juan Llanes, Havana University)	
0-51	A	0	0			Almost all quotations to economic issues relays on the neoclassical approach, other approaches as ecological economics and bioeconomics both with well-known Journals are not included as alternatives to be assessed, specially on chapter 2,3, and 11. (Juan Llanes, Havana University)	Efforts to add other social science (non-economics) references in Ch. 13
0-52	A	0	0			There is a general problem how to handle the TAR. Should it be summarized or just cited as a reference? THis issue is not dealt with in the same way in the different chapters. (Marco Mazzotti, Institute of Process Engineering)	
0-53	A	0	0			The whole present report gives a good updated material and captures as well new recent information. Chapters 2, 3, 11 and 12 will be in that regard very important, in the sense they are going to capture cross sectoral informations as well as long term perspective consequences of all the relevant informations. I recommend that particular attention is given to these chapters, which will be of added value, for the whole process. (Jean-Yves CANEILL, Electricité de France)	
0-54	A	0	0			Very comprehensive document, but from the Chapters I have carefully read, I would like to see more integration between Ch. 4 and the general aspects covered in Ch. 2, 12 and 13. Presume this also relates to the other sectoral chapters. (Oren Kjell, Norsk Hydro ASA)	
0-55	A	0	0			There are a number of practical consequences of taking such a view seriously. One is that distributional issues are much more important than commonly recognized. Mainstream economics acknowledges the existence of a “declining marginal utility of income”, but with limited exception it is not incorporated into economic	Distributional issues covered in Ch. 13

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						analysis. Frankly, there is not - and I would argue cannot be - an "objective" measure of the declining marginal utility of income; in practice it is a choice of the analyst, and - as with the choice of a discount rate - it implies that costs are fundamentally indeterminate, and specifiable only by value choices of the analyst. The few studies (e.g., the work of Richard Tol and Christian Azar) that have taken this up have demonstrated that the conclusions of climate policy analyses are enormously dependent on these choices, but the consequences of this indeterminacy haven't been widely acknowledged. (Paul Baer, Stanford University)	
0-56	A	0	0			One issue that seems to have fallen between the scope of chapter outlines is any analysis of the financial sector. I am not expert in this field but surely it plays an important role and the literature on this should be covered somewhere? (Michael Grubb, Cambridge University)	Noted and to be covered in analysis of financial arrangements in Ch.13
0-57	A	0	0			Indeed, if I had one meta-level comment to make about all of the WGIII FOD, it's that the draft needs to be more self-conscious about the deep controversy about values at the heart of the economic paradigm. In particular, the assumption that "utility" is something objective that can be measured through market or non-market valuation, and thus that economic analysis is a useful approximation of "true" values, is only one perspective, albeit the dominant one. What I would consider the primary alternative - that valuation is an ongoing a social process, and that the value of "outcomes" is a question of meaning and choice rather than utility - is not well represented in this document. (Paul Baer, Stanford University)	
0-58	A	0	0			Generally I am surprised there is not an element in the structure that identifies key weaknesses in literature/knowledge to assist future work (Andrew Dlugolecki, university of east anglia)	To be discussed in 13.5 and summary
0-59	A	0	0			A second practical consequence is that uncertainty becomes much more important. Subjective expected utility maximization requires a unique probability distribution for outcomes as well as a unique utility function. Such unique probability distributions do not exist for most parameters of interest (both "scientific" and "economic") in the climate policy debate (see Baer et al 2005 and Baer 2005). The consequences of this kind of multi-dimensional uncertainty for decision-making have barely begun to be explored, but again, it implies that most economic analyses which suppress this uncertainty through unexplained value choices of the analysts, do not provide the kind of "objectivity" that they are presumed to have.	Ch.2

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						(Paul Baer, Stanford University)	
0-60	A	0	0			Whenever data for the European Union are mentioned, it is important to make clear "which" EU it refers to. The EU has been enlarged from 15 to 25 member states in 2004, and it maybe further enlarged by 2007. Some data cannot be interpreted without the knowledge whether it refers to the EU-15, the EU-25 (and perhaps later the EU-27). (Diana Urge-Vorsatz, Central European University)	Review text and make appropriate changes
0-61	A	0	0			All authors and lead authors must be commended for bringing a large amount of valuable material in this first order draft. There at this stage many redundancies, which should be reduced in the further development of the report. However, despite these redundancies, or perhpas because of them, there are several topics that are not addressed with sufficient scope and detail altogether - or presented in a misleading manner. I shall limit my general comments to two of them: renewables, and long term strategy (though a third one could be discounting, but I hope the detailed comments that follow will be sufficient). 1. RENEWABLE. It is hardly surprising that in a 1255 page draft renewables are only covered in a few pages, and with somehow misleadidng information. First, a global perspective could be given about the overall potential. Solar energy exceeds 8,000 times our primary energy supply. Although the technico-economic potential is certainly orders of magnitude lowers than the overall potential, it is still likely to ultimately cover a large percentage of our needs, if not all. Second, a fair assessment could be made of the "technico-economic potential" that could be reached, say, in 2050 and 2100, for all technologies. For example, table 4.3.1 narrows solar thermal to solar thermal electricity alone - and mixes estimates of overall technical potential, such as indicated for PV (1600 Ej/y), and assessments likely to be derived from technico-economic consideration, such as that for solar thermal (1.7 Ej/y). Although the confusion is in the source, IPCC role is to critically assess the information. What solar technology is more likely to provide more electricity in 2050 or 2100 is hard to guess, but they may end with comparable contributions: PV is handicapped by its costs and intermittent nature, CSP technologies being cheaper and more easily made guaranteed and even dispatachable, but limited to areas with strong direct insulation unless exported. In any case, both technologies may remain outweigthed by far, as they are today, by solar thermal contribution to heating and cooling needs (see comments on chapt'er 4). 2. LONG TERM STRATEGY.The report could perhaps more clearly make three points: 1) cooperative strategies oriented toward	Long-term strategy issues will be addressed in Ch. 13

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						research and development, as useful they might be, are unlikely to produce sufficient results by themselves in the absence of carbon prices throughout the economy; 2 Economic instruments, as useful they might be, need to be complemented by other instruments to address market imperfections, including R&D support and some specific financing mechanisms for technologies in their infancy, in order to bring down their costs through learning by doing processes; 3 Uncertainties on both costs and benefits of climate policies conflict with inertia to create a dilemma on long term objective(s): it cannot be defined once for all, but its absence is detrimental to the process. An abundant literature showing firm targets do not really fit the long terme cumulative nature of the climate change problem in the context of uncertainties. Combined with periodic revisions of an educated guess on what we would like to pay for mitigating climate change, the most pragmatic way to drive action by all countries and all players would be set indicative ambitious long term targets while making their full achievement dependent on actual costs - ie a sustained use of price capping mechanisms to accompany tradable permit schemes. This and similar suggestions could be more extensively discussed, in particular, but not exclusively in chapter 13 (see detailed comments). (Cédric Philibert, International Energy Agency)	

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
13-1	A	0	0			I have four general observations. 1. There is considerable overlap between the chapters I looked at, between WG2 and WG3, and even within chapters. A lot of material is simply duplicated, and should be cut to improve readability and reduce size. 2. In a number of instances, authors mainly quote their own work. This is unworthy. In a number of instances, authors mainly quote other IPCC material. This is incestuous. The quoting of IPCC material is most pronounced in the scenario discussion, which can be summarised as "We, the IPCC, declare that all previous IPCC work is great." This is silly. 3. When cutting overlap, please concentrate the material in the chapters	4

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						with experts among the authors. In many places, the authors are out of their depth; the selection of papers is haphazard, the assessment superficial. I also found too many references that are simply wrong; the authors cannot have read these papers. For a supposedly expert panel, this is very serious. 4. In a number of instances, the draft material reads like a political manifesto rather than a scientific document. In other instances, the authors have tried to hide their political message in pseudo-scientific language. For a supposedly independent panel, this is very serious. (Richard Tol, Hamburg University)	
13-2	A	0	0			This chapter is not in a good shape. The authors are pushing a political agenda by the selection of examples and by selective citation. This is unworthy. (Richard Tol, Hamburg University)	4
13-3	A	0	0			This chapter is not in a good shape. In some areas, the authors are simply out of their depth; game theory is an example (not surprising with this author list), decision analysis is another example (which is a surprise), and instrument choice is a third (no real surprise). In these areas, the chapter should seek support of convening authors. (Richard Tol, Hamburg University)	game theory 3 add short paragh the rest 4
13-4	A	0	0	0		The definition of the different criteria is found at many places and in different contexts : in table 13.1, in sections 13.2.2, 13.3.1, 13.3.3. I suggest to explain the different criteria in general in section 13.2.2 and then evaluate all policy instruments discussed in 13.2.1 with respect to these criteria in a seperate section 13.3.3. A good idea would be to extend table 13.1. to include the other instruments and instead to remove the explanations of the criteria. It is then possible in section 13.3.3 to refer to the description of the criteria in 13.2.2 and only add addiotnal criteria relevant for agreements. (Sonja Peterson, Kiel Institute for World Economics)	1
13-5	A	0	0	0	0	This very good chapter could perhaps more explicitely spell out the advantages and disadvantages of any international regime based on emissions trading, in particular by comparison with other economic instruments such as taxes. Beyond cost-effectiveness properties which belong to all economic instruments, tradable permit schemes allow addressing a wide range of concerns through allocation - from grandfathering to energy-intensive industry to preserve profitability of vested investments, to differentiation of levels of efforts given the level of development of	4

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						the various countries. They allow negotiators to focus on acceptable allocation, which would be equitable if the negotiating process is not too biaised, according to procedural equity concept. On the other hand, any short term fixed targets are hard to justify when the driving force behind climate change is the cumulative build-up of atmospheric concentrations, not instanteous emissions. While taxes would provide some certainty on marginal abatement costs tradable permit schemes provide worthless certainty on short-term levels but entail highly uncertain abatement costs. Their combination with price capping mechanisms would be a way to get the better of both taxes and tradable permit schemes. As it would reduce expected abatement costs, it may alleviate concerns about uncertain costs and thus facilitate broader participation. (Cédric Philibert, International Energy Agency)	
13-6	A	0	0			The detailed and careful discussions of incentives for countries to join and comply to international climate change agreements in Chapters 2 and 13 might be missing an important point: Dispersion of information about policy options and their consequences within electorates. Presently, severe information bottlenecks seem to prevail. For example, several government-commissioned studies (USA: "The Kyoto Protocol and the President's Policies to Address Climate Change: Administration Economic Analysis", July 1998 [http://www.envcomplex.ynu.ac.jp/Policies-to-Address-Climate-Change.pdf]; European Commission: "Economic Evaluation of Quantitative Objectives for Climate Change", by COHERENCE, Belgium with the support of ECOFYS, the Netherlands National University of Athens (NTUA), Greece ECOSIM, UK [http://europa.eu.int/comm/environment/enveco/studies2.htm]; Japan "Summary for the results of top-down models" (Team AMI) [in Japanese, http://www.env.go.jp/council/16pol-ear/y162-03/mat_02_2.pdf]) and independent studies (e.g., Kemfert 2002) have estimated the economic impact of meeting the Kyoto targets to be within the 0.1% range of the GDP by 2010. Yet, government concerns that meeting the Kyoto targets might hurt national economies are widely cited within the media without comment.The capacity of the news media might not be sufficient to overcome this information bottleneck. Efforts such as the UNEP publication "How will global warming affect my world? A simplified guide to the IPCC's Climate Change 2001: Impacts, Adaptation and Vulnerability" (2003, [http://www.unep.org/themes/climatechange/Publications]) address this problem, but may be insufficient. Rational decision making, as it is presupposed in the fist	A footnote in a section of political feasibilty

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						order draft, depends on providing the available information to a heterogeneous audience with a wide variety of backgrounds over a multitude of channels. Practically-minded discussions of consensus-building for environmental risk management (e.g. Rossberg et al. "A guideline for ecological risk management procedures", Landscape and Ecological Engineering 1(2), 221-228, 2005) stress the responsibility for information dispersal by those directly concerned with the problem analysis. I recommend to point out this aspect more clearly in the revised draft. (Kiminori Itoh, Yokohama National University)	
13-7	A	0	0			The chapter is very focused on policies, but it would benefit from a link to the market transformation process and the entry points for the different types of policies. For any given technology, its energy/greenhouse intensity, for example, is distributed as a bell curve in terms of market share (y axis) vs. intensity (x axis). We need policies (i) to eliminate the least efficient technologies (referred to as "market push", for which minimum energy performance standards can be very efficient), (ii) to encourage continuous development of new, even more efficient technologies (referred to as "market pull", for which procurement programs or technology R&D are important) and (iii) to promote timely replacement of equipment in the center of the curve, which will result in more efficient equipment in use. In general, there has been too little attention to energy efficiency and market transformation and there is a huge literature (and experience) on the subject. A generic evaluation of policies, in isolation of their intended function (e.g., market push), is not of much practical use. (Anne Arquit Niederberger, Policy Solutions)	2 relevant to sectorial chapters
13-8	A	0	0			Throughout the chapter, too much emphasis is on Kyoto Protocol, EU ETS and 2-degree target and the argument is unbalanced. In view of the fact that apart from these there are a wide range of forms of international agreements, regional market-based policies and type of long-term targets,the chapter should provide more general information that can be applied to various situations in various countries. (Koji Kadono, Global Industrial and Social Progress Research Institute)	4: increase the contents in for example, section 13.3.4
13-9	A	0	0			This chapter exhibits a strong bias towards abatement strategies - partly expressed (e.g., Box 13.1, partly implicit (by the relative length and depth of Chap. 13.2.2.5) – that comes as a surprise given the great importance that is given to adapation strategies in the general introduction. There has been many important new developments, e.g. in the field of natural hazards insurance and capital markets,	Not in the scope of this chapter

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						which are not reflected in the current draft. (Reimund Schwarze, DIW Berlin)	
13-10	A	0	0			The various parts of the chapter vary a lot with regard to the extent that literature is cited. For example, on pp.8-10 ('Emissions taxes and charges') very few references are made, while on pp. 32-34 large number of citations are made (on p.32, 19 citations with regard to a single argument), many of them citing related papers by the same authors. (Frank Jotzo, Australian National University)	1, review the balance of ref
13-11	A	0	0			This chapter need a lot of revision in all aspects. (Mohammed Alfehaid, Saudi Aramco)	1
13-12	A	0	0			The difference between cap and trade and baseline and credit scheme has not been made explicit (see chapter 13.2.1.3). They are listed separately in Box 13.1 but the credit scheme does only appear later on under international agreements (chapter 13.3.2) under the Kyoto Mechanisms. However, a few countries like Canada and Australia are having baseline and credit schemes for greenhouse gases and even more countries have implemented green or white certificate schemes. Comparing the advantages and disadvantagese of cap and trade compared to baseline and credit would be worthwhile since they perform very differently (see Betz and MacGill 2005: Emissions trading for Australia: Design, transition and linking options, CEEM discussion paper, Sydeny. Available from www.ceem.unsw.edu.au). (Regina Annette Betz, University of New South Wales (UNSW))	1
13-13	A	0	0			The criteria for policy choice in this chapter (see e.g. 13.1.2 and 13.3.3) seem to be lacking of consistency. The definition of "environmental effectiveness" (see page 5 line 17) is already including the aspect of "least costs" and therefore overlapping with "economic efficiency". The definition in Table 13.1 is more usefull in focusing on certainty and defining environmental effectiveness as "certainty with which a given environmental target is reached". In addition, one of the crucial criteria the criteria of "dynamic efficiency" is treated differently sometimes subsumed under the criteria of economic efficiency sometimes not. It should be more explicitly mentioned that dynamic efficiency which is a necessary condition to achieve long term economic efficiency is included under economic efficiency. This would be possible with the following changes (see following comments 2 and 3). (Regina Annette Betz, University of New South Wales (UNSW))	3 revision of criteria
13-14	A	0	0			Previous experience with environmental policy for conventional pollution (eg. SOx	4 consider in the discussion of goals

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						and NOx) and ex-perience to date with climate change policies are both useful for guiding future policy efforts but have important limitations to consider. In particular, an effective response to dangerous climate change would seem to require near transformation of our society. The largely incremental policy measures seen to date don't necessarily inform us how such a transformation is to be achieved (Regina Annette Betz, University of New South Wales (UNSW))	
13-15	A	0	0			As noted in Chapter one of the WG III report, policy making represents decision making under uncer-tainty. The uncertainties of what temperature rise constitutes dangerous climate change, climate sensi-tivity to atmospheric GHG concentrations, the implications on acceptable GHG emissions and the risks of catastrophic irreversible change need to be reflected in the policy framework. (Regina Annette Betz, University of New South Wales (UNSW))	2
13-16	A	0	0			This chapter, including the executive summary, needs to give attention to the importance of capital turnover in capital intensive industries, most of which are also GHG- and energy-intensive. In the pulp and paper industry, for instance, one study 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)	4 consider in criteria discussion
13-17	A	0	0			Important the chapter clearly state what is BAU and what is not for Voluntary Agreements and CDM Also that climate mitigation needs also to assess corporations as well as Governments in climate mitigation options. (Capetown Industry Expert Meeting, Industry)	2 unclear
13-18	A	0	0			Andrei Marcu reiterated the rapid development in the CDM and emissions trading market. He wanted also to raise the point that he knows of positive stories and impact the literature does provide and he can provide information from Swiss Re on insurance. He also asked about linkages of the various instruments. (Capetown Industry Expert Meeting, Industry)	4 discussion in CDM
13-19	A	0	0			• There are examples of sustained private R&D: Netherlands' company DSM programme had a program on melamine, an energy-efficient product/process. Another example: Toyota: vehicle analysis and continued R&D, bringing them to the top of world automobile manufacturing. The CLA, Dennis Tirpak would very	4 still waiting for inputs

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						much appreciate the information from Koba from Toyota on this. • On Toyoto, there is Swedish paper on the development on hybrid cars and Kornelis Blok will send this to Dennis. (Capetown Industry Expert Meeting, Industry)	
13-20	A	0	0			The chapter lacks a more detailed and comprehensive description of the EU ETS (most important rules, participants, timing, penalties, and possibly also the results of the allocation process across the EU 25 (treatment of newcomers, differentiated treatment of existing installations in electricity vs. industry sectors, closure rules, banking rules, etc.....) . If there is interest, I could provide such a summary in short time. (Joachim Schleich, Fraunhofer Institute Systems and Innovation Research)	1
13-21	A	0	0			Chapter 13 deals with climate policy and instruments and agreements used to pursue climate policy objectives. In the Chapter, the presentation of instruments is textbook-like and the author's seem generally fascinated with tradable permits, perhaps a reflection of the wide interest in the EU ETS. The current fascination with tradable permits also reflects an implicit assumption that not only are climate policy targets necessary, but they are likely to take the form of some absolute level of emissions. (The latter assumption is at least debatable, if one takes a longer view.) In any event, the impression is left that current climate policies have exercised an important influence on what is presented in the Chapter, virtually to the exclusion of other possible approaches to climate stabilization. I find the chapter lacking in the following respects: (a) The authors do not appear to question whether the instruments listed are actually capable of stabilizing GHG concentrations at a level that avoids DAI, as opposed to being limited to slowing emission growth, or reducing emissions somewhat, to the extent there is still "low hanging fruit" to pick. (b) There does not appear to be consideration of whether the application of market-based instruments should be linked in time to the availability of scaleable technologies. That is, there does not appear to be consideration that an appropriate way to use market-based instruments is as a means to deploy technologies when they arrive on shelf in scalable form, while employing concerted research and development effort to bring new technologies to the shelf. (c) There does not appear to be serious consideration of "hybrid" approaches, such as that proposed by McKibbin and Wilcoxen (Journal of Economic Perspectives, Spring, 2002), or any consideration of intensity targets (e.g. carbon emissions per dollar of GDP), such as those proposed in the "Pocantico	4 consider many points in the revision

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						Dialogue" (November, 2005), that emanated from a conference organized by the Pew Climate Center. www.pewclimate.org (d) There does not appear to be any discussion of what might be required to stimulate an incentive-compatible energy technology race, if as seems likely, ITC is not sufficiently strong, and the conclusions of Hoffert et al (1998, 2002) prove to be correct. (e) In the section on climate agreements and initiatives, the authors should consider the important paper by Victor, et.al, (Science, 2005), which raises serious questions about the workability of integrative climate policies, such as those reflected in the Kyoto Protocol. (f) Two recent papers seem to me to have important implications for the policies (and instruments to achieve them) that will be required for stabilization. One of these is the paper by Montgomery and Smith (2006), that is cited in an earlier chapter of the AR4 draft (and mentioned above in my second comment on Chapter 1). The other is a paper by Sanden and Azar (Energy Policy, 2005), cited in Chapter 3. Both of these papers raise questions about the policies (and, by extension, the instruments) required to bring advanced energy technologies "to the shelf". While the reasoning in the two papers is somewhat different (Montgomery and Smith focus on the potential dynamic inconsistency of market-based instruments which work through ITC, and Sanden and Azar emphasize that focusing too much on the "cost-efficiency" of current policies can blind us to the type and magnitude of effort that will be needed to bring advanced energy technologies to the "shelf"), the two papers have a common message. The message is that: (a) current, on the shelf, energy technologies will not be sufficient to stabilize climate at an acceptable level, and (b) that the policies that may be effective in inducing their deployment may be inadequate or ineffective in bringing "advanced energy technologies" to the shelf. As both papers make clear, advanced energy technologies will be needed beyond some future date (Sanden and Azar suggest 2030) to achieve stabilization. Because the advanced energy technologies require serious R&D effort over some considerable period of time, now is not too soon to begin to research and develop them in a committed, well-financed, and incentive-compatible manner. (This is similar to the message of Hoffert, et.al. (1998, 2002)). The potential inadequacy of market or related mechanisms to stimulate and finance what is essentially a global energy technology race, one that may be required if we are to avoid DAI, does not appear to be considered in Chapter 13, but it should be. (g) No attention appears to be given to the US DOE Climate Change Technology Program (CCTP). The CCTP is a massive energy	

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						research and technology blueprint that essentially connects the dots between the DOE energy research infrastructure (14 government run and financed energy research and development labs) and the GHG emission/climate change problem. If pursued vigorously, the CCTP holds real hope for facilitating the eventual stabilization of the atmospheric concentration of carbon. The CCTP reflects the view that serious reductions in carbon emissions will require a patient, long term, and concerted effort to develop a suite of technologies that, in combination, will contribute substantially to achieving stabilization. The US CCTP is an approach to climate policy that deserves attention (Christopher Green, McGill University)	
13-22	A	0	0			Chapter 13 (and the Report as a whole) give the impression that there is a consensus that adopting the right policies (increasingly stringent emission targets) and the right instruments (particularly tradable emission permits) will be sufficient to stabilize climate-presumably short of DAI. The proposition seems to be that the combination of emission reduction targets and market-based instruments is both: (a) sufficient to induce deployment of "on the shelf-ready to go" technologies, and (b) able to stimulate the research and development of advanced energy technologies to the point that they, too, are brought to the shelf, and ultimately deployed. Consensus or not, and there are those who would demur, the proposition is at best a hypothesis. There is, as yet, neither theoretical agreement nor a large body of empirical evidence to support it. An alternative hypothesis is that neither carbon emission targets nor market-based instruments, individually or collectively, are sufficient for stabilization, and the former may not be a necessary condition either.Climate scientists have demonstrated that the world almost certainly faces an increasingly serious climate change problem as the century progresses. The ball has been thrown into the court of social scientists and energy experts to consider the ways, means, and implications of a mitigation effort sufficient to stabilize climate. No favor is done to anyone by understating the magnitude and difficulty of that task. Achieving sufficient mitigation to put the world on a path to an acceptable stabilization level is a huge energy technology problem, with no easy or apparent answers. The problem is further magnified, if to avoid DAI, stabilizing atmospheric concentration means doing so below 550 ppmv. The question of what it will take to stabilize climate should be explicitly and coherently posed, and it should be addressed with candour as well as vision. In its current state, the FOD of IPCC WG III AR4 is wanting in both respects	Wait for Group 2 response

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						(Christopher Green, McGill University)	
13-23	A	0	0			There is much new literature about regional abatement costs of allocation schemes, which are not described in this Chapter. Studies of energy system-models: Criqui, P. et al.: 2003. Greenhouse gas reduction pathways in the UNFCCC Process up to 2025; den Elzen, M.G.J. and Lucas, P.: 2005, 'The FAIR model: a tool to analyze environmental and costs implications of climate regimes', Environmental Modeling and Assessment 10(2), 115-134; den Elzen, M.G.J., Lucas, P. and van Vuuren, D.P.: 2005b, 'Abatement costs of post-Kyoto climate regimes', Energy Policy 33(16), pp. 2138-2151; Nakicenovic, N. and Riahi, K.: 2003. Model runs with MESSAGE in the Context of the Further Development of the Kyoto-Protocol. WBGU - German Advisory Council on Global Change, WBGU website, http://www.wbgu.de/, Berlin, Germany; Persson, T.A., Azar, C. and Lindgren, K.: 2006, 'Allocation of CO2 emission permits – economic incentives for emission reductions in developing countries', Energy Policy In Press. Also of macro-economic models: Buchner, B. and Carraro, C., 2003. Emissions Trading Regimes and Incentives to Participate in International Climate Agreements. FEEM Working paper 104.03, Fondazione Eni Enrico Mattei (FEEM), Milan, Italy. Böhringer, C. and Löschel, A., 2003. Climate Policy Beyond Kyoto: Quo Vadis? A Computable General Equilibrium Analysis Based on Expert Judgements. ZEW Discussion Paper No. 03-09, Centre for European Economic Research, Mannheim, Germany.; Böhringer, C. and Welsch, H., 1999. C&C - Contraction and Convergence of Carbon Emissions: The Economic Implications of Permit Trading,. ZEW Discussion Paper No. 99-13, Centre for European Economic Research, Mannheim, Germany. Bollen, J., C , Manders, A.J.G. and Veenendaal, P.J.J., 2004. How much does a 30% emission reduction cost? Macroeconomic effects of post-Kyoto climate policy in 2020. CPB Document no 64, Netherlands Bureau for Economic Policy Analysis, The Hague. (Michel den Elzen, The Netherlands Environmental Agency)	Wait for Group 2 response
13-24	A	0	0			The regional costs implications of post-2012 regimes for the allocation of emission allowances (future commitments) is not described in this Chapter 11. Chapter 3 describes the regional costs of 4 IPCC SRES regions (based on EMF study), but only for a regimes based on full IET and marginal costs, but this is only one allocation scheme, there are many others (i.e. Multi-Stage, Triptych, Contraction & Convergence, costs-allocation etc), which are well analyzed in the literature (IIASA, WBGU, MNP-RIVM, Chalmers University/Gothenburg, CIRED, etc. etc.)	Wait for Group 2 response

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						(* see next comment-block). You can contact me for more next about this (michel.den.elzen@mnp.nl) (Michel den Elzen, The Netherlands Environmental Agency)	
13-25	A	0	0			Other costs-studies also not described here: Akimoto, Keigo, Toshimasa Tomoda, Yasumasa Fujii, and Kenji Yamaji. 2004. Assessment of global warming mitigation options with integrated assessment model DNE21. Energy Economics 2 (4):635 - 653. 3; Fujino, J., R. Nair, M. Kainuma, T. Masui, and Y. Matsuoka. 2005. Multi-gas mitigation analysis on stabilization scenarios using AIM global model. Energy Journal Submitted. Kainuma, M., Y. Matsuoka, T. Morita, T. Masui, and K. Takahashi. 2004. Analysis of global warming stabilization scenarios: the Asia-Pacific Integrated Model. Energy Economics 26:709-719. ; Smekens-Ramirez Morales, Koen E. L. 2004. Response from a MARKAL technology model to the EMF scenario assumptions. Energy Economics 4 (26):655-674. Mori, Shunsuke, and Takahiro Saito. 2004. Potentials of hydrogen and nuclear towards global warming mitigation—expansion of an integrated assessment model MARIA and simulations. Energy Economics 26 (4):565-578. Sands, Ronald D. 2004. Dynamics of carbon abatement in the Second Generation Model. Energy Economics 26 (4):721-738. (Michel den Elzen, The Netherlands Environmental Agency)	Wait for Group 2 response
13-26	A	0	0			This chapter is also generally well organised and in fairly good shape at this stage. (Pat Finnegan, Grian)	2
13-27	A	0	0			Table 13.3: In line 3 (Kyoto Protocol) and column 4 (Participation): Non-Annex I Parties are participation through mechanisms like CDM in order to help Annex B Parties. Should they be mentioned as well? (Regina Annette Betz, University of New South Wales (UNSW))	1 with modified table
13-28	A	0	0			By its nature Chapter 13 is one of the more dense and broad chapters in the WGIII report. In attempting to cover the range of national and international policy instruments used to limit greenhouse gas emissions, there is some significant scope for unintended emphasis of particular policy approaches. While it is recognised that this chapter will undergo significant revision, the assessment of policy and measures should be strictly from a scientific basis and not deviate into political comment. On this basis it is clear that there is some bias in the chapter towards a targets and timetable approach based on the framework of the Kyoto Protocol. As previously commented, references in Chapter 13 should concern specific mitigation activities rather than to compliance (or otherwise) with any particular political	2

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						instrument. (Spencer Edwards, Australian Greenhouse Office)	
13-29	A	0	0			There are quite a number of additional sources I could provide relevant to this section if they cans till be taken on board. (Dian Phylipsen, Ecofys)	4
13-30	A	0	0			The report touches on many topics, but in a number of sections the issues are dealt with them so superficially (one or a few lines per topic) that thry are either not understandable for anyone who is not an expert on the topic (as introduction of topics or furtjer explantion of conclusions are lacking) or has limited added value. (Dian Phylipsen, Ecofys)	4
13-31	A	0	0			Many overlaps, purpose of individual sections in overall storyline/message is not always clear. Sections clearly written by different authors, with posibly different objectives in mind. Overlapping sections lack coordination of contents and sources (Dian Phylipsen, Ecofys)	1
13-32	A	0	0			This is a very good chapter that takes account of most recent developments at the national/international level. At the national level, I missed a discussion and appraisal of feed-in laws. These have been very successfully employed in Germany and Spain and have been adopted by more that ten other countries in the EU. Furthermore, China has introduced a comparable instrument. The EU Commission has, in December 2005, analysed feed-in and quota systems and came to the conclusion that feed-in systems yielded better results at lower cost. In Germany, installed capacity in wind power rose by 14.000 MW from 1998-2004. This does not mean that a feed-in law like the German Renewable Energy Act is a silver bullet, but it is certainly is one of the most creative instruments for the market introduction of renewables in recent years. (Hermann E. Ott, Wuppertal Institute for Climate, Environment and Energy)	1 consider in section of incentives 13.2.1.4 & Box 13.1
13-33	A	0	0			In general, Chapter 13 is well written, clear, well balanced, policy relevant and well substantiated with facts and references to recent research findings. I only tound the sections on the interactions between policy instruments rather weak. Although the title of Section 13.2 mentions these interactions explicitly, this section hardly deals with these interactions (only some very brief remarks on pages 13 and 25, based on a few - partly outmoded - references). There are several other (more relevant) interactions that could be discussed, based on more recent research publications (see specific comments below)	4 consider to improve 13.2.2.6, 13.3.4.1, & 13.3.4.3

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						(Jos Sijm, ECN)	
13-34	A	0	0			GENERAL COMMENTS: In general, the chapter is well structured, it is clear and relatively well organised. However, I would suggest merging Sections 13.1.2 (page 5) with 13.2.2 (page 20 and followings) and 13.3.3 (page 51 and followings) on evaluation criteria. This suggestion will help to better specify the criteria which are used to assess climate policies (see next comments) and to avoid repetitions. My preference would be to insert the material in 13.2.2 and 13.3.3 in Section 13.1.2: the advantage will be to have defined much of the terms used to evaluate policy instruments since the beginning of the chapter. (Andrea BARANZINI, Geneva School of Business Administration)	1
13-35	A	0	0			GENERAL COMMENTS: I do not have checked for all references in the text, but there are a number which are not quoted in the references (13.6): see e.g. 13.2.2.4, page 22, line 40-43 (Andrea BARANZINI, Geneva School of Business Administration)	1
13-36	A	0	0			The slightly more specific point concerns UK policy, arguably one of the most "advanced laboratories." There are extensive evaluations of UK policy available on the UK DEFRA website, and in some other publications. The Carbon Trust carried out an early evaluation of hte effort (Wordsworth, A. and M. Grubb (2003). "Quantifying the UK incentives for low carbon investment." Climate Policy 3(1): 77-88, and recently published a major analysis of the lessons learned and proposals for reform (See Carbon Trust, 'The UK Climate Change Programme: potential evolution for business and the public sector' , www.carbontrust.co.uk, which embodies not only results of the Carbon Trust's main policy analysis for the UK government but also draws on the Trust's extensive experience of energy and carbon management with commercial organisations). (Michael Grubb, Cambridge University)	1 review of references
13-37	A	0	0			The draft report rightly emphasizes the diversity of policies and instruments, their respective advantages and disadvantages, and "considerable" interaction between climate change mitigation and adaptation policies and policies in other areas. The Kyoto Protocol has set a significant precedent, that its most notable achievements are the stimulation of an array of national policies, the creation of an international carbon market and the establishment of new institutional mechanisms, even though its environmental effectiveness and economic impacts has yet to be demonstrated.	4

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						The draft mentions the complementary role of policies and instruments but, in our opinion, that could be emphasized, as advantages and disadvantages of each instrument can vary among the sectors ("one size does not fit all").GHG tradable allowances can be an effective tool for fixed industrial installations such as in the electricity sector or in chemistry, but is less effective for diffuse sources such as individual car users and methane emissions from agricultural land; Taxation can be appropriate for individual car users (excise tax based on fuel consumption); Norms are appropriate for building insulation (tradable "white" certificates can be used as a complementary instrument, but cannot be mixed with GHG tradable allowances). For the same kind of reasons, the distinction of the respective usefulness of instruments in terms of timeframe, while suggested by the draft, could more developed: what is appropriate to modify day to day consumer behaviour can be different to what is appropriate to provide the right incentives to investors in long lifetime CO2 free assets, or what is appropriate to promote R&D in new innovative technologies. These considerations are consistent with the existence of considerable interaction between the different policies and instruments. Thus, as the report suggests, analysis of this interaction should be stimulated in order to avoid major policy inconsistencies, and to promote consistency in the precise design of policy rules. (Jean-Yves CANEILL, Electricité de France)	
13-38	A	0	0			The chapter is very long and not enough focussed: at many places it is unclear what the issue / question is that is actually being addressed, and the hierarchy of subheadings is too extensive, making the reader loose his/her orientation. Text at times isvery broad and general and just indicating interrelatedness of issues without getting to clear insights on these. (Marcel Berk, Netherlands Environmental Assessment Agency)	1
13-39	A	0	0			The chapter is comprehensive in discussing all relevant issues for international	1

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						agreements, but it remains very descriptive and leaves the user/ reader with many questions on what lessons to draw. More assessment is needed of the strengths and weaknesses of the various proposals and the limitations of the approaches under various circumstances (in particular in the context of deep redcutions and low stabilisation levels). Without such an assessment the chapter will have limited value for climate chnage negotiators.Section 13.3.1 and 13.3.3 have a huge overlap. Better to integrate the material from 13.3.1 with 13.3.3. (see also comment on 13.3.1). The question on the title of section 13.3.3 reflects a somewhat problematic structure of the whole of 13.3. In general it may be better to discuss criteria first before discussing the main elements of agreements, because that would allow an assessment of the various proposals (discussed under "elements") as they are presented. Some cross-cutting analysis could then be added after 13.3.2 if needed. This would also help to eliminate duplications and fragmentation of the material on specific approaches (now some of that is partly in 13.3.2 and partly in 13.3.3).Finally, section 13.3. lacks assessment of literature on other international agreemnets with the aim of drawing lessons for future climate change agreements. (Bert Metz, IPCC)	
13-40	A	0	0			The chapter discusses criteria for evaluating policies and instruments at two places; this should be integrated in one section; at the same time the selection of criteria should be better argued for (e.g. based on criteria in the literature instead of a prioritisation by the authors) (Marcel Berk, Netherlands Environmental Assessment Agency)	1
13-41	A	0	0			The authors refer too often to a limited number of overview articles, instead of to the specific and original sources of ideas and findings (Marcel Berk, Netherlands Environmental Assessment Agency)	1
13-42	A	0	0			The authors at some places also are not really discussing what is in the literature, but instead make there own arbitrary choices in structuring the issues and providing too much their own views. (Marcel Berk, Netherlands Environmental Assessment Agency)	2
13-43	A	0	0			Some issues simply don't fit at all under the sub-sub headings they are being placed (Marcel Berk, Netherlands Environmental Assessment Agency)	2
13-44	A	0	0			Since part of my interest is in the Global dimension, and I think there are some inescapable links between this and domestic policies, I look forward to the complete text including this. I would offer one general, and some specific,	4

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						comments at this stage. The general is the fact that, in contrast to the TAR, there is now a considerable base of implemented policy upon which assessment can start to be based - given the academic literature emphasis upon learning-by-doing this is important. Whilst the chapter captures some of this, it does retain a slightly theoretical flavour at places. (Michael Grubb, Cambridge University)	
13-45	A	0	0			One debate this chapter could usefully cover would be that between feed-in tariffs and portfolio standards / credits for renewable energy. Literature includes Butler and Neuhoff (2005), Cambridge working paper www.econ.cam.ac.uk (in review for journal). The chapter could also consider institutional issues (such as the role of Energy Agencies, the UK Carbon Trust, etc etc). (Michael Grubb, Cambridge University)	1 conisder international aspect in 13.3 & 13.2.14
13-46	A	1	30	4	31	The executive summary is perhaps the only part of the report which is red by decision-policy-makers. For that reason it must give clear views about the policy instruments. In particular, energy taxes should be explicitly mentioned as the most efficient way to cut emissions. It should be clearly stated that taxing energy is almost equivalent to taxing emissions. Also it is very important to note that, while most of the other possible instruments can be efficient only under costly controls from the regulator, an energy tax does not need any control. It should also be mentioned about taxes that, to be efficient an energy tax has to be related to the carbon content of the energy. That means, in particular, that the tax has not to be paid by nuclear energy users. As recently shown by U. Chakravorty, B. Magné and M. Moreaux ("Can Nuclear Power Solve the Global Warming Problem", IDEI Working Paper n 381, 2006, available on the IDEI Web Site, http://idei.fr/) it seems difficult to satisfy reasonable atmospheric carbon ceiling constraints, say for example a 550 ppmv ceiling, without an intensive use of the nuclear technology (For the theoretical aspects, see also U. Chakravorty, B. Magné and M. Moreaux, "A Hotelling Model with a Ceiling on the stock of pollution", forthcoming in The Journal of Economic Dynamics and Control, 2005)). More generally it is very necessary to say that, any environment policy instrument that does not give incentive to switch between energy forms with regards to their respective carbon content, is not efficient. (Norbert LADOUX, University of Toulouse and IDEI)	1 consider exec summary & 13.2.1.2

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
13-47	A	1	30			The Executive Summary is hard to read when you have not read the entire chapter. There is a lot of assumed knowledge and implicit assumptions. It is not easy to distill 60+ pages into a few pages, but explaining a few points or themes well is better than trying to be comprehensive. One could also think about reducing the length of the sentences and leave out some of technical terms. Both of these suggestions could make the summary easier to read. (Jensen Jesper, J-Consulting ApS)	1
13-48	A	1	0	12		my suggested changes are all aimed at getting the AR4 to consider a wider range of market mechanisms (emission taxes and tradable permits) as policy instruments for greenhouse gas control. Such mechanisms are the only ones that can create a pervasive, uniform, hence efficient incentive to reduce emissions. So it is economically crucial that the AR4's list of policy instruments includes market mechanisms that can be both politically feasible (or they will not be used) and equitable. For climate policy it is especially important that feasible taxes are considered, since the large existing stock of greenhouse gases means current environmental damage is not very sensitive to current emission levels, and hence taxes are economically preferable to tradable permits (Pizer 2002). However, the list of market mechanisms in the FOD of AR4 is too narrow, for two reasons: (a) It is assumed in 13.1.2 and 13.2.1.2 that a tax (charge, fee, levy) must be imposed on each and every unit of emissions, i.e. must be a "pure" tax. This restriction is quite unnecessary, as shown by the widespread use of thresholds in income tax systems. It also guarantees the political unacceptability of emission taxes at a full incentive rate, i.e. a rate likely to achieve the same emissions control as a tradable permit scheme. No full incentive emissions tax has ever been adopted politically, because the large revenue it would raise is unacceptable to powerful interest groups; witness the failure of the European carbon tax proposal in the early 1990s. I have argued in Pezzey (2003), using earlier results in Pezzey (1992), that emission taxes can and should use thresholds, so that while the tax is imposed on any extra (marginal) unit of emissions, which is all that's needed for efficiency, units below the threshold are free of the tax, and indeed attract a subsidy. Thresholds can be set flexibly, at any level needed to achieve political feasibility by reducing the amount of revenue raised, but not necessarily to zero. Their exact distribution of thresholds can be decided by whatever principles would be used for the distribution of free tradable permits, since tax thresholds are economically	1 consier revision permits and tax sections

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						equivalent to free permits (Pezzey 1992). However, there is obviously little experience so far of emission taxes with thresholds, which I acknowledge in my suggestions. (b) Though the possibility of combining free permits and auctioned permits is at first recognised on p11, it is not repeated. One is then left with the strong impression that all free permits or all auctioned permits are the only practical options on the agenda. The political infeasibility of auctioning all permits will then result in the polar opposite, "all free permits", remaining the dominant form of distribution, rather than the flexible notion of "some free permits", which is generally better on both economic and equity grounds (Pezzey and Park 1998, Bovenberg and Goulder 2001). REFERENCES (Pezzey ones are attached to the same email) Bovenberg, A. Lans and Lawrence H. Goulder (2001). "Neutralizing the adverse industry impacts of CO2 abatement policies: What does it cost?" In C. Carraro and G. Metcalf, eds., Behavioral and Distributional Effects of Environmental Policies. Chicago: University of Chicago Press. Pezzey, John (1992). "The symmetry between controlling pollution by price and controlling it by quantity." Canadian Journal of Economics, Vol 25 No 4, 983-91. Pezzey, John C.V. (2003). "Emission taxes and tradable permits: a comparison of views on long run efficiency." Environmental and Resource Economics, Vol 26 No 2, 329-342. Pezzey, John C.V. and Andrew Park (1998). "Reflections on the double dividend debate: The importance of interest groups and information costs." Environmental and Resource Economics, Vol 11 No 4, 539-555. (Jack Pezzey, Australian National University)	
13-49	A	1	0			Executive summary: the summary reflects the lack of clear questions being addressed in the chapter (Marcel Berk, Netherlands Environmental Assessment Agency)	4
13-50	A	2	6	2	6	The following phrase should be added after incentive; “”phasing out of the Environmentally Harmful Subsidies”. (Mitsutsune Yamaguchi, Teikyo University)	1
13-51	A	2	11	2	13	What about equity and fairness apart from the three criteria presented in the text? (Koji Kadono, Global Industrial and Social Progress Research Institute)	3 revise the section of equity
13-52	A	2	11	2	46	Using 'political feasibility' as a criterion is a misleading thought. Political feasibility is the OUTCOME of a political negiotiation process, in which various actors with	3 revise the section of equity

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						various concepts and ideas (reflected by 'criteria' and the weighing of these criteria) and different levels of power and influence come to some form of agreement, actions and so on. Primary criteria can be effectiveness, efficiency (static and dynamic), social justice, fairness, flexibility, freedom of choice, internalisation of costs and some others, not political feasibility. (Jan Paul van Soest, Advies voor Duurzaamheid on request of International Gas Union)	
13-53	A	2	11	2	14	Is fairness not also one of the major criteria used? If it isn't any discussion of equity subsequently is largely moot. Or is it intended to be subsumed under "political feasibility"? (Paul Baer, Stanford University)	3 revise the section of equity
13-54	A	2	12	2	13	Another Important criterion, i.e. equity (or distributional considerations) is missing. Refer to TAR WG3 p.406 as well as page 4 line 47, page 21 lines 7-10 and page 29 lines 15-52 of this document (AR4 WG3 Chapter 13). (Mitsutsune Yamaguchi, Teikyo University)	3 revise the section of equity
13-55	A	2	13			in the list of main criteria: add distributive impacts (delete political feasibility?); (Andrea BARANZINI, Geneva School of Business Administration)	3 revise the section of equity
13-56	A	2	17	2	46	The executive summary spends too much time attempting to provide a summary evaluation of the effectiveness of different sorts of policy mechanisms, when the purpose of the report appears more to be indentifying the various mechanisms. (Joanna Lewis, Pew Center on Global Climate Change)	4
13-57	A	2	18	3	16	While I found the chapter very comprehensive and rather balanced, I feel the present executive summary and technical summaries represent a less balanced overview of the chapter. I recognise this is a major challenge to synthetise such a diverse set of conclusions, but the present summary creates the impression that no policy instruments are really worth embarking on besides tradable permits and taxes. Is this really the overall message you want to convey? Perhaps it is better to summarise concisely the MERITS of the individual instruments (under which circumstances they ARE useful - as these are well indicated in the chapter)? (Diana Urge-Vorsatz, Central European University)	4
13-58	A	2	19	2	46	The list of bullets tends to generalize. Suggest that the list be reconsidered, and that each point be explicitly supported by the underlying text. For example, the statement that voluntary measures are not environmentally effective does not appear to be supported. Many question the extent to which voluntary effects can	3 revise exec summary

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						occur (e.g. without being limited by competitive concerns; although consider the Keidenren proposal in Box 13.9), but potential limits in scope seems different than being environmentally ineffective. And the economic efficiency of taxes, of course, is limited by their uncertainty and the distortions that they may induce (particularly with differing tax regimes). (Haroon Kheshgi, ExoonMobil Research and Engineering Company)	
13-59	A	2	19	2	21	It would be hard for us to understand that the authors have concluded that Voluntary measures and information campaigns are "not generally" environmentally effective. (Shigeo Murayama, The Federation of Electric Power Companies)	3
13-60	A	2	19	2	35	The statements here are not based upon empirical records. Carbon tax has not been effective due to distortion in carbon tax (See Kasa, Sjur (2004) "The Domestic Policies Bias in Analyses of CO2-taxation in the Nordic Countries", University of Oslo, Centre for Technology, Innovation and Culture Working Paper 03/04; Larsen and Nesbakken (1997) "Norwegian Emissions of CO2 1987-1994: A Study of Some Effects of the CO2 tax", Environmental and Resource Economics 9, 275-290). (Taishi Sugiyama, CRIEPI)	4 consider tax section and review references
13-61	A	2	19	2	35	Direct regulation was powerful in inducing technological change for automobile, stationary sources and appliacnes (See: Nadel, Steven. 2002. Appliance and Equipment Efficiency Standards. Annual Review of Energy and the Environment, 27: 159-92; Nadel, Steven & David Goldstein. 1996. Appliance and Equipment Efficiency Standards: History, Impacts, Current Status, and Future Directions. Proceedings of the ACEEE 1996 Summer Study on Energy Efficiency in Buildings, 2: 163-72; Gerard, David & Lester B. Lave. 2005. Implementing technology-forcing policies: The 1970 Clean Air Act Amendments and the introduction of advanced automotive emissions controls in the United States. Technological Forecasting & Social Change 72(6): 761-778; Taylor, Margaret R., Edward S. Rubin, & David A. Hounshell. 2005. Regulation as the Mother of Innovation: The Case of SO2 Control. Law & Policy, 27(2): 348-378.). (Taishi Sugiyama, CRIEPI)	4 consider 13.2.1.1 and review references
13-62	A	2	19	2	35	VAs have many successful records as reviewed in chapter 7 hence they are as promising as any other policy instruments at least. The problem I see is that VA's	3 Need evidences about Japanese programs

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						are seriously critisized while tax, cap and trade and any other policy instruments are not in this chapter. Japanese pollution control agreements were powerful tool to control emissions from stationary sources. See: Kitamura, Yoshinobu (2003) "Local Environmental Low and Policy 3rd ed."(in Japanese); Terao, Tadanori (1994) "Industrial Policy and Industrial Pollution in Japan", in "Development vs. Environment" Kojima and Shinozaki eds., The Institute of Developing Economies (in Japanese), Chapter 8.. Moreover, is should be noted that legal nuiance differ across countries. Japanese pollution control agreements, as well as top-runner standards for electric appliances, are "voluntary" legally, but there are strong compliance in reality. (Taishi Sugiyama, CRIEPI)	
13-63	A	2	19	2	21	There are many examples of effective voluntary agreements and actions. Some are documented in previous chapters, for example Toyota hybrid car (in chapter on transportation references Sasanounchi, 2004), the World Semiconductor Council, the International Aluminium Association (both Chapter 7), CEFIC Voluntary Energy Efficiency Programme 2005 (VEEP); this latter example has resulted in a 30% emission reduction whilst production has increased. (Nick Campbell, ARKEMA SA)	3 Need evidences about Japanese programs
13-64	A	2	22	2	22	The following should be added after economic efficiency; “if uniform taxes or charges are applicable to every emitter”. In reality, this is often not the case in almost all of the European Countries where taxes are popular. To avoid any misunderstandings, the above insertion should be necessary. (Refer to page 8 line 35 of this document (AR4 WG3 Chapter 13). (Mitsutsune Yamaguchi, Teikyo University)	3
13-65	A	2	22	2	24	The context in the section 13.2.1.2 Emission taxes and charges does not necessarily mean that Taxes and charges are given high marks for economic efficiency. (Shigeo Murayama, The Federation of Electric Power Companies)	4 consider section 13.2.1.2
13-66	A	2	23	2	25	We do not understand why it is necessary to mention that taxes cannot guarantee a particular level of emissions (row 23 page 2) while nothing is said about the uncertainty on the equilibrium price on a tradable permit market. This uncertainty on the price is more or less equivalent to the uncertainty on the quantity of which will be emitted under a tax system (one is the dual version of the other). Moreover I do not understand why it is necessary to mention that taxes are difficult to implement. Clearly this is sufficiently known by policy-makers. In addition the difficulty of implementation is not a specificity of the taxes. We can consider for	1 modify text tradable permits section

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						instance that tradable permit markets are more difficult to implement, not only from the point of view of the political acceptability, but also because of the control costs mentioned above. Nevertheless, it would be necessary to remember that the implementation of an international permit market would reduce the world cost of emissions reductions. (Norbert LADOUX, University of Toulouse and IDEI)	
13-67	A	2	23	2	25	Taxes and charges can indeed not guarantee a particular level of emissions, but based on well-known price elasticity figures quite adequate expert guesses can be made. (Jan Paul van Soest, Advies voor Duurzaamheid on request of International Gas Union)	2
13-68	A	2	24			SUGGEST ADDING: [...if necessary, adjust.] Political feasibility can be improved by levying taxes and charges only above certain thresholds, economically equivalent the same amount of free permits. (Jack Pezzey, Australian National University)	See comment 57
13-69	A	2	25	13	28	There is a general confusion in the literature between two meanings of "regulation" and two meanings of "flexibility" that is reflected in this statement. Regulation that mandates technology obviously limits flexiblity to the regulated industry; however, regulation that limits pollution quantitatively ("performance targets") does not limit flexibility in the same way. Performance targets do limit flexibility by requiring polluting industries to actually make reductions rather than allowing them to buy offsets in unrelated industries. But a case can be made (see Driesen 2003a, 2003b in attached citations) that trading which allows inexpensive offsets in other industries actually impedes innovation which will be essential to the long-term reduction of pollution to tolerable levels, and thus to the long term survival of pollution-intensive industries. (Note that I subsequently realized that this distinction is made in the chapter in section 13.2.1.1; it should definitely be reflected in the Executive Summary.) (Paul Baer, Stanford University)	4
13-70	A	2	25	2	30	also regulatory measures can be designed in such a way that there is freedom to choose for the 'regulated population', creating incentives for innovation and technological change. The exact policy instrument design is often more relevant for the types of effects and consequences that will be catalysed by the instrument than some general ideas of categories of instruments.	2 meaning is not clear

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						(Jan Paul van Soest, Advies voor Duurzaamheid on request of International Gas Union)	
13-71	A	2	26			Regulatory measures and standards" … add "...coupled with effective control and sufficient penalties" (Andrea BARANZINI, Geneva School of Business Administration)	2 consider section 13.2.1.1
13-72	A	2	29	2	29	the chapter tends to overlook personal consumers in favour of "firms". In some countries this is 25% of energy use (Andrew Dlugolecki, university of east anglia)	1
13-73	A	2	30	2	31	"Popular" does not in this case equal "widespread." The number of operating tradeable permit systems is actually still quite small. It would be more correct to say something like "Tradeable permit systems, while still farely rare relative to other types of regulation, are increasingly popular." (Paul Baer, Stanford University)	2 minor point
13-74	A	2	33	2	33	Suggested to change: … has implications for economic efficiency, equity as well as effectiveness. Add then: Allocation rules are of critical importance for the effectiveness of a trading scheme, in particular concerning the stimulation of efficient new entrants over less efficient incumbents and the stimulation of plants with CCS (Carbon Capture and Storage). Current allocation rules in the EU ETS show most often no stimulation for new entrants and even deter new entrants as reserved can be depleted when needed. Current rules in the EU ETS fail for CCS. (Vianney Schyns, DSM & SABIC)	2 exec summary, but consider later sections
13-75	A	2	33			fossil fuel (Catherine Beard, Greenhouse Policy Coalition (NGO representing energy intensive sector))	2 meaning not clear
13-76	A	2	36	2	40	It's not clear why the statement about fossil fuel subsidies belongs in here. (Paul Baer, Stanford University)	2, but consider in the incentive section
13-77	A	2	41	2	46	There are analyses of success stories of governmentally sustained R&D in many countries. See National Research Council. 2003. Energy Research at DOE: Was It Worth It?. Committee on Benefits of DOE R&D on Energy Efficiency and Fossil Energy, National Research Council. National Academy Press: Washington, D.C. Geller, Howard & Scott McGaraghan. 1998. Successful government-industry partnership: the US Department of Energy's role in	3, consider review ref

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						advancing energy-efficient technologies. Energy Policy, 26(3): 167-177. (Taishi Sugiyama, CRIEPI)	
13-78	A	2	41	2	46	The statement here regarding the ability of the government to sustain R&D programs for decades are incorrect. Since 1970s Japanese government have sopported renewables, nuclears, and energy efficiency programs. The programs resulted in, among others, the diffusion of PV power in Japan (See: Watanabe, Chihiro. 1995. Mitigating global warming by substituting technology for energy: MITI's efforts and new approach. Energy Policy, 23(4-5): 447-461; Watanabe, Chihiro, Kouji Wakabayashi & Toshinori Miyazawa. 2000. Industrial dynamism and the creation of a "virtuous cycle" between R&D, market growth and price reduction: The case of photovoltaic power generation (PV) development in Japan. Technovation, 20(6): 299-312. (Taishi Sugiyama, CRIEPI)	3, consider review ref., need documents and ref for a long term R&D
13-79	A	2	41	2	46	The EU 7th Framework Programme for Research should be referenced as a long-term government support for R&D. (Nick Campbell, ARKEMA SA)	3, consider in the body of the text
13-80	A	2	41	2	46	Note that due to liberalisation the amount of money spent by the private sector on R&D has decreased significantly (Jan Paul van Soest, Advies voor Duurzaamheid on request of International Gas Union)	4, send e-mail for the evidences
13-81	A	2	43	2	44	I believe it is false that " there is little evidence to indicate that governments are capable of providing significant sustained support over 30-50 year time periods for social purposes." Governments have provided substantial, ongoing support to general science, medical research, and military R&D over many decades, all of which are "social purposes." That they haven't funded renewable energy or energy efficiency research is a comment about political and economic interests and priorities. (Paul Baer, Stanford University)	1
13-82	A	2	50	2	51	Environmentally efficient and economically effective should be “environmentally effective” and “economically efficient”, though I think the word economically is unnecessary in this case. (Mitsutsune Yamaguchi, Teikyo University)	1
13-83	A	2	53	3	6	We do not understand the sentence beginning row 53 page 2 (“For example a tax	1, redrafting in the text

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						(or a tradable permit system) can affect the total use of a given product and the choice between different products, but may be less suited to address how a given product is used, when it is used, where it used"). A tax on energy or on emissions is clearly well suited to address how energy is used (the tax promotes energy savings for instance), it also addresses when and where it is used (where and when it is the less costly). (Norbert LADOUX, University of Toulouse and IDEI)	
13-84	A	2	53	3	6	The example is absolutely unclear. There are several arguments roled in to one, and does not clarify the point, on the contrary. (Dian Phylipsen, Ecofys)	1, redrafting in the text
13-85	A	2	0			Section on ABBREVATIONS: For LPG please use liquefied petroleum gas and not liquid (Johanna Wickstrom, World LP Gas Association)	2
13-86	A	3	6	4		Pursue to the analysis of instruments, their effectiveness, efficiency and such, an attempt is needed to produce a sharper evaluation of the pro's and con's of each of the instruments, and may even make rankings in terms of effectiveness, efficiency and other criteria. The acceptance of effective instruments is the key problem: the more effective, the less accepted, seems to be the basic law. Now, in the light of the quest for effective instruments, what (international) debates are necessary, what further analysis will be needed, what strategy can be followed to have a growing acceptance of the right instruments? May be some unconventional approaches should be elaborated, such as the one proposed by J.F. Rischard, vice-president World Bank Europe in his book (high-level think tanks wich people from various backgrounds proposing solutions that are yet politically unacceptable, but that may become more acceptable when they are backed by these think tanks), or an intensive, well-structured dialogue process involving scientists and policy makers, systems of naming, blaming and shaming, and others. (Jan Paul van Soest, Advies voor Duurzaamheid on request of International Gas Union)	4, consider in the revision of criteria
13-87	A	3	7	3	16	Statement that the "environmental effectiveness and economic impacts of [Kyoto] have not yet been demonstrated" is simply wrong. Wigley et al (1998) demonstrated that full participation and success in meeting all Kyoto targets reduces warming 0.07degrees per half century. That amount is too small to measure. Therefore, Kyoto is not environmentally effective. Admit it. (Patrick Michaels, University of Virginia and Cato Insitutute)	2, the author prejudges the effectivenss: our interpretation is environmental effectivenss much broader

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
13-88	A	3	8			It is too early to say whether the Kyoto Protocol is successful or not, sets a good precedent or a bad, or none at all. (Richard Tol, Hamburg University)	4
13-89	A	3	8	3	8	Is not clear why the Kyoto Protocol is singled out ahead of the UNFCCC; or, since the sentence refers generically to the environment, why not refer also to, say the Montreal Protocol or several other international instruments. (Spencer Edwards, Australian Greenhouse Office)	3, add UNFCCC line 32, page 3
13-90	A	3	8		16	This section could als mention the short-sightedness of the KP emissions trading due to a lack of a long-term goals and a focus on short term cost-effective soluctions over investments in longer-term mitigation options; this is one of the reasons for a focus on technology development (Marcel Berk, Netherlands Environmental Assessment Agency)	3
13-91	A	3	8	3	16	Practically speaking, it is true that effectiveness and economic inpacts of the mentioned policy measures "have not yet been demonstrated". But it is a suggestive way of saying things. Theoretically, and by means of models, ex ante analyses, effects and impacts HAVE been demonstrated, that's way policy makers choose to introduce these mechanisms. Ex post analyses are not yet available, mainly due to the fact that the mentioned instruments are installed only recently. (Jan Paul van Soest, Advies voor Duurzaamheid on request of International Gas Union)	2
13-92	A	3	12	3	14	this seems much too positive about CDM. The criticisms at COP11 were very loud- see UNEPFI Climate Change Working Group CEO Briefings on CDM and post-2012 policy. (Andrew Dlugolecki, university of east anglia)	2
13-93	A	3	14		16	The accurate description would be "stimulated the development of national and regional emission trading systems for business". "…..a fully global system for business has yet to be implemented." (Andrei Marcu, IETA)	2 too detailed
13-94	A	3	20		25	Beyond the positive aspects listed for a sectorial market mechanism there are a number of other potential benefits including addressing competitive tension within the sector (Andrei Marcu, IETA)	3 in section 13.3.2.3.1
13-95	A	3	24			"However, there is no evidence that investments in R & D activities will achieve the same level of emission reductions as global targets and common markets (such	3

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						as those under the Kyoto Protocol) in either the near or long-term unless supplemented with other policies to promote diffusion." This makes an assumption that global targets and common markets actually achieve a "level of emission reductions". Either it should be re-written or the evidence for this should be presented together with a discussion of the relative costs of the two approaches. (Catherine Beard, Greenhouse Policy Coalition (NGO representing energy intensive sector))	
13-96	A	3	24	3	27	I am not sure that IPCC should be stating that literature is NOT available and using this to demonstarte a point. This does not strike me as good practice! (Nick Campbell, ARKEMA SA)	2
13-97	A	3	26			Drop "(such as those under the Kyoto Protocol)". Reason: Kyoto Protocol doesn't provide a long-term target. (Koji Kadono, Global Industrial and Social Progress Research Institute)	See 95
13-98	A	3	27	3	27	"Integrating and comparing activities" is very confusing - "Integrating" seems to imply integrating in practice, whereas "comparing" is an analytical activity. I'm guessing that some other sense of "integrating" is meant? (Paul Baer, Stanford University)	1
13-99	A	3	37	3	37	As per above, Kyoto is not "scientifically sound". What dynamic has changed that will make any subsequent protocol or agreement different? (Patrick Michaels, University of Virginia and Cato Insitutute)	2
13-100	A	3	38	3	40	I think what is really meant is not that political acceptability depends on "climate policies leading to a more sustainable development path," but that it depends on "not impeding the rate of growth", which is in certain contexts defined as "sustainable development" (with absolutely no environmental content to "sustainability") (Paul Baer, Stanford University)	2
13-101	A	3	43			' may be appropriately given' - given by whom? (Dian Phylipsen, Ecofys)	3
13-102	A	3	46	3	50	I do not see the link between the second and third sentence. Authors have developed pathways, defining the global reduction target. Sometime other studies analyze then calculate the regional reductions. These are two, and not necessary one step. Revise text. Suggested text: For example, to limit ... above pre-industrial levels, global emissions needs to be reduced..... . (Michel den Elzen, The Netherlands Environmental Agency)	3

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
13-103	A	3	47	3	49	drop "-" signs; the text already refers to a reduction of emissions; strictly speaking, a negative reduction would be an increase in emissions. (Joachim Schleich, Fraunhofer Institute Systems and Innovation Research)	1
13-104	A	3	47	2	51	The authors should explain a wide range of discussion, which includes researches not based on Climate Sensitivity. The EU argument that temparature should not be increased over 2 degree is basically based on Climate Sensitivity analysis, however, this approach might be a simple, but not updated one. (Shigeo Murayama, The Federation of Electric Power Companies)	2, not correct
13-105	A	3	47			Climate change is a global issue. The logic in the text is unclear and insufficient how a 2-degree goal would lead to the distribution of GHG emission reductions as in the text. (Koji Kadono, Global Industrial and Social Progress Research Institute)	See 102
13-106	A	3	47	3	50	There are a lot of goals and the pathways to be considered. Even if "For example, to limit global temperatures to a goal of 2 degC above pre-industrial levels, developed countries …" is described, other examples should also be described because only one example might be interpreted by readers as the IPCC recommend. (Keigo Akimoto, Resaerch Institute of Innovative Technology for the Earth (RITE))	See 102
13-107	A	3	47	3	48	replace ” to limit global temperatures to a goal of 2 C above pre-industrial levels” by ”to limit the GHG atmospheric concentration to 450 ppm”. The rationale is that there is a significant probability that the warming will be larger than 2 , even if the limit of 450 ppm is not exceeded. (Michel Petit, CGTI)	3
13-108	A	3	48			Why is this particular target singled out? As the target is on the extreme side, even technically infeasible according to some models, this is a suggestive example. (Richard Tol, Hamburg University)	3
13-109	A	3	50	3	50	Change into: -60% to -90% (Michel den Elzen, The Netherlands Environmental Agency)	1
13-110	A	3	50			-60% as in 32.33 (Catherine Beard, Greenhouse Policy Coalition (NGO representing energy intensive sector))	1
13-111	A	3	51	3	52	Why concentrations? I do not see the link with the goals earlier mentioned. (Michel den Elzen, The Netherlands Environmental Agency)	1
13-112	A	3	51	3	51	change path in baseline emissions	2

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						(Michel den Elzen, The Netherlands Environmental Agency)	
13-113	A	3	51	3	51	"Deviate from their current path as soon as possible?" Doesn't the 2ºC target actually imply some very specific constraints on DC emissions, in terms of deviate how much, how soon? Particularly if Annex I emissions are specified within the ranges in this paragraph? Is it not being stated just to avoid antagonizing southern readers? (Paul Baer, Stanford University)	See 102
13-114	A	4	5	4	8	Might it also be worth noting that many corporations and NGOs are active opponents of mitigation? (Paul Baer, Stanford University)	2
13-115	A	4	20	3	22	See examples detailed above in previous comment (Some are documented in previous chapters, for example Toyota hybrid car (in chapter on transportation references Sasanounchi, 2004), the World Semiconductor Council, the International Aluminium Association (both Chapter 7), CEFIC Voluntary Energy Efficiency Programme 2005 (VEEP); this latter example has resulted in a 30% emission reduction whilst production has increased.) Also using "no literature" again to prove a negative point!! (Nick Campbell, ARKEMA SA)	3
13-116	A	4	26			Interaction between climate mitigation and adaptation is not clearly explained. Examples should be provided. (Koji Kadono, Global Industrial and Social Progress Research Institute)	3, rephrase the paragraph
13-117	A	4	31			….endeavours to serve (Catherine Beard, Greenhouse Policy Coalition (NGO representing energy intensive sector))	1
13-118	A	4	31	4	32	sentence seems to be misconstructed (Dian Phylipsen, Ecofys)	1
13-119	A	4	33			Section 13.3. There is quite some approaches of post-2012 regimes, such as grand-fathering, multi-sector convergence, multi-criteria convergence, CSE convergence, Brazilian Proposal, capability to pay/jacoby rule and intensity target approach (see Bodanksky, 2004 for an overview), costs-based allocation approaches, which are not described in this section. I would suggest to a more extensive overview of all the different architectures of post-2012 regimes, similar as has been done by Philibert (2005) - Approaches to future international cooperation (Chapter 3), i.e. mention the main regime and its variants. This gives a much better overview of the	Group 2

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						nice work that has been done since the IPCC-TAR on the various post-2012 regimes, and is well described in the literature (see Bodanksky, 2005; den Elzen and Lucas, 2005; Höhne et al., 2005; Philibert, 2005; etc. (Michel den Elzen, The Netherlands Environmental Agency)	
13-120	A	4	33			Section 13.3. Sometimes I had the feeling of reading the report of Hohne et al. (2005) again. (Michel den Elzen, The Netherlands Environmental Agency)	Group 2
13-121	A	4	33			Section 13.3. Miss the different dimensions of the post-2012 regimes (see report of Philibert and Pershing, 2003) (Michel den Elzen, The Netherlands Environmental Agency)	Group 2
13-122	A	4	33			Section 13.3. Miss quite some references to more costs-based allocation approaches. (Michel den Elzen, The Netherlands Environmental Agency)	Group 2
13-123	A	4	33			Section 13.3. In general I do not like the structure of this Section. I would prefer to include one section on Quantitative approaches: type of commitments (discussing the different types of targets) and then one section on Quantitative approaches: timing and allocation schemes (discussing the representative regimes and their variants: multi-stage, C&C, global Triptych and per capita variant, costs based allocations, Brazilian proposal), and then one section on non- Quantitative approaches: PAMS, etc. Similar as being discussed in Philibert (2005). I think this set-up is also used in other studies: Bodansky, den Elzen, Criqui etc. In the present form not all types of commitments are discussed. The discussion on post-2012 regimes is not clearly discussed and many regimes are not discussed (like the costs-based regimes, etc. etc.). (Michel den Elzen, The Netherlands Environmental Agency)	Group 2
13-124	A	4	33			Section 13.3 sometimes very briefly describes some of the post-2012 studies. Some representative studies for example, Bodanksky (2004), den Elzen et al., (2003), Criqui et al. (2003) and Aldy et al. (2003) do provide a very nice overview of the different architectures of post-2012 regimes, but these hardly cited (less than 3 times each), whereas others also representative studies in this field (belonging to one of the CLAs, and is indeed a nice reports together with the earlier mentioned ones), Höhne et al. (2005) are cited 12 times and Höhne et al. (2003 are cited 9 times, with extensive parts of the studies included in this chapter. Sometime I have the feeling that I am reading the reports of Höhne et al instead of the IPCC FAR, as	Group 2

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						I am quite familiar of these reports. So, I miss a kind of a balance between the various studies, and I think the authors should sometimes cite the studies Bodanksky (2004), den Elzen et al., (2003), Criqui et al. (2003) and Aldy et al. (2003) more, or cite the original sources, as some of the citations were already concluded by earlier studies in stead of the reports of Höhne et al. You can contact me for more next about this (michel.den.elzen@mnp.nl). I hope I am also one the CAs. (Michel den Elzen, The Netherlands Environmental Agency)	
13-125	A	4	33	3	25	Section 13.1 and Section 13.2 describe sometimes in detail different studies (Michel den Elzen, The Netherlands Environmental Agency)	2
13-126	A	4	33			MORE SPECIFIC COMMENTS: in particular under heading 13.1.2, 13.2.2 and 13.3.3 (but also more in general throughout all the chapter), the authors have chosen 3 main criteria to judge climate policy instruments, that is environmental effectiveness; economic "efficiency" (but see above about this terminology); and political feasibility. I have some doubts about this latter criterion and I would suggest another criterion to replace it (or to be a 4th main criteria). Firstly, there is some uncertainty on what the authors precisely mean by this criterion. Indeed, political feasibility is for instance defined in 13.1.2 (page 5, line 23) as the "extent to which a policy instrument is likely to be viewed as legitimate, gain acceptance, and be adopted and implemented". A similar definition may be found in 13.2.2, while in 13.3.3 political feasibility is defined with reference to equity, governance and side payments. I have the impression that this does not imply the same concept. However, and more fundamentally, I would say that a criterion has to be measurable, otherwise it is not useful. In this respect, "political feasibility" is not a good criterion. For this reason, I would refer and use another criterion much used in the literature (and also linked to political feasibility), which is distributive consequences. I would thus suggest deleting "political feasibility" as one of the main criterion (although some elements, e.g. related to equity may be discussed in evaluating climate policy instruments) and add instead "distributive impacts". In this context, the authors could refer to a very large literature, see e.g. articles by I.W.H. Parry (2004): "Are emissions permits regressive?" Journal of Environmental Economics and Management 47: 364–387; S. Tiezzi (2005) "The welfare effects and the distributive impact of carbon taxation on Italian households" Energy Policy 33: 1597–1612; S.E. West (2004): "Distributional effects of alternative vehicle pollution control policies" Journal of Public Economics 88: 735– 757; S. Speck	3 revision of criteria, check ref.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						(1999): "Energy and carbon taxes and their distributional implications" Energy Policy 27(11): 659-667; A. Baranzini, J. Goldemberg & S. Speck (2000): "A Future for Carbon Taxes" Ecological Economics, 32(3): 395-412; R. Brannlund, J. Nordstrom (2004): "Carbon tax simulations using a household demand model" European Economic Review 48: 211 – 233. (Andrea BARANZINI, Geneva School of Business Administration)	
13-127	A	4	35		50	it is said that the purpose of the chapter is to discuss national policy instruments etc; instead one would expect the chapter to more specifically review the design and use of policy instruments and evaluate their performance. (Marcel Berk, Netherlands Environmental Assessment Agency)	2, our goal is to access the features, not evaluate them
13-128	A	5	5	5	15	At the outset, it should be clear that this study is talking about both the various types of policies that can explicitly serve as climate policies, as well as policies that were enacted primarily to meet other goals but double as climate policies (have climate co-benefits) as in 13.2.1.7. (Joanna Lewis, Pew Center on Global Climate Change)	2
13-129	A	5	7			principal, not principle; why are there only three criteria? Efficacy and efficiency are typically split into short-term and long-term (as the effects can be opposite), and equity is often added as criterion in ist own right, beyond political feasibility; practicality and robustness may be criteria as well. (Richard Tol, Hamburg University)	3 in the revision
13-130	A	5	10	5	10	The following phrase should be added after incentive; ""phasing out of the Environmentally Harmful Subsidies". (and this should be shown in Box 13.1) (Mitsutsune Yamaguchi, Teikyo University)	1 addressing at 13.2.1.4 (See 50)
13-131	A	5	15			Regarding the criteria in 13.1.2., equity and fairness should be added as criteria. (Koji Kadono, Global Industrial and Social Progress Research Institute)	3
13-132	A	5	15	6	29	Add a new definition of economic efficiency as follows: productive: relating to more efficient use of existing systems and processes, allocative: the most efficient mix of available options, and dynamic: referring to the processes of technological and organisational innovation responding to longer-term developments. This is clearly the most relevant for long-term climate action because it focuses on transformation through investment and innovation, rather than incremental improvements. Delete reference to dynamic effects in the following paragraph replace e.g. by competetiveness or adaptability.	3

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						(Regina Annette Betz, University of New South Wales (UNSW))	
13-133	A	5	17	5	24	Should also include a social dimension of the policy - i.e. policies that empower stakeholders, facilitate participation, and do the least harm to communties or stakeholders, as well as measures that are better accepted by the community or stakeholders. Ref. (MM 2001) or (MMRS 2005) for details. (MM 2001) = Munasinghe, M. 2001. "Sustainable development and climate change - applying the sustainomics transdisciplinary framework", Int. Journal of Global Environmental Issues, Vol.1, pp.13-55. (Mohan Munasinghe, Munasinghe Institute for Development (MIND))	3
13-134	A	5	17	5	24	I would consider "equity" as the third basic criterion, and refer to the political acceptance more as the process of determining the relative importance of the three basic criteria and the respective characteristics of different policy options in the political decision-making arena. Equity would address issues such as distributional effects, burden-sharing across generations, nations, emission sources, etc. (Anne Arquit Niederberger, Policy Solutions)	1, but retain political feasibility
13-135	A	5	18	5	22	Definisions on environmental effectiveness and economic efficiency seem to be not clear. Cost-effectiveness is included in the definition of environmental effectiveness but economic efficiency also refer to achievement of minimum cost. So it needs to be clearer to define the two concepts. For example, environmental effectiveness can be defined to be meeting an intended environmental objective while economic efficiency can be defined to be achieving cost-effectiveness(e.g., marginal cost equalization). (Yoon-Young Kang, Korea Energy Economics Institute)	3
13-136	A	5	18	5	19	I would not include cost-effectiveness in the "environmental effectiveness" criterion. This is dealt with in the next criterion on economic efficiency. Including cost-effectiveness already here may preclude measures that ensure great environmental effectiveness but at somewhat higher cost to individuals, companies or society.One might argue that the cost argument will arise anyway, but it is not irrelevant at what point such an analysis takes place. First the environmental effectiveness has to be determined, afterwards the issue of costs explored and last the political feasibility. (Hermann E. Ott, Wuppertal Institute for Climate, Environment and Energy)	3
13-137	A	5	18		19	the criteria of environmental effectiveness is mixed up with that of cost-effectiveness, which is economic efficiency	3

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						(Marcel Berk, Netherlands Environmental Assessment Agency)	
13-138	A	5	18	5	19	Environmental effectiveness is simply the extent to which a policy meets its targets. The cost issue is about efficiency. (Paul Baer, Stanford University)	2, does not need to be tight to the target
13-139	A	5	18		22	Is this really how the literature defines these two criteria in a SINGLE assessment? To me it is surprising, as according to this definition, basically both the environmental and the economic efficiency evaluate the cost-efficiency of the instrument (only in the econ. efficiency a wider set of benefits are included - if I understand well). However, I am also not familiar with the literature about these definitions. (Diana Urge-Vorsatz, Central European University)	2, comments unclear
13-140	A	5	19	5	20	In my oppinioon "least cost" has nothing to do with environmental effectiveness, it belongs to economic efficiency. I suggest to erase "at least cost" and the last sentence. (Sonja Peterson, Kiel Institute for World Economics)	1
13-141	A	5	19			SUGGEST ADDING: [...to be cost-effective.] However, adopting an environmental objective, rather than maximising overall economic welfare, as the prime criterion can bias the choice of policy instrument (Weitzman 1974). (Jack Pezzey, Australian National University)	4
13-142	A	5	19			Environmental effectiveness is defined as "the extent to which a policy meets its intended environmental objective at least cost. Least cost methods are deemed to be cost effective." In the literature, environmental effectiveness is the extent to which the policy meets its intended environmental objective. Issues about costs belong to "economic effectiveness" (Andrea BARANZINI, Geneva School of Business Administration)	1
13-143	A	5	20			In the literature, economic effectiveness is defined in static and dynamic terms. Thus (cf. line 27), "dynamic effects" are not a separate criteria, as written in the text. As explained above, I would suggest discussing economic effectiveness and all its consequences in greater details. (Andrea BARANZINI, Geneva School of Business Administration)	1
13-144	A	5	26	5	28	Administrative costs are a subset of economic efficiency, not an additional criteria. And it's not even clear what "dynamic effects" means. (Paul Baer, Stanford University)	1
13-145	A	5	26	5	28	Linked with comments above, and relevant also for section 13.2.2.1 below: the	4

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						matter of efficacy for attracting finance and investment may be simply dealt with by incorporating as one of the principle or additional criteria for policy evaluation. Note that economic efficiency is not the same. Comments above for Chapter 4, noted that financiers and investors advised that policies should be 'loud, long and legal' to attract capital. This is also relevant for emerging markets, although off-grid and very small scale projects require additional capacity building factors (also covered in Van Aalst, 2004 - background paper for UNFCCC workshop on Innovative Financing for the Development and Transfer of Technology). (Kirsty Hamilton, retainer to UK Business Council for Sustainable Energy; Associate Fellow, Chatham House.)	
13-146	A	5	30	5	55	Bullet needed for sentence that begins "A voluntary agreement… (Lynn Price, Lawrence Berkeley National Laboratory)	1
13-147	A	5	30			In box 13.1, feed-in tariffs are missing from the list. They do not fit in either of the categories given. (Hermann E. Ott, Wuppertal Institute for Climate, Environment and Energy)	1
13-148	A	5	31			Why does this box develop a new classification of instruments? Why not use a textbook classification? (Richard Tol, Hamburg University)	4, send e-mail
13-149	A	5	31			Box 13.1 fifth bullet: VA needs a separate bullet point (Catherine Beard, Greenhouse Policy Coalition (NGO representing energy intensive sector))	1
13-150	A	5	34			SUGGEST REPLACING: "An emissions tax" by "A conventional emissions tax". SUGGEST ADDING: [...to the tax.] Alternatively, the tax could be levied only on emissions above a threshold, with subsidies given for emissions below the threshold. (Jack Pezzey, Australian National University)	3
13-151	A	5	48	5	50	Technology and performance standards are very different and deserve different bullet points. The definition provided is actually only a definition of a performance standard. (Paul Baer, Stanford University)	1
13-152	A	5	0			MORE SPECIFIC COMMENTS: in all the chapter, but more specifically under headings 13.1.2 (page 5), 13.2.2 (page 20) and 13.3.3 (page 51) the authors use the terminology "economic efficiency" as one of the (principle) criterion to evaluate policy instruments. I found this terminology confusing. Indeed, in the literature, one	3

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						often makes the distinction between "economic efficiency" and "economic effectiveness". Economic efficiency is a criterion mainly used to judge the objective of an environmental policy, e.g. does the emission abatement goal maximises the resulting benefits minus costs. A policy objective is thus efficient (or optimal) when the abatement level equalises marginal abatement benefits with marginal abatement costs. This criterion may also accessorily be used to judge an instrument: e.g. if NGOs and civil society are allowed to participate in an emissions trading program (as e.g. in the US SO2 program), they may buy emission certificates and not use them, so that the number of available permits to emitters is reduced and thus total emissions will be decreased. In this way, this instrumen may contribute to reveal some of the benefits of a more stringent climate policy. However, throughout the chapter, by economic "efficiency" the authors mean economic "effectiveness", i.e. how to reach a given policy objective at minimum global cost. This criterion is mainly used to judge the economic performance of instruments in order to reach a given environmental objective. An instrument is economically effective if it distributes abatement efforts among polluters so as to equalise their marginal abatement costs. I would thus suggest to avoid this confusion and to use only the term economic "effectiveness". It should be noted that economic effectiveness is defined in static and dynamic terms. In static terms it corresponds to equalising marginal abatement costs between polluters at one point in time. In dynamic terms, it implies to equalise marginal costs between polluters AND through time (and thus the implications for adopting new technologies). (see also comment below). In addition, I would suggest the authors to briefly discuss how the cost minimisation conditions are modified in order to account for the fact that several GHG are to be considered in the Kyoto Protocol (e.g. CO2, methane, asf). In this case, marginal abatement costs should not be equalised among GHG, but have to account for the different impact on climate change (e.g. radiative force). This would imply, e.g. that the tax rate is adjusted and that exchanges between pollutants are limited in an emissions trading program. In other words, in order to fully judge the economic effectiveness of policy instruments, it is important to consider how the instrument distributes the abatement effort between polluters AND between GHGs (and not only consider distribution of the abatement effort between polluters as in the chapter). (Andrea BARANZINI, Geneva School of Business Administration)	
13-153	A	5	0			section 13.1.2 postulates 3 principle criteria for evaluating policy instruments; it is	3

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						unclear on the basis of what this selection is made as their are many more criteria and if it reflects the priority found in the literature. As a result of this selection less attention is paid in the chapter to for example more practical aspects of the policy instruments (measuring, monitoring, verification, administrative burdens, institutional requirements etc). It is also unclear what is done with these criteria in following sections. If it were to structure the evaluation of the various instruments it should be stated more clearly to avoid repetition of arguments at a later stage of the chapter. Now it seems they are somehow implicitly used in discussing the (experience with) the various policy instruments. (Marcel Berk, Netherlands Environmental Assessment Agency)	
13-154	A	5	0			The chapter is very comprehensive, and provides a rich review of relevant policies, strategies and approaches. The one aspect I did not find (but perhaps it is my fault!!) was a discussion on voluntary national and sub-national CO2 emission targets. FOr instance, in EUrope app. 8 countries have committed themselves to ambitious CO2 emission limitation targets in the mid- and long-term. In the US, hundreds (?) of cities and several states made GHG emission limitation commitments. The global network of "cities for climate" also embrace a large number of cities worldwide (this needs to be double checked - I do not have internet access at the time of writing this document). While these maybe mostly empty political slogans, I believe they deserve some attention, as they do signal that there are a large number of entities worldwide who are ready to commit to ambitious targets. Some of these have already designated substantial resources and started major studies to facilitate the progress towards these goals (such as the United Kingdom). With regard to references, I believe the authors of this chapter have better references for these; but I attach a table to this file including the national targets in Europe as of last Summer. (Diana Urge-Vorsatz, Central European University)	4, revision in section 13.5
13-155	A	6	6			The relationship between Chap. 13.2 (national policies) and Chap. 13.3 (international agreements) is not entirely clear as can been seen, for example, from the fact that the EU-ETS is framed as an “international policy” in Chap. 13.2.3.3. EU-ETS is not a regime of “voluntary assent” or multiparty contractual agreement (as the Kyoto Protocol) but a comprehensive, fully embedded policy within the European legislative framework. The key difference between “government” and “governance” (briefly explained in Chap. 13.3.3.4.2) should figure much more prominent, e.g. in the introduction to this Chapter. A helpful paper related to this	4, EUETS being revised and review ref.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						key difference is: Wiener, Jonathan Baert, "Designing Global Climate Policy: Efficient Markets vs. Political Markets", December 1997, Center for the Study of American Business Policy Study No. 143. (Reimund Schwarze, DIW Berlin)	
13-156	A	6	8		18	very general text; could be better focussed at indicating /discussing trade-offs in policy instrument choice. In fact it would be better if at the end of the overall section of 13.2 there would be a section specifically dealing with the issue of trade-offs (Marcel Berk, Netherlands Environmental Assessment Agency)	1 will develp a table
13-157	A	6	11	6	13	What is the evidence or argument that stricter standards create barriers to entry? (Paul Baer, Stanford University)	3
13-158	A	6	13	5	14	"Permits allocated free to existing firms represent a transfer of rents from government.. Rent is not clear to some readers. Suggest to use word like "responsibilities" or "commitments". (Kok Kee Chow, Malaysian Meteorological Deparment)	1, transfer valuable asset
13-159	A	6	13			"Permits allocated free to existing firms acknowledge the transition difficulties for fixed investment in long lived equipment and processing technology. They also represent a transfer of rents from Government to industry while auctioned permits and emissions taxes generally impose heavier burdens on polluters." (Catherine Beard, Greenhouse Policy Coalition (NGO representing energy intensive sector))	2
13-160	A	6	14	6	14	I propose to change "form government" for "from society" (FÉLIX HERNÁNDEZ, IEG-CSIC)	2
13-161	A	6	15	6	16	Voluntary measures aren't favored by industry due to their flexibility (performance standards are equally flexible) but because of their weakness (they impose no actual costs). (Paul Baer, Stanford University)	4, potential lower cost
13-162	A	6	16			some environmental groups (others acknowledge the importance of voluntary measures for transition) (Catherine Beard, Greenhouse Policy Coalition (NGO representing energy intensive sector))	3
13-163	A	6	20	6	25	Figure 13.1 can only be understood if the different categories are specified in more detail - which instruemtns belong to which category in the figure. E.g. this could be done in box 13.1 on page 5.	Delete Fig.13.1

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						(Sonja Peterson, Kiel Institute for World Economics)	
13-164	A	6	20	6	25	Add some text in a bracket after "fiscal mechanism" what is meant by this in order to explain Figure 13.1. Since the label "fiscal" in the chart is not clear. What is meant by fiscal (subsidies?) since taxes are referred to under economic. Is "research" covering R&D as defined in chapter 13.2.1.5? Better to use the same wording in chart and text in order to be consistent. (Regina Annette Betz, University of New South Wales (UNSW))	1. Delete Fig. 13.1
13-165	A	6	27			Fig. 13.1: This figure is questionable (with regard of the underlying methodology) because the mentioned "policy types" are often applied in conjunction, e.g. permitting procedures for installations (= regulatory) is used as a sanction for emission trading (= economic). (Reimund Schwarze, DIW Berlin)	1. Delete 13.1
13-166	A	6	27			Figure 13.1: Please, specify the area (OECD, Annex I, ??) to which this figure refers. In addition, indicate the number ('frequency') of cases in which an instrument has been used. (Jos Sijm, ECN)	1. Delete 13.1
13-167	A	6	29	8		In section 13.2.1.1 the authors should emphasize that "regulations and standards" is really "regulations, standards, controls and penalties", cf. the US terminology "command-and-control": regulations have to be coupled with controls and penalties. (Andrea BARANZINI, Geneva School of Business Administration)	1. Note that enforcement is important for all policy instruments
13-168	A	6	29	8	12	other than a brief section at p7 lines 34-36, this is all about firms. Needs to say more about the value of regulation for end-consumers (possibly supplemented with better information for consumers). (Andrew Dlugolecki, university of east anglia)	1. Will add text to indicate that policies can address individuals, e.g. behavioural standards
13-169	A	6	29	8	12	Also, chapter 12 usefully discusses the Green Building initiative in USA, which could be referred to here, and there is UK literature eg Bordass on this issue and the problem of achiebving higher standards in buildings (Andrew Dlugolecki, university of east anglia)	1. Cross reference buildings chapter at p. 7 line 33.
13-170	A	6	30	8	13	Some case study material would be helpful here, for example, from China and Europe. (HEDGER MERYLYN, Environment Agency)	4 Will look for case studies.
13-171	A	6	31	8	12	The section makes the distinction between technology standards and performance standards, but after that it is not always clear what the text refers to. Is important to	4. Already addressed as co-benefits of standards implemented for non-GHG reasons

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						be specific given the large differences. The text should be made consistent with the respective parts of chapters 4-11, which could mean more nuance could be brought in to conclusions about relative strength of economic incentives versus regulation (e.g in the building sector the use of building codes may be more effective than economic incentives). Aren't here more success stories on technology forcing standards from California? (Bert Metz, IPCC)	
13-172	A	6	33		34	Has it really been researched what comes to mind when most people think of environmental regulations? I am not sure the statement holds. (Diana Urge-Vorsatz, Central European University)	1. Delete text after "regulation".
13-173	A	6	38	6	39	The described Technology Standard seems a poor example. Better to use a real technology example such as combined heat and power as a technology standard. (Regina Annette Betz, University of New South Wales (UNSW))	2. Use buildings examples.
13-174	A	6	39			Prohibiting coal is an input standard, or rather an input ban (an extreme standard). ICCG with CCS is a technology standard. (Richard Tol, Hamburg University)	4. Change example to buildings examples.
13-175	A	6	39	6	41	Here would be a good place to make the distinction between mass-based and rate based standards (Driesen 2003a, 2003b). (Paul Baer, Stanford University)	2. Mass-based regulations are not common
13-176	A	6	43	6	48	Another reason (for the inefficiency of technology standards) is that they do not allow firms to respond to regulation by adjusting the scale and mixture of production (see Helfland, Gloria E. (1991), `Standards versus standards: the effects of different pollution restrictions', American Economic Review 81: 622-634. (Reimund Schwarze, DIW Berlin)	1. insert "reducing operational flexibility" in the sentence. Check the reference.
13-177	A	7	6	7	21	There is a large body of new literature on the incentives to develop and adopt new environmental technologies. For an overview see: Carolyn Fischer, Ian W.H. Parry, and William A. Pizer, Instrument Choice for Environmental Protection when Technological Innovation is Endogenous, Journal of Environmental Economics and Management 2003, Vol. 45, pp. 523-545 | Related RFF Discussion Paper 99-04. (Reimund Schwarze, DIW Berlin)	1 Look at reference and possibly amend text.
13-178	A	7	9			Static standards do not stimulate much innovation, but dynamic standards would do much better. (Richard Tol, Hamburg University)	4.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
13-179	A	7	9	7	36	Very informative paragraphs. That said, in preceding paragraphs, it is described that performance standard is better from efficiency view point. Whereas, here mainly technology standard is compared with economic instruments. It would be better to compare performance standard and economic instruments as well. (Mitsutsune Yamaguchi, Teikyo University)	1. Note performance standards can induce innovation
13-180	A	7	9	7	11	Does this literature specifically refer to performance standards as well as technology standards? All of the examples in the paragraph address technology standards. If not, the first sentence (line 9) should say "technology standards" not "regulatory standards." Furthermore, there are alternative perspectives (e.g., Driesen 2003a, b, and other references cited in Lohman et al. 2005) which are not reflected anywhere in this section. (Paul Baer, Stanford University)	1 See comment 179, possibly improve references
13-181	A	7	10			you might want to insert: “Some standards such as emission standards are much more conducive to research and innovation than others – often referred to as technology standards, since the former only set goals but do not prescribe actual methods.” If you need a citation then you already have one since that paragraph refers to my book Sterner 2003 where this point is carefully discussed. (Thomas Sterner, University of Gothenburg)	1. See comment 179, check reference
13-182	A	7	12	7	14	The "regulatory ratchet" effect could also exist under incentive mechanisms such as permits or taxes. So the reference of regulatory rachet effect as a shortcoming of regulatory standards does not seem to adquate in this context. (Yoon-Young Kang, Korea Energy Economics Institute)	2.
13-183	A	7	20	7	35	The comments concerning SO2 are not relevant to CO2 trading, since "hot spot" problem does not exist (Alexander Golub, Environmental Defense)	4. Text relates to technology, not hot spots. Check Watzold
13-184	A	7	20			There are also results for energy use and CO2-emissions. Thus add: "The evaluation of Walz (2004) demonstrates that the standards for residential heating also had positive influence on the generation of innovation in the respective technologies." Reference: Walz, R. (2004): Innovation effects of energy policy instruments in Germany. Energy & Environment 15 (2), pp. 249-260. (Rainer Walz, Fraunhofer Institute Systems and Innovation Research)	4. Check reference provided.
13-185	A	7	22	7	36	A technology standard may also be desirable in cases where the economic	4.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						incentives for consumers are low so that information does not provide a sufficient motivation. A case may by the so-called stand-by function of electronic products (The overall cost for a household of all stand-by appliances is only in the range of 120 - 150 Euro per annum). There are alternative technological options that consume only a tenth of the current appliances and in may cases a stand-by function is not even necessary. Therefore the only option appears to be the regulatory instrument of mandating a standard for stand-by functions. (Hermann E. Ott, Wuppertal Institute for Climate, Environment and Energy)	
13-186	A	7	33			Add explanation: "Walz (2004) argues that technology leaders use standards as benchmarks to distinguish themselves from the rest of the competitors. Thus raising standards leads to additional pressure for the technology leaders to maintain their technological lead." (Rainer Walz, Fraunhofer Institute Systems and Innovation Research)	4. Check the reference.
13-187	A	7	33		37	It maybe worthwhile including a cross-reference to Chapter 6, which also concludes the same, and generally finds standards (apliance and building codes) very cost- and environmentally effective in the buildings sector. (Diana Urge-Vorsatz, Central European University)	1.
13-188	A	7	36	7	36	Add: However, performance standards as a basis for tradable permits may overcome the drawback of inflexibility and provide for environmental effectiveness, a level playing field and the polluter-pays principle (Schyns, 2005 b,c and d). The performance standard rate (PSR) is calculated from the weighted average, lowered by a compliance factor (CF) times the difference between weighted average and the proven best practice. The weighted average changes only slowly and in this system it is beneficial for producers to improve the best practice. Schyns 2005 b = "Climate change challenges and the search for a sustainable policy", 21 June 2005, pp 38, paper presented at the 8th International Conference on Carbon Dioxide Utilization (ICCDU-VIII), 20-23 June 2005, Oslo. (Vianney Schyns, DSM & SABIC)	2. Specific proposal by the reviewer in an unpublished paper. This proposal is not yet used anywhere.
13-189	A	7	38			"few" quantify with reference or delete (Richard Tol, Hamburg University)	2.
13-190	A	7	48	8	12	Developing countries should grow before they adopt climate policies. Even then, cost-effectiveness and robustness against corruption must be the two major criteria. It is unclear that technology standards are any good; a bad example is the license raj in India.	4. Add text on corruption, as part of text on compliance and enforcement. Add reference, World bank or preferably more recent work.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						(Richard Tol, Hamburg University)	
13-191	A	8	6	8	12	The conclusion drawn is far fetch. I do not see how emission cap at facility level could lead to emission trading.Perhaps, such cap at sectoral level culd leave to long term trend of reduction. (Kok Kee Chow, Malaysian Meteorological Deparment)	2. Mention Chinese example.
13-192	A	8	11	8	12	Wouldn't it be worth stating at the end of this paragraph that there is hardly any evidence to speak of, and thus that we really don't know what would work in developing countries? (Paul Baer, Stanford University)	4. Add “Athough experience is limited” to start of the sentence
13-193	A	8	12	8	12	Add: When applied to tradable permits, performance-based (output-related) allocation is argued to deliver equal functioning as auctioning (Schyns, 2005 a, 2005 b page 36, 2005 d, page 43 and 46). This is remarquable, because many authors put cap & trade schemes in the same box as auctioning and output-related (PSR type) systems in another box. Schyns 2005 a = "Illustration of market distortions under a cap & trade regime", 2 April 2005, pp 6, paper made for the EU Commission to clarify this point and to address competitve distortions induced by cap & trade. (Vianney Schyns, DSM & SABIC)	2. Comment unclear. Citations not published.
13-194	A	8	14	14	34	The suggestion is to include somewhere in this paragrah a small part on the importance of a tax on GHG emissions for reaching the MDGs. There is an urgent need to create additional ways of mobilising extra resources to help fund the MDGs. This also because of the fact that the aggregate target of 0.7% of GDP of ODA will not be met in the near future. See e.g. Agnar Sandmo, Environmental taxation and revuenue for development, in: A.B. Atkinson, New Sources for Development Finance, UNU-Wider Studies in Development Economics, Oxford University Press, 2005. See remarks nr. 2 and 18. (Gert de Gans, Kerkinactie)	2. Should be addressed in chapter 12
13-195	A	8	16			SUGGEST REPLACING: "An emission tax" by "A conventional emission tax". (Jack Pezzey, Australian National University)	4. Use same approach as agreed earlier for tax with threshold.
13-196	A	8	20			SUGGEST ADDING: [...would be undertaken.] Pezzey (1992) and Farrow (1995) have suggested that an emission tax could instead be levied only above a given threshold, with emissions below the threshold receiving a subsidy. REFERENCE Farrow, Scott (1995). "The dual political economy of taxes and tradable permits."	4. Use same approach as agreed earlier for tax with threshold.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						Economics Letters, Vol 49 No 2, 217-220. (Jack Pezzey, Australian National University)	
13-197	A	8	22			Pearce (forthcoming, Energy Economics) is a nice piece on how taxes then not be uniform in reality. Taxes should be uniform in the first-best only, but that is different story. (Richard Tol, Hamburg University)	4. Check the reference.
13-198	A	8	22			CO2eq suggests that you adopt conventional global warming potentials. These are inefficient, as was shown by Eckaus and Schmalensee in 1992. (Richard Tol, Hamburg University)	1. Add a footnote on GWPs with references
13-199	A	8	27			Discussion on the performance of climate policy instruments in the presence of market imperfections (e.g. market power) should be expanded and also not only confined to emission taxes and charges: all the discussed instruments work differently when markets are not perfectly competitive (e.g. the costs of buying emissions permits can be translated into consumer prices dependig on market power (and also price elasticity of demand)). (Andrea BARANZINI, Geneva School of Business Administration)	4. Address market power in tradable permits section.
13-200	A	8	39			Why not refer to Weitzman, Newell, and Pizer? (Richard Tol, Hamburg University)	1.
13-201	A	8	42			provide reference (Catherine Beard, Greenhouse Policy Coalition (NGO representing energy intensive sector))	1. Delete sentences summarizing Maestad study
13-202	A	8	42			SUGGEST ADDING: [...international agreement).] However, it is not necessarily best for overall welfare to choose some emissions commitment as the primary aim of policy (Pizer 2002). (Jack Pezzey, Australian National University)	1. Addressed elesehwre
13-203	A	8	42	8	48	There's no reporting of uncertainty in these figures - was it included in the article cited or not? (Paul Baer, Stanford University)	1. See comment 201
13-204	A	8	42			I have not found the reference for the Maested assessment. (Diana Urge-Vorsatz, Central European University)	1. See comment 201
13-205	A	8	45			Unclear meaning - amend to something like "An OECD tax would reduce emissions of CO2 from its steel industry by 19 percent. Despite relatively high emission intensities in non-OECD countries, global emissions from the sector would decline 4.6 percent, because of the substitution toward cleaner inputs and	1. See comment 201

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						processes in the OECD area. It would also reduce global steel production by 9 percent." (Catherine Beard, Greenhouse Policy Coalition (NGO representing energy intensive sector))	
13-206	A	8	48	8	48	Add in new alinea: Taxes are argued to be hardly effective if they are less severe and will cause leakage of emissions if they are severe and not applied on a global scale. Tradable permits are considered superior to energy (or emission) taxes. Auctioning is regarded as the most effective system, but this is only feasible if applied globally. Trading based on performance standards is regarded as the best conceptual alternative to auctioning (Schyns and van de Worp, 2003). Schyns and van de Worp 2003 = "Energy taxes in general and the Directive of the European Council in particular", 21 April 2003, pp 9, paper send to the EU Council via the Dutch permanent representation). (Vianney Schyns, DSM & SABIC)	2. Author's opinion on best policy from an unpublished paper.
13-207	A	8	0	14	34	General comments Taxation is not only one of the possible remedies to the climate change. It is also, in some cases, the most efficient way to cut greenhouse gas emissions. In our opinion, the section 13.2.1.2 (beginning page 8 in the report) should discuss much more one possible way to cut emissions, namely energy taxation. Here, we should want briefly explain why. Actually, emissions resulting from the combustion of a given energy form depends only on the carbon content of that energy. Moreover energy combustion is nearly the only source of emissions and the carbon content of the different kinds of energy is known and immutable at the current state of knowledge. Why taxing energy is more efficient than any alternative solution is almost an evidence, at least when energy use is relatively decentralized. First, as an incentive regulation scheme, energy taxes are more efficient than control and command regulations. Second, alternative solutions, such as the implementation of a tradable permits market, force the regulator to control that the polluters do not emit more than he is allowed by the permits he owns. It could be argued that the informational structure is the same whatever energy taxes or tradable permits are used. But in the first case, energy taxes are already existing and have only to be modified while in the second case, permits have to be created, allocated and the market itself has to be implemented. As a huge number of agents would have to sell or buy permits on a tradable permit markets, the administrative costs associated to that market would be	4. Check the references.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						very high. Comparatively, these same costs would be about nil when increasing the taxes on energy. Control costs can be very high and often are a limit to the use of some regulations. In particular, implementing a tradable permits market could only be possible for the bigger polluters. Of course, as mentioned in the text, the political feasibility is often a limit to the implementation of incentive regulations. This could be a problem for energy taxes. In particular, distributional impacts of energy taxes has to be taken into account. Equity considerations are in practice a limit to the use or increase of energy taxes in many countries (LDCs and the USA are well known examples). Recent works by Cremer and al. (references are given hereafter) and Pirttilä and Tuomala ("Income tax, commodity tax and environmental policy", International tax and public finance, 4, 379-393, 1997) have studied this question. Among this studies, the one by Cremer and Gavhari ("Second-best taxation of emissions and polluting goods", Journal of Public Economics, Volume 80, Issue 2, May 2001, Pages 169 -197) gives some very useful results for any discussion on that topic. One of the results of their paper is particularly useful in the context of energy taxation. This result applies to a polluting good, let us say energy, which is used at the same time by households as a consumption good, and by firms as an input. Cremer and Gahvari study the optimal taxation of such a good in a very general context with heterogeneous individual preferences and non-linear income taxation. They show that an energy tax, levied on energy used as a consumption good by households, can be different from the energy tax, levied on energy used as an input by the firms. In a very recent working paper, Cremer, Gahvari and Ladoux ("Tax design with endogenous earning abilities and consumption and production externalities (with applications to France)", July 2005; available on the IDEI Web Site, http://idei.fr/) have applied the theoretical model to energy taxation in France. Their results show for instance that when the optimal tax on energy used as an input is 10% the optimal tax on energy used as a consumption good is 3.6 % only. We think that this result should be mentioned and commented in the report. In particular, because it gives an answer to the question asks in the report page 9 row 20 ("Should the emitters always pay the tax directly (such individual automobile owners) or should the tax be levied on more convenient points (such as the petrol refinery)?"). Here, we see that, even if the answer is in part "political or practical", as mentioned in the report, it is also economic. Moreover, we consider that this kind of information	

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						could be useful to the decision makers when thinking about the possible use of energy taxation. (Norbert LADOUX, University of Toulouse and IDEI)	
13-208	A	9	11	9	24	"Double dividend" and other tax interaction effects: The concept of the double dividend and the relevant literature should be mentioned here. (Effects of using emissions tax revenue to offset other, possibly distorting taxes, or other economy-wide effects from distortions arising from raising emissions taxes.) (Frank Jotzo, Australian National University)	1.
13-209	A	9	11	9	24	The paragraph discusses in length regarding the emission tax. I do not think such a lengthy explanation is necessary in the 4th assessment. Most readers will be familiar with the tax. I suggest this para be condensed. (Kok Kee Chow, Malaysian Meteorological Deparment)	1.
13-210	A	9	11	9	24	This section should also take into account the effect of progressive taxes, as it was implemented in Germany from 1999 onwards. This progression was specifically intended to induce a change in consumer expectation over the mid and long term. (Hermann E. Ott, Wuppertal Institute for Climate, Environment and Energy)	1. Add text to indicate that taxes can rise over time.
13-211	A	9	11		24	here a lot of questions are raised and left unanswered, while there is a lot of insides available from economic analysis on taxation policies, rebates etc. (Marcel Berk, Netherlands Environmental Assessment Agency)	4. Text will be modified
13-212	A	9	14			In equally many countries, petrol is heavily subsidised. (Richard Tol, Hamburg University)	1. Add “in others it is subsidized”
13-213	A	9	14			A. Baranzini, J. Goldemberg & S. Speck (2000): “A Future for Carbon Taxes” Ecological Economics, 32(3): 395-412 discussed and analyzed how to adjust for existing tax rates (i.e. even without carbon taxes) to reform the tax system in order to account for climate policy objective. They showed that much can be done in rebalancing existing tax system by accounting for the carbon content of different fuels, without introducing new carbon taxes. Indeed, fossil fuels with higher carbon content often have lower implicit carbon taxes than those with lower carbon content. See for instance the example of the Swedish tax reform which mostly corrected existing tax system (e.g. switch taxes on gas to heavier taxes on coal), without increasing the overall tax levels, in order to better reflect the carbon content of different fuels. In any case, introducing a new carbon tax when fuels on top of an existing taxation system which does not consider the carbon content of the different	4. Check the reference.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						fuels could introduce new distortions and even be ineffective. Therefore, with respect to the objective of reducing carbon emissions, a reform of the energy tax structure should accompany the eventual introduction of carbon taxes. See also R. Baron (1997): "Carbon and Energy Taxes in OECD Countries" Berlin: Technical University, Paper presented at the Advanced Study Course Goals and Instruments for Achievement of Global Warming Mitigation in Europe, 20–26 July; Hoeller, P., Coppel, J. (1992): "Energy Taxation and Price Distortions in Fossil-fuel Markets: Some Implications for Climate Change Policy." In: OECD, Climate Change—Designing a Practical Tax System. OECD, Paris. (Andrea BARANZINI, Geneva School of Business Administration)	
13-214	A	9	21	9	21	After words climate change, please add the following; "Are governments wise enough in spending these revenues?" (Mitsutsune Yamaguchi, Teikyo University)	2.
13-215	A	9	21			SUGGEST ADDING: [...damage from climate change?] Or should tax thresholds be used, as Pezzey (1992, 2003) suggests, to reduce the amount of tax revenue, and thus improve political feasibility? (Jack Pezzey, Australian National University)	4. Address in the same way as agreed previously.
13-216	A	9	26	9	36	In Germany, apparently the progressive CO2-tax induced a fall in CO2-emissions from the transport sector in the range of 2 percent. (Hermann E. Ott, Wuppertal Institute for Climate, Environment and Energy)	2. No literature provided
13-217	A	10	6			Figure 13.2: hard to see the difference between petrol and diesel and where one country ends and the other begins. Better to use different colours for diesel and petrol. (Regina Annette Betz, University of New South Wales (UNSW))	1. Streamline the figure.
13-218	A	10	7	10	15	I think it should be pointed out that petrol demand is much lower in the US than in Europe in this paragraph too. If you want a quote then for instance Hammar, H, Å Löfgren and Sterner, T., "Political Economy Obstacles to Fuel Taxation", Energy Journal, ISSN0195-6574, July 2004, Vol 25(3). Furthermore the discussion on diesel tax might be modified somewhat: a) it is lower because diesel is more or less the same as light fuel oil which is usually almost untaxed. B) Diesel is not uniformly considered worse from an environmental viewpoint: with modern diesel engines (particle filters etc) they can even outperform ottoengines. (Thomas Sterner, University of Gothenburg)	4. Check the reference. Comment appears wrong about lower petrol demand in the US.
13-219	A	10	13			from a local environmental point of view…..	1. Insert "local"

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						(Claire Parker, Environmental Policy Consultant)	
13-220	A	10	14	10	15	It may be better to provide (references of) some evidence on climate change friendliness of diesels. (Yoon-Young Kang, Korea Energy Economics Institute)	4. Insert "thus' before "climate"
13-221	A	10	16		24	OECD (2000, 2005) is probably not peer-reviewed. There are peer-reviewed sources for price elasticities, however, and even peer-reviewed surveys. (Richard Tol, Hamburg University)	1. Replace OECD report with peer reviewed literature.
13-222	A	10	16	10	25	There are large disparities between elasticities for different types of energy, e.g. transport fuels and electricity/heat. In the long-run the own price elasticities for fuels are almost double the o.p.e. of electricity (e.g.: www.eia.doe.gov/oiaf/issues/pricetbl1.html). (Reimund Schwarze, DIW Berlin)	1. Will be addressed in rewrite mentioned in comment 221.
13-223	A	10	21			It would be interesting to cite the short-term elasticities observed as a result of the high oil prices in 2005. Some analyses should be available by now. (Anne Arquit Niederberger, Policy Solutions)	4. Reference needed
13-224	A	10	25	10	25	Caption is missing for chapter 13.2.1.3 tradable permits. (Regina Annette Betz, University of New South Wales (UNSW))	1. Insert caption
13-225	A	10	25	14	34	This section lacks an analysis of the experience with the introduction of the European emissions trading scheme. Various articles deal with the most important design parameters, including the effect of most important rules (e.g. Ehrhart, K.-M.; Hoppe, C.; Schleich, J.; Seifert, S. (2005): The role of auctions and forward markets in the EU ETS: counterbalancing the cost-inefficiencies of combining generous allocation with a ban on banking, Climate Policy 5, 31-46), the results of the allocation process in the EU member states (e.g. Betz, R.; Eichhammer, W.; Schleich, J. (2004): Designing National Allocation Plans for EU emissions trading – A First Analysis of the Outcomes, Energy & Environment 15, 375-425. Böhringer, C.; Hoffmann, T.; Lange, A.; Löschel, A.; Moslener, U. (2005): Assessing Emission Allocation in Europe: An Interactive Simulation Approach, The Energy Journal 26 (4), 1-22) and the interaction of emissions trading with other policies (Walz, R. (2005): Interaktion des EU Emissions Trading Systems mit dem Erneuerbaren Energien Gesetz, Zeitschrift für Energiewirtschaft 29 (4), pp.261-270. Sijm, J. (2005): The interaction between the EU emissions trading scheme and national energy policies, in: Climate Policy, 5 (1), pp. 79-96). (Rainer Walz, Fraunhofer Institute Systems and Innovation Research)	4. A box to be created on EU ETS. Check the references.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
13-226	A	10	25			SUGGEST that "Tradable permits" sub-heading is numbered 13.2.1.3 (otherwise 13.2.1.2 must be renamed "Emission taxes and charges, and tradable emission permits"), with subsequent sections renumbered as necessary. (Jack Pezzey, Australian National University)	1. Number sub-heading
13-227	A	10	25			In lines 28-29 on page 10, it says "there is a growing body of research on tradable permits, including efficiency and equity issues associated with the distribution of permits, ….." Also, in Table 13.1, "market efficiency" is listed as one of policy choice criteria. Since this issue is important in the design and implementation of permit markets, it should be discussed in detail in the section of "tradable permits." The following is an example of the discussion on the issue of market efficiency, especially the effect of market power, focusing on the recent development of the literature: …… Market efficiency is one of most important issues for the design and implementation of permit markets. The possibility of market power plays a key role in this issue. Representative studies which are frequently referred in the literature include Hahn (1984). Hahn argues that assuming that there is one firm with market power in a permit market, the initial distribution of permits may influence the monopolistic behavior of the firm and thus may affect the degree of efficiency of the market. Several studies including van Egteren and Weber (1996), Westskog (1996), Malik (2002) extend Hahn's model of firms with market power in permit markets. The results of these studies are convincing to argue that a market participant who initially holds a large proportion of available permits in a permit market would be expected to behave as a monopolist. Tietenberg (1985) in his subsection on "grandfathering" explores such issues as under what circumstances market power can arise, and how much it is serious. Illustrating studies including Hahn (1984), Hahn and Noll (1982), and Maloney and Yandle (1984), Tietenberg concludes his discussion as follows: □) In theory, "the larger the number of permits granted to the predatory source above its cost-effective allocation, the more serious the problem" (p.146). 2) However, numerical analyses by Hahn and others in the context of the EPA emissions trading program show that market power "is not normally likely to be a significant problem" (p.147). Maeda (2003) examines the conditions on the initial permit distribution for the emergence of emitters with market power in the more general context of permit	4. Market power will be addressed in the tradable permits section

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						markets. Analyzing an analytical model of emission permit markets in which a large number of regulated emitters participate, Maeda derives formulae that estimate the degree of market distortion. These formulae clearly show the entire dependence of the ratio of market prices to competitive levels on the permit initial distribution as well as the existence of a threshold for effective market power. References: [1] Hahn, Robert W. (1984). "Market Power and Transferable Property Rights." Quarterly Journal of Economics (November): 753-765. [2] Hahn, Robert W. and Roger G. Noll (1982). "Designing a Market for Tradable Emissions Permits." In Reform of Environmental Regulation, edited by Wesley A. Magat. Cambridge, MA: Ballinger. [3] Maeda, Akira (2003). "The Emergence of Market Power in Emission Rights Markets: The Role of Initial Permit Distribution." Journal of Regulatory Economics 24(3): 293-314. [4] Malik, Arun S. (2002). "Further Results on Permit Markets with Market Power and Cheating." Journal of Environmental Economics and Management 44: 371-390. [5] Maloney, Michael T. and Bruce Yandle (1984). "Estimation of Cost of Air Pollution Control Regulation." Journal of Environmental Economics and Management 11: 244-263. [6] Tietenberg, Thomas H. (1985). Emissions Trading: An Exercise in Reforming Pollution Policy. Washington, D.C.: Resources for the Future. [7] Van Egteren, Henry and Marian Weber (1996). "Marketable Permits, Market Power, and Cheating." Journal of Environmental Economics and Management 30(no. 2, March): 161-173. [8] Westskog, H. (1996). "Market Power in a System of Tradable CO2 Quotas." Energy Journal 17: 85-103. (Akira Maeda, Kyoto University)	
13-228	A	11	5	100		The first three rows of Table 13.1 need to be rewritten by somebody with a basic understanding of economics. Why are tradable permits singled out as an instrument? Why are dynamic effects limited to technology? (Richard Tol, Hamburg University)	1. Delete table 13.1
13-229	A	11	5			I was not able to find where this table is referenced, nevertheless, it is useful for defining the 3 criteria put forth in the ES: economic efficiency, environmental	1. Delete Table 13.1

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						effectiveness, and political feasibility. However, the topics covered do not explicitly match these 3 criteria. And the topics chosen under each heading are not transparent. For example, the topics under environmental effectiveness appear to deal with the accuracy of meeting a prescribed target, and not minimizing impacts? Suggest that this table be used to define in a transparent way the 3 criteria. (Haroon Kheshgi, ExoonMobil Research and Engineering Company)	
13-230	A	11	5			Table 13.1: Some of the text refers to baseline and credit which has not been discussed in the chapters before and will only come up later in chapter 13.3.2.3.4. If there is no inclusion of a comparision between baseline and credit vs. cap and trade (see comment 43) in this chapter it is better to stick to cap and trade in the describing the potential benefits from trading. E.g. in Line 12 "data accuracy" the text could be referring to cap and trade: Since data has to be monitored, verified and reported in order to determine compliance of companies reliable data is gathered on emissions of regulated sources. Same comment applies to "Start-up costs". (Regina Annette Betz, University of New South Wales (UNSW))	1. Delete Table 13.1
13-231	A	11	5			Table 13.1: Dynamic efficiency seems closely linked with economic efficiency therefore move up. Move Dynamic effects (line 14) up under economic efficiency. (Regina Annette Betz, University of New South Wales (UNSW))	1. Delete Table 13.1
13-232	A	11	5			Table 13.1: what is the source of this table? (Jos Sijm, ECN)	1. Delete Table 13.1
13-233	A	11	5			Table 13.1: Comments on 'start-up costs': in general, baseline and credit schemes are introduced at substantial costs (Jos Sijm, ECN)	1. Delete Table 13.1
13-234	A	11	5			Table 13.1: Comment on 'rate of innovation': in general the impact of tradable permits on the rate of innovation is rather low. (Jos Sijm, ECN)	1. Delete Table 13.1
13-235	A	11	5	11	5	Table 13.1 - why are just benefits of tradeable permits shown? Surely the negative aspects of TPs are worth reporting as well. (Paul Baer, Stanford University)	1. Delete Table 13.1
13-236	A	11	6	15	19	Erratum: to change letter of notes (FÉLIX HERNÁNDEZ, IEG-CSIC)	1. Make footnote reference a superscript
13-237	A	11	7	11	18	Böhringer et al. (2006) show theoretically why there are efficiency losses in segmented markets and calculate the efficiency losses of the Euroepean ETS in	4. Check the reference

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						Germany using a simulation model. Böhringer, C. T. Hoffmann & C. Manrique-de-Lara-Peñate , The efficiency costs of separating carbon markets under the EU emissions trading scheme: A quantitative assessment for Germany, Energy Econmics, In Press, Corrected Proof, Available online 8 November 2005. (Sonja Peterson, Kiel Institute for World Economics)	
13-238	A	11	7	11	18	It should be made clear that all of these are model-based studies (if I'm correct that in fact they all are). Also, shouldn't uncertainty be reported? (Paul Baer, Stanford University)	4. Mention that these are model based studies
13-239	A	11	8	11	10	It is difficult to understand "minimize marginal costs across…". Does that mean to equalize marginal costs across…? (Yoon-Young Kang, Korea Energy Economics Institute)	1. Change “minimize’ to ‘equalize”
13-240	A	11	9	11	10	Sectorial approach should be defined. Is it sectoral coverage or sectoral targets? (Andrei Marcu, IETA)	1. Clarify text. Check if Pizer et al is published.
13-241	A	11	13	13	15	The finding attributed to Klepper and Peterson (2004) is a well known condition which can easily be derived: overall mitigation costs are minimized if (prior to trading) the marginal costs of the trading sector are equal to the marginal costs of the nontrading sector. This optimality condition would have to taken into account when governments set emission budgets for the installations covered under the EU ETS. Analysing the actual outcome of the allocation process in the EU ETS, several authors argue, that this condition is violated: the budget for the trading sectors is too large; marginal costs in the non-trading sectors (household, transport) are too high. Papers which make this point also include: (1) Böhringer, Christoph, Tim Hoffmann, Andreas Lange, Andreas Löschel und Ulf Moslener (2005), Assessing Emission Allocation in Europe: An Interactive Simulation Approach, The Energy Journal 26 (4), 1-22. (2) Betz, R., Eichhammer, W. and Schleich, J. (2004), ‘Designing National Allocation Plans for EU emissions trading – A First Analysis of the Outcomes’, Energy & Environment 15, 375-425. (3) Ehrhart, K.-M., Hoppe, C., Schleich, J., and Seifert, S. (2005): The role of auctions and forward markets in the EU ETS: counterbalancing the cost-inefficiencies of combining generous allocation with a ban on banking, Climate Policy 5, 31-46, or (4) Böhringer, Christoph, Tim Hoffmann, Andreas Lange, Andreas Löschel und Ulf Moslener (2005), Assessing Emission Allocation in Europe: An Interactive Simulation Approach, The Energy Journal 26 (4), 1-22. (Joachim Schleich, Fraunhofer Institute Systems and Innovation Research)	4. Focus the paragraph to point out that reduced coverage reduces efficiency.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
13-242	A	11	13	11	18	There is a new MIT study (Paltsev et al, 2006) examining the EU trading system that may be relevant here (Alexander Golub, Environmental Defense)	4. Review paper consider in rewrite of the paragraph
13-243	A	11	14	11	17	Two comments. A) The result by Klepper and Petersen (2004) is not very clearly presented; it seems that either the word "only" (line 14) should be removed or the concept "cost savings" should not be understood in the traditional sense. B) The intuition for the result of Proost and Van Regemorter (2004) should be briefly presented (gerneral equilibrium effects, revenue recycling ?) (Peter Wittoeck, Belgian Federal Administration)	4. Paragraph will be rewritten
13-244	A	11	15	11	17	Considering what Klepper and Peterson(2004) argue, it is not logically clear to continue as "This would imply a relatively tighter cap in the sectors covered in the EU ETS". (Koji Kadono, Global Industrial and Social Progress Research Institute)	4. Paragraph to be rewritten
13-245	A	11	20	11	20	Suggest to replace ".the point of obligation" by "extent obligation" (Kok Kee Chow, Malaysian Meteorological Deparment)	2. Comment misinterprets the point of the sentence
13-246	A	11	25	11	40	A number of publications are quoted that support one or an other approach. The statement is clearly putting autioning in a possitve light leaving out other approaches (Andrei Marcu, IETA)	4. will try to improve the balance by strengthening the next para at the top of page
12.13-247	A	11	26	12	6	COMMENT: The discussion here seems to be unbalanced in favour of auction.But the fact is, as the text indicateds, auctions have been little used despite all those benefits.Thus, it is natural to think there must be reasons that fairly justify grandfathering and these arguments should also be provided here. (MASAHIRO NISHIO, Ministry of Economy, Trade and Industry)	4. will try to improve the balance by strengthening the next para at the top of page
13-248	A	11	26	12	6	The discussion here seems to be unbalanced in favour of auction.But the fact is, as the text indicateds, auctions have been little used despite all those benefits.Thus, it is natural to think there must be reasons that fairly justify grandfathering and these arguments should also be provided here. (MASAHIRO NISHIO, Ministry of Economy, Trade and Industry)	4. will try to improve the balance by strengthening the next para at the top of page
13-249	A	11	26	12	27	There is some recent evidence from the EU ETS implementation about freely allocated allowances having been factored into electricity prices by electricity producers (see ECN report; not sure if there are other studies available). (Bert Metz, IPCC)	4. Need some references
13-250	A	11	27	11	27	Why should companies receiving permits be designated as "polluters"	4. Change text to “generally to existing

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						(Nick Campbell, ARKEMA SA)	emitters"
13-251	A	11	28	11	28	Insert after "… or auctions": The former can be implemented as a cap & trade regime based on historical emissions, such as in the EU ETS, or as a performance standard rate (PSR) regime with ex-post control of the production for at least the largest emitters (electricity, steel, cement, refineries, major chemicals) (Schyns, 2005 b, d). (Vianney Schyns, DSM & SABIC)	2. too detailed
13-252	A	11	30			SUGGEST ADDING: [...at no cost.] The danger is then that only the polar opposites of all-auctioned or all-free permits are discussed, and all inbetween options of part-auctioned, part-free permits are easily overlooked. (Jack Pezzey, Australian National University)	2. Covered in line 28
13-253	A	11	33			It is unclear what exactly "windfall profit" is supposed to mean in this context and it should be clearly defined. With the current text, readers may think it means profits received from a more amount of allocated allowanes than they need. In the case of the EU ETS, "windfall profit" refers to such profits that accrue to electricity utilities by raising electricity price more than sufficient to cover the cost arising from the EU ETS.It was discussed mainly before the implementation of the scheme and received a lot of criticisms from industry groups. But this kind of "windfall profit" is not inherent to emissions trading. REFERENCE: http://www.cembureau.be/Cem_warehouse/ELECTRICITY%20PRICES%20LEAFLET.PDF (MASAHIRO NISHIO, Ministry of Economy, Trade and Industry)	4. Change to "windfall"
13-254	A	11	33			It is unclear what exactly "windfall profit" is supposed to mean in this context and it should be clearly defined. With the current text, readers may think it means profits received from a more amount of allocated allowanes than they need. In the case of the EU ETS, "windfall profit" refers to such profits that accrue to electricity utilities by raising electricity price more than sufficient to cover the cost arising from the EU ETS.It was discussed mainly before the implementation of the scheme and received a lot of criticisms from industry groups. But this kind of "windfall profit" is not inherent to emissions trading. REFERENCE: http://www.cembureau.be/Cem_warehouse/ELECTRICITY%20PRICES%20LEAFLET.PDF (MASAHIRO NISHIO, Ministry of Economy, Trade and Industry)	Duplicate comment

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
13-255	A	11	34	11	35	Please add more findings and recent references to the issue of free allocation of CO2 emission allowances and its implications for power prices and windfall profits, see particularly Sijm, J. et al. (2005), CO2 Price Dynamics: The Impl;ications of EU Emissions Trading for the Price of Electricity, ECN, report no. ECN-C-05-081, or - more generally on the structural aspects of allocation within the EU ETS: Matthes, F. et al (2005) The Environmental Effectiveness and Economic Efficiency of the European Union Emissions Trading Scheme (Öko Institut). (Jos Sijm, ECN)	4. Check references and revise text
13-256	A	11	38			Without seeing the original papers it is difficult to know whether this summary misrepresents the arguments or whether the authors have poorly expressed their findings. "However, Dinan and Rogers (2002) and Parry (2004) argue that free allocation of tradeable permits may be regressive because this type of allowance distribution leads to income transfers towards higher income groups (ie shareholders) at the expense of households." This would only represent an income transfer if an existing emissions tax was replaced by a trading scheme. More likely it would be a new cost imposition on industry so it is not appropriate to call it an income transfer. (Catherine Beard, Greenhouse Policy Coalition (NGO representing energy intensive sector))	2. Comment misinterprets the text.
13-257	A	12	0	12		Not all indexed or dynamic targets are "intensity targets" (see Ellerman & Wing). The literature also includes Baumert, Frankel, Hargrave, Lutter, Lisowski (see quotes, analysis and references in IEA 2002 Beyond Kyoto), and more recently, Jotzo and Pezzey (2005) whose modelling exercise confirmed that dynamic targets can achiever higher reductions at lower expected costs than fixed targets (see also comment on FOD chapter 13 page 36) Frank Jotzo and John C.V. Pezzey, 2005, Optimal intensity targets for emissions trading under uncertainty. Australian National University Economics and Environment Network Working Paper EEN0504 (Cédric Philibert, International Energy Agency)	4. This comment applies to international targets Check Climate Policy special issue for papers specific to domestic emissions trading programs.
13-258	A	12	9	12	10	"This is largely --- convincing industry groups to support auctions" should be changed to "This is largely because auctions involve a significant wealth transfer from the polluters to the government." It is more neutral and correct in terms of economic theory. (C.Kolstad "Environmental Economics" 2000 Oxford U.press) (Koji Kadono, Global Industrial and Social Progress Research Institute)	1

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
13-259	A	12	9	12	13	This is a subjective statement; there are a number of Member States that oppose auctioning of permits in the EU. Furthermore, the EU Parliament and Council in agreeing the regulation limited the levels of auctioning to 5 and 10% for the two periods. (Nick Campbell, ARKEMA SA)	4. Auctions are part of EU ETS Box
13-260	A	12	10			In the discussion about why only a small part of allowances are auctioned off in the first phase of the EU ETS, it should be mentioned that the share of auctions which may be auctioned off is limited to 5% by the EU Emissions trading Directive. (Joachim Schleich, Fraunhofer Institute Systems and Innovation Research)	4. Auctions are part of EU ETS Box.
13-261	A	12	14			dd Possibly better, though older references on the political economy of US SO2 trading are Joskow and Schmalensee (1998) and/or Stavins (1998). REFERENCES Joskow, P. L. and R. Schmalensee (1998). "The political economy of market-based environmental policy: the U.S. Acid Rain Program". Journal of Law and Economics, Vol 41, 37-83. Stavins, Robert N. (1998). "What can we learn from the grand policy experiment? Lessons from SO2 allowance trading." Journal of Economic Perspectives, Vol 12 No 3, 69-88. (Jack Pezzey, Australian National University)	2. Do not need these old references
13-262	A	12	17		27	apart from grandfathering and auctioning there are also alternatives possible like benchmarking, where the allocation is related to an assumed convergence and progress in technological standards (Marcel Berk, Netherlands Environmental Assessment Agency)	2 Do not use the “grandfathering” in the text here
13-263	A	12	26			"may reduce the decline in production for some sectors that might arise from an emissions cap compared with ??? But that it also may reduce profits and raise overall costs." (compared with no emissions cap or auction or historic allocation??). (Catherine Beard, Greenhouse Policy Coalition (NGO representing energy intensive sector))	4. Text revised.
13-264	A	12	28	12	43	In addition to environmental benefits of this choice, Quirion quantifies that a price instrument or an absolute cap yields a higher expected welfare than a reletive cap. Source : Quirion P.2005 "Does uncertainty justify intensity emission caps?" Resource & Energy Economics, 27(4), November 2005, pp. 343-353 (Antoine BONDUELLE, E&E_Consultant)	4. Check reference

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
13-265	A	12	29	12	43	There is additional literature on intensity targets. Sue Wing et al. (2005) derive conditions under which compared to absolute targets, intensity targets are able to reduce uncertainty of abatement costs. They depend on the correlation between emissions and GDP and the variance in the predictions of these variables. Pure intensity targets are preferable if emissions and GDP are highly positively correlated and have similar degrees of variablity. Using empiricial data their results are mixed. While intensity targets reduce uncertainty of abatement costs in some countries they do not in others. In a model based on marginal abatement costs and marginal benefit curves, Quirion (2005) finds that the ranking of an emission tax and absolute and intensity targets depends on the level of uncertainty about emissions and the relative slopes of the marginal benefit and marginal cost curves. In most plausible cases intensity targets are either dominated by taxes or absolute targets. But Quirion also concludes that in a case where e.g. a tax is not politically feasible in an international context, intensity targets may be preferable to absolute targets when marignal benefit curves are very flat. The expected welfare gaps are found to be very small though. Pizer (2005) stresses in his arguementative analysis that the underlaying premise for intensity targets better accomodating unexpected growth is that emission fluctuations are tied to economic fluctuations, and that intensity targets behave more predictable over time then emissions. He also stresses the importance of the correlation between intensity and GDP. With a negative correlation, at least simple intensity tragets flip the relation between adverse econocmic shocks and the prospect of easier or harder targets. An intensity target becomes harder in the face of lower growth and easier in the face of higher growth. This is also noted by Dudek and Glolub (2003). Summarized, the difference in cost uncertainty between standard intensity targets and absolute targets depends on the correlation between emissions, GDP and intensity and on the predicatability of these parameters. Esepecially the correlation between GDP and emissions is important in different theoretical analysis. Empirical work by Höhne and Harnisch (2002), Pizer (2005), Kim and Baumert (2002), Sue Wing et al. (2005) reveals that there is evidence for a strong positive correlation between emissions and GDP especially in developing countries. In some of the countries though, especially in the industrialized world, the correlation is weak or even negative. Also, the realationship between GDP and emissions varies over time, and cannot always be defined easily. In addition, there is especially in industrialized countries a negative correlation beteen GDP and intensity. The results about the uncertatnty of	4. See comment 264

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						emissions, intensity and GDP are mixed and sometimes contradicting. They differ across countries and time periods. Overall there is evidence, that emissions are indeed more uncertain than intensity especially in developing countries. Cited literature: Höhne, N. and J,. Harnisch (2002). greenhouse gas intensity targets vs. absolute emission targets. Paper presented at the 6th conference on Greenhouse Gas Control technologies, 1. - 4. October 2002, ECOFYS energy and environment. Kim, Y.G. & K. Baumert (2002). In: K.A. Baumert, O. Blanchard, S. Llosa & J.F. Perkhaus (Eds.). Options for Protecting the CLimate.Wordl Resource Institue. 109-133. Pizer, W. (2005). The case for intensity targets, RFF Discussion Paper 05.02. Resources for the Future, Washingotn, D.C. Quirion, P. (2005). Does uncertaitny justify intensity emission caps? Resource and Eenrgy Economics, Forthcoming. Sue-Wing, I; A.D. Ellerman & J. Song (2005). Absolute vs. intensity Limits for CO2 Emission Control: Performance under uncertainty. Technical Report, University of Boston. (Sonja Peterson, Kiel Institute for World Economics)	
13-266	A	12	29	12		The discussion of options for designing emissions trading mechanisms to reduce cost uncertainty deserves more space, compared to other parts of the chapter. A subheading might be useful (eg. "Flexible targets" or "Target types") (Frank Jotzo, Australian National University)	4. Clarify footnote 12
13-267	A	12	29	12	44	It would be useful to explain here why various authors have suggested and analysed different types of targets to deal with uncertainty. The reasoning is generally that uncertainty about the cost of complying with an emissions target is a political obstacle to taking on a target in the first place, and an obstacle to ambitious target commitments. (See for example Kim and Baumert 2002, or Philibert and Pershing 2002.) Therefore, more flexible emissions targets and trading are hoped to increase the chances for broader participation and more stringent emissions targets. (Frank Jotzo, Australian National University)	4. Address for domestic programs in the discussion of the safety valve. References are to international targets
13-268	A	12	29	12	30	Another reason (perhaps the most important one) for the increasing attention on the type of target is the debate about options for the 2nd commitment period of the Kyoto Protocol, or a post-Kyoto treaty. (Frank Jotzo, Australian National University)	4. Applies to international targets.
13-269	A	12	29	12	43	The matter of the absolute targets vs intensity targets is important vis a vis impact on carbon values, and assessment of supply and demand. Preliminary results from a detailed survey of businesses on the transmission between international policy and business investment, that myself and a colleague are involved in at present (not	2. Too preliminary to cite

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						completed till February 2006), suggests that within the actual trading markets eg EU ETS, absolute targets are seen as very important from market players. (Kirsty Hamilton, retainer to UK Business Council for Sustainable Energy; Associate Fellow, Chatham House.)	
13-270	A	12	34	12	36	The draft does not make reference to the probably most detailed study currently available that empirically models the potential impact of intensity targets in a future climate treaty, under emissions trading with uncertainty. SUGGESTION: Include reference to "Jotzo and Pezzey (2005)". REFERENCE: Jotzo, F. and Pezzey, J. C. V. (2005), "Optimal intensity targets for emissions trading under uncertainty", Economics and Environment Network Working Paper EEN0504, Australian National University, Canberra; also published as PESD working paper no.41, Stanford University. [Note: This is expected to be published in an environmental economics journal in 2006.] Paper attached. (Frank Jotzo, Australian National University)	4. Applies to international targets
13-271	A	12	34	12	36	SUGGESTION for text: "Jotzo and Pezzey (2005) show that intensity targets could increase expected payoff from a future greenhouse gas treaty by reducing cost uncertainty, and lead to more stringent commitments if countries are risk averse. They find that intensity targets would be especially useful if the degree of indexation could be differentiated between countries." (Frank Jotzo, Australian National University)	4. Applies to international targets
13-272	A	12	34	12	36	Further new and important work intensity targets is by Sue Wing et al. (2005). REFERENCE: [Sue Wing, I., Ellerman, A. D. and Song, J. (2005), "Absolute vs. intensity limits for CO2 emissions control: Performance under uncertainty", typescript, Boston University] I'm not sure however whether that manuscript is publicly available. (Frank Jotzo, Australian National University)	4. Too preliminary to use
13-273	A	12	36	12	37	The argument by Pizer (2004) described here overlooks the fact that intensity targets are exactly equivalent to absolute (Kyoto-style) targets, in expectation terms. This is shown by Ellerman and Wing (2003), and by Jotzo and Pezzey (2005). An strict intensity target could be set so that it halts, not just slows, emissions growth. (Frank Jotzo, Australian National University)	3. Valid point
13-274	A	12	36		43	in principle both absolute and intensity targets can be strict and lean and thus result in high or low macro-economic costs	3. See comment 273

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						(Marcel Berk, Netherlands Environmental Assessment Agency)	
13-275	A	12	44	12	44	Thirdly, operators are discouraged to undertake investments to reduce emissions because lower emissions will inevitably become part of the historical reference for a future trading period (the updating problem). (Vianney Schyns, DSM & SABIC)	3 Revise text
13-276	A	12	44	12	44	The problems of current cap & trade rules within the EU ETS were also assessed by various organisations such as IFIEC (2005) in which undesired windfall profits for electricity producers are challenged and the effectiveness of the trading scheme is questioned and the ECRN (2005). The EU Commissions (2005) did not address these shortcomings in its new guidance note. As a reaction it is stipulated that the effectiveness of the EU trading scheme is undermined and that requests for improvements of the EU Council - which apparently assume shortcomings - are so far ignored (Schyns, 2005 e). (Vianney Schyns, DSM & SABIC)	2. Reviewer's opinion
13-277	A	12	44	12	44	Sixthly, it is concluded that cap & trade based on historical grandfathering is contrary to the polluter-pays principle, for the EU required by the EC Treaty. Cap & trade based on historical grandfathering rewards high polluters and keeps them longer alive instead of shorter under an effective scheme. (Vianney Schyns, DSM & SABIC)	3. Note that grandfathering may be inconsistent with the polluter pays principle
13-278	A	12	44	12	44	In contrast, a cap & trade regime cannot fulfill the objectives of emissions trading in general and the EU Directive in particular (Schyns, 2005 b,c,d,e). Economic models such as Worldscan, GTAP or MIT-EPPA, etc. (see Kuik, 2005, pages 24 and 25) work equally for cap & trade as for auctioning. For incumbents there are at least six fundamental shortcomings under a cap & trade regime. Firstly, there is no equitable, scientific method to determine an ex-ante cap for a individual producer. Emissions of the past have a limited meaning for the future. Secondly, two factors determine the effectiveness of a trading scheme for investments to reduce emissions: a meaningfull CO2-price and a driving force to stimulate to undertake such investments. The latter is most often ignored in economic literature, it means with historical grandfathering that the driving force is rather low, in contrast with auctioning. (Vianney Schyns, DSM & SABIC)	2. Reviewer's opinion. No peer reviewed literature cited.
13-279	A	12	44	12	44	IFIEC (2005) = International Federation of Industrial Energy Consumers, "Correcting the failures in the EU emissions trading scheme", 28 July 2005, pp 5).	2. No peer reviewed literature cited.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						ECRN (2005) = European Chemical Regions Network, "Chemical regions call for changes in ETS implementation", 22 December 2005, page 1-5). Schyns (2005 e) = "Comments on the guidance note of the EU Commission of 22 December 2005 on the allocation of allowances for the 2nd trading period 2008-2012", 27 December 2005, pp 8, paper send to the EU Commission. (Vianney Schyns, DSM & SABIC)	
13-280	A	12	44	12	44	Fourthly, winners of market share are hampered because the need to buy allowances and losers of market share are protected. This phenomenon is argued to be in conflict with rules on free trade, such as the competition rules of the EC Treaty (articles 81-88), it also hampers innovative producers and therefore the effectiveness of a trading scheme. Fifthly, cap & trade rules discourage a firm to close down older inefficient production plants and to shift production to more efficient existing plants elsewhere. After closure the emission allowances are lost in most Member States while additional production in these existing plants elsewhere require purchases of allowances. (Vianney Schyns, DSM & SABIC)	4.
13-281	A	12	44	12	44	Cap & trade rules equally fail for new entrants and closures. On the one hand the theory of cap & trade stipulates that new entrants must buy all allowances while on the other hand an effective scheme stimulates earlier replacement of older less efficient plants. In conclusion, the fundamental problems - of incumbents and of new entrants and closures - cannot be resolved within the cap & trade theory. The fundamental failure of cap & trade is that the quantities of allowances for incumbents and for new entrants are decoupled from future production, in contrast with auctioning and PSR emissions trading. (Vianney Schyns, DSM & SABIC)	4.
13-282	A	12	44	12	44	Add: Schyns (2005 c, 2005 d page 46) argues that trading with intensity targets, notably performance standard rate (PSR) trading, can be as stringent as aimed for by absolute targets, provided that the expected economic growth is taken into account. In a numerical illustration for the EU-25 as a whole it is estimated for the example electricity that the PSR (Performance Standard Rate) needs to be lowered from about 690 kg CO2/MWh in 2007 to about 470 kg CO2/MWh in 2017 for fossil-fuelled electricity to obtain an absolute lowering of emissions of 182 Mton/year by 2017 (example for two trading periods of the EU ETS). It is further demonstrated that this approach provides predictability and legal security for the participating firms and that efficiency improvements and innovation are stimulated	1.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						unambigiously. Under PSR, like under auctioning, there are no problems anymore with new entrants and closures, competitive issues and windfall profits for electricity producers. The latter are completely eliminated. (Vianney Schyns, DSM & SABIC)	
13-283	A	12	44	12	44	Add: It is argued that the theory of cap & trade as opposed to PSR trading is based on assumptions which are not based on facts concerning the certainty of the environmental outcome, market liquidity, lower transaction costs and finally the certainty for investments to reduce emissions (Schyns, 2005 b, pages 6-12). (Vianney Schyns, DSM & SABIC)	4. Lots of unsupported opinion
13-284	A	12	50			Footnote 12: Price caps are the same as the 'safety valve' discussed in the last paragraph on p.13. SUGGESTION: Move text from footnote 12 to text at bottom of p.13, and/or make mention of price caps as another design feature for reducing uncertainty on p.12. Make clear that 'price caps' and 'safety valve' is the same thing. (Frank Jotzo, Australian National University)	1.
13-285	A	12	50			Footnote 11: Intensity targets are also known as "dynamic targets". SUGGESTION: Insert "dynamic". (Frank Jotzo, Australian National University)	2. Check definition of "intensity target" Delete the sentence that begins with Philibert and Criqui
13-286	A	12	50	12	50	Add reference in footnote 10 and improve text. Replace last two sentences by: Only four EU Member States (Denmark 5%, Hungary 2.5%, Ireland 0.75% and Lithuania 1.5%) decided to auction off parts of their ET budget (Betz, et. al, 2004). Reference: Betz, R. / Eichhammer, W. / Schleich, J. 2004, 'Designing National Allocation Plans for EU Emissions Trading – A First Analysis of the Outcome', Energy and Environment, vol. 15, no. 3, pp. 375-425. (Regina Annette Betz, University of New South Wales (UNSW))	1. Move to EU ETS Box Clarify that SO2 auction is zero revenue for the government.
13-287	A	12	50	12	50	In footnote 11 , it is said that Denmark will auction 5% of its allowances during the first phase of the EU program. Since the first phase begun in 2005 and end in 2007, such auction might need to be taken place before the time this report is published or even before now. Some more explanation seem to be necessary on that auction. (Yoon-Young Kang, Korea Energy Economics Institute)	1. Move EU ETS Box
13-288	A	13	9			Zapfel and Vainio is not peer-reviewed. (Richard Tol, Hamburg University)	1. Delete this reference
13-289	A	13	9	13	9	Philibert (2005) and not Philibert and Criqui (2005) (Cédric Philibert, International Energy Agency)	1 Deleted the whole sentence.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
13-290	A	13	12	13	15	This statement is very general and needs to be more elaborate and should make reference to the Eric Haites 2004 report (Estimating the Market Potential for the Clean Development Mechanism: Review of Models and Lessons Learned) (Andrei Marcu, IETA)	2. Sentence has been deleted.
13-291	A	13	15	13	19	Discussion ot interaction between emissions trading and policy instruments should not be restricted to the interaction between greenhouse gas allowances and green certificates, because there are several other interactions between ET and energy/climate policies which ar probably more important. For recent research and (peer reviewed) publications on this issue see for instance (1) Johnstone, N. (2002), The Use of Tradable Permits in combination with Other Policy Instruments: A Scoping Paper, ENV/EPOC/WPNEP(2002)28, Working Party on National Environmental Policy, OECD, Paris, (2) Sorrell, S., and J. Sijm (2003): "Carbon Trading in the Policy Mix", Oxford Review of Economic Policy, Vol 19. No. 3, pp. 420-437; (3) Sorrell, S., A. Smith, R. Betz, R. Waltz, C. Boemare, P. Quirion, J. Sijm, D. Mavrakis, P. Konidari, S. Vassos, D. Haralampopoulos, and C. Pilinis (2003): Interaction in EU Climate Policy, Final Report to the European Commission, Brussels.; and (4) Sijm, J. (2005): "The Interaction between the EU Emissions Trading Scheme and National Energy Policies", Climate Policy, Vol. 5, No. 1, pp. 73-90. (Jos Sijm, ECN)	4. Check the peer reviewed references
13-292	A	13	21	13	34	One reservation regarding banking should be mentioned: If allocation in the first period is rather generous banking might compromise environmental effectiveness of the target in the second phase. (Regina Annette Betz, University of New South Wales (UNSW))	3. Add wording to paragraph
13-293	A	13	21			The authors mention the issue of "banking" in emissions trading permits, but they are silent about the possibility of "borrowing". Although I am quite negative about this possible characteristic, the literature discusses the pros and cons of it and should be mentioned in this section. (Andrea BARANZINI, Geneva School of Business Administration)	3. See 292
13-294	A	13	21	13	34	Allowing banking creates profound impacts on permit market prices. Maeda (2004, 2001) assesses the effects of banking on tradable emission permit markets, and in particular the role of uncertainty in permit markets that allow banking. In such markets, current and future spot trade markets are linked: an increase in uncertainty about future spot markets at first lowers spot prices due to the presence of unregulated agents, but soon spurs an increase in spot prices.	4. Probably too detailed to include in the text

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						References: Maeda, Akira (2004). "Impact of Banking and Forward Contracts on Tradable Permit Markets." Environmental Economics and Policy Studies 6(2):81-102. Maeda, Akira (2001). Domestic Greenhouse Gas Emissions Trading Markets: Forward Pricing and Banking Impacts. IIASA Interim Report: IR-01-048. International Institute for Applied Systems Analysis, Laxenburg, Austria. 32pp. (Akira Maeda, Kyoto University)	
13-295	A	13	35	13	45	The important issue that is not raised is that there high penalty is required to have a viable trading system and an active market (Andrei Marcu, IETA)	2. Already covered in the text
13-296	A	13	39	13	40	The price cap definitively requires more elaboration and discussion of possible advantages/disadvantages. It can either be implemented at a domestic level or an international level - with different policy and political implications; several price cap levels may coexist in a single regime, though at the cost of lesser cost-effectiveness (including for most developing countries non-binding targets, which may be considered as targets with a zero price cap). On these aspects, see Philibert, 2005, New commitment Options: Compatibility with emissions trading, IEA and OECD paper, Paris. The possibility of agreeing on a single global price cap level has been questioned by some (Müller, Benito, Axel Michaelowa & Christian Vroljik, 2002, Rejecting Kyoto, A study of proposed alternatives to the Kyoto Protocol, Climate Strategies2002); however, "a single price cap does not imply equal compliance costs, as these depend on countries' quantitative targets." (Philibert, 2005, Approaches for future international co-operation, OECD and IEA Information Paper, Paris). Thus, an agreement on a single price cap level may be facilitated by a differentiation of levels of efforts through allocation of assigned amounts. Other relevant references are Aldy et al 2001, Schlamadinger et al. 2001; NCEP 2004; Egenhofer & van Schaik 2005, and last but not least Victor and Coben 2005: Aldy, Joseph.E., Peter R. Orszag & Joseph E. Stiglitz, 2001. Climate Change: An Agenda for Global Collective Action. Prepared for the Conference on "The Timing of Climate Change Policies", Pew Center on Global Climate Change, October; Schlamadinger, Bernhard, Michael Obersteiner, Axel Michaelowa, Michael Grubb, Christian Azar, Yoshiki Yamagata, Donald Goldberg, Peter Read, Miko U.F. Kirschbaum, Philip M. Fearnside, Taishi Sugiyama, Ewald Rametsteiner and Klaus. Böswald, 2001, Capping the cost of compliance with the Kyoto Protocol	4 Redraft footnote 12

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						and recycling revenues into land-use projects, The Scientific World, 1, 271-280; National Commission on Energy Policy (NCEP), 2004. Ending the Energy Stalemate – A Bipartisan Strategy to Meet America's Energy Challenges, NCEP, Washington DC., December; Egenhofer, Christian and Louise van Schaik, 2005. Towards a Global Climate Regime – Priority Areas for a Coherent EU Strategy, CEPS Task Force Report n 55, Centre for European Policy Studies, Brussels, BE; Victor, David G. and Lesley A. Coben, 2005, A Herd Mentality in the Design of Environmental Agreements? Global Environmental Politics 5:1, February 2005 (Cédric Philibert, International Energy Agency)	
13-297	A	13	43			Including a make good provision will also create a high incentive for compliance and would limit the penalty rate to be seen as a price cap. Add after "...Swift, 2001)" the following text: "or include a make good provision (Betz and MacGill, 2005)." See Betz and MacGill 2005 Emissions trading for Australia: Design, transition and linking options, CEEM Discussion Paper, www.ceeem.unsw.edu.au. (Regina Annette Betz, University of New South Wales (UNSW))	4. Address in the compliance section
13-298	A	14	11	15	34	I appreciate (actually throughout the whole report, this is just an example) that developing countries' views/ special circumstances are systematically considered. (Reimund Schwarze, DIW Berlin)	1.
13-299	A	14	16	15	37	The OECD reports that voluntary agreements on the environment have questionable effectiveness and efficiency in achieving environmental targets and this would seem to generally be the case with climate change measures to date. The OECD also notes the risk of 'regulatory capture' with such approaches such that agreed environmental targets largely reflect Business-As-Usual for the industries involved. OECD, Voluntary Approaches for Environmental Policy Effectiveness, Efficiency and Usage in Policy Mixes, 2003 Another arguments seems missing: Voluntary agreements might be used as a means of buying time by forestalling regulation. See: Patrick ten Brink, 2001, Voluntary Environmental Agreements: Process, Practice and Future Use. (Regina Annette Betz, University of New South Wales (UNSW))	4. Check this reference
13-300	A	14	17			"They find that despite a lack of permit market development, there was improved documentation of historic emissions inventories and increased flexibility to address changing market conditions." This comes across as biased towards the advantages with no focus on the disadvantages. Why did the market not develop? - high costs?	3. Edit the text

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						(Catherine Beard, Greenhouse Policy Coalition (NGO representing energy intensive sector))	
13-301	A	14	25			The abbreviation of et alii is et al., not et. al. (Richard Tol, Hamburg University)	1.
13-302	A	14	34	14	34	Add: For the implementation of regional or global trading schemes under PSR (Performance Standard rate) an approach and a formula is proposed (Schyns, 2005 d, pages 45-46): PSR = Weighted Average Efficiency (WAE) - Compliance Factor (CF) x (WAE - BAT) in which BAT is the proven Best Practice. The CF is equal to all products under the trading scheme reflecting equal efforts. It is recommended that the CF is adjusted annually for future years to ensure the environmental outcome by an independent "Climate Board" (Schyns, 2005 b, pages 31-36). (Vianney Schyns, DSM & SABIC)	4. A proposal for an international target.
13-303	A	14	34	14	34	Add: A potentially interesting option for global emissions trading is to apply regional PSRs (Performance Standard Rates) for major homogeneous products - e.g. for regions such as for example EU-25 plus Japan, North America (USA and Canada), China, India, etc. - as a transition for 10-20 years (Schyns, 2005 d, page 45). A regional approach takes account of sunk costs as it avoids sudden economic disparities, which are not possible with a global auctioning approach. The transition period may also be shorter, for example 7-10 years, and is to a large extent a political decision (Schyns, 2005 b, page 37). (Vianney Schyns, DSM & SABIC)	2. International proposal. Not peer reviewed.
13-304	A	14	36	16	24	VAs are currently being tried in China. There is a pilot program with two steel mills in Shandong Province and an approved GEF project to expand the pilot. For further information on the pilot program, see: Price, L., Worrell, E., Sinton, J., and Yun, J., 2003. Voluntary Agreements for Increasing Energy Efficiency in Industry: Case Study of a Pilot Project with the Steel Industry in Shandong Province. Berkeley, CA: Lawrence Berkeley National Laboratory. (http://ies.lbl.gov/iespubs/52715.pdf). (Lynn Price, Lawrence Berkeley National Laboratory)	3. Review the paper. Cross reference to Industry chapter
13-305	A	14	36	16	24	This section could be improved by determining a framework within which to discuss different types of VAs. I have reviewed about 20 VAs between industry (or industry associations) and governments and grouped them into 3 general categories: completely voluntary, voluntary with a threat of future stringency if targets are not achieved, and stringent (associated with taxes or regulations). In this way, it is	3. Will review the paper. Discussion of voluntary agreements will be revised.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						easier to evaluate the effectiveness of these programs. The completely voluntary programs typically have lower participation and reduced energy or GHG savings compared to the other two categories. The more stringent programs typically offer more incentives and penalties and realize greater energy or GHG savings. See: Price, L., 2005. Voluntary Agreements for Energy Efficiency or GHG Emissions Reduction in Industry: An Assessment of Programs Around the World. Proceedings of the 2005 American Council for an Energy Efficient Economy Industrial Summer Study. Washington, DC: ACEEE.(http://ies.lbl.gov/iespubs/58138.pdf) (Lynn Price, Lawrence Berkeley National Laboratory)	
13-306	A	14	36	16	24	In addition, when looking at historical trends, I found that governments are moving from the use of the completely voluntary category toward more strengthened programs that fall under the other two categories. I think a more rigorous analysis of these programs in this section of your chapter is warranted - otherwise the reader comes away with a very mixed picture. See: Price, L., forthcoming (2006), International Experience with Voluntary Agreements as a Policy Mechanism to Transform Industrial Energy Efficiency with a Case Study in the Chinese Steel Sector. Proceedings of the Workshop on Globalization, Technology Transfer, and Energy-Efficiency of Energy Intensive Industries in Asia, 12-13 January 2006, Beijing, China. (Lynn Price, Lawrence Berkeley National Laboratory)	3. Will review the paper. Discussion of voluntary agreements will be revised.
13-307	A	14	38	14	40	The definition of voluntary agreement is quite different from the one established in TAR, where it describes as “VA is used here to mean an agreement between a government authority and one or more private parties, as well as a unilateral commitment that is recognized by the public authority, to achieve environmental objectives or to improve environmental performance beyond compliance" (refer to page 417, TAR WG3 Chapter 6). This definition derives of CEC 1996. As a matter of fact, the VA of Japanese Keidanren, started in 1997, to stabilize CO2 emissions in 2010 at 1990 level have wide variety of participants (35 industry sectors participated, including utility sector, and their CO2 emissions cover 45% of all Japanese emissions and 82% of industry emissions). This VA falls into the category of a unilateral commitment that is recognized by the public authority. Actually the VA is integrated into Japanese Government Implementation Plan of the Kyoto Target.and the outcome is reviewed regularly at the Government committee. In addition the third party evaluation committee evaluates the effectiveness annually. I think there is no reason to change the definition of VA. Please follow TAR	3. Review the TAR definition. Consider in the revised text on voluntary agreements.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						definition. (Mitsutsune Yamaguchi, Teikyo University)	
13-308	A	15	19		20	More than what? (Richard Tol, Hamburg University)	3. Review the language of the sentence
13-309	A	15	20	15	23	references Phylipsen and Bolk 2002, Phylipsen 2002 are not included in reference list (Dian Phylipsen, Ecofys)	1. Add to the reference list
13-310	A	15	23			Phylipsen has a strong record of underestimating costs. Do you have a credible reference? (Richard Tol, Hamburg University)	2. No evidence is provided
13-311	A	15	38	15	42	This description is not accurate. As a social appraisal for Japanese companies participating in the Keidanren (Japanese Business Federation), the Keidanren Voluntary Action Plan becomes a driving force which forces us to comply our own commitment. As a one of the evidence, the CDM credits which Keidanren companies have attained by the end of 2005, comes to 28million t-co2, nevertheless they are not imposed any caps by Japanese government. (Shinichi Nakakuki, Tokyo Electric Power Company)	3. Consider in the revision of the section on voluntary agreements. Murase to provide references on voluntary agreements in Japan
13-312	A	15	40	15	45	interpretation of additional effects of VAs may be a bit more negative here than in original sources. (Dian Phylipsen, Ecofys)	3. Check reference when revising the text on voluntary agreements
13-313	A	15	48			Torvanger 2002 missing in ref.list. Also note the article by Torvanger and Skodvin in ten Brink, Patrick (ed.) (2002), Voluntary environmental agreements - Process, practice and future use, Greenleaf Publishing, Sheffield. (Asbjørn Torvanger, CICERO)	1.
13-314	A	16	20	16	25	Box 13.2: The Greenhouse Gas Challenge Programme has been modified and part of the programme is now mandatory and not voluntary anymore beyond a certain size. Needs updating. (Regina Annette Betz, University of New South Wales (UNSW))	3. Verify the comment
13-315	A	16	21	16	21	Box 13.2. As the VA of Japanese Keidanren is such a big and successful one, please insert this as one of the examples (please refer to box 6.3 page 418 of TAR WG3 Chapter 6). (Mitsutsune Yamaguchi, Teikyo University)	3. See comment 311

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
13-316	A	16	22	16	22	In box 13.2, most of the bullets describe something about the content of the Vas mentioned, but the Australian example does not - given that it has such high compliance, I'd sure like to know what it commits industry to! (Paul Baer, Stanford University)	1. Check what the commitment is. See comment 314
13-317	A	16	24	17	41	The subsidies discussed here is mainly environmentally harmful subsidies. Better to describe subsidies to reduce GHG emissions as well. Though there are not so many cases the text book style subsidies (either similar to Pigouvian tax or Baumol-Oats tax), there are other types of subsidies, including the one that helps entities to comply with standards (most of the subsidies in Japan are the ones of this kind). (Mitsutsune Yamaguchi, Teikyo University)	1.
13-318	A	16	24	17	42	Perhaps nuclear and renewable energy could also be listed as regular beneficiary of energy subsidies, along with coal. (Diana Urge-Vorsatz, Central European University)	1.
13-319	A	16	26	17	22	A discussion of the effects of subsidising renewable energy is missing. This can take several forms, should remain limited and for a fixed time, but may nevertheless be a valuable instrument for the market introduction of renewables. (Hermann E. Ott, Wuppertal Institute for Climate, Environment and Energy)	1. See comment 318
13-320	A	16	29	16	29	I think this should say "In all countries, to greater or lesser extent" rather than "in most countries." There are no counterexamples… (Paul Baer, Stanford University)	3. Modify the text
13-321	A	16	0			Box 13.2, first bullet. Figures are not correct. Benchmarking covenant covers 90% of energy. 96% figure may include participants in the Long Term Agreements, a different type of voluntary agreement (not based on benchmarking but on annual improvement targets) (Dian Phylipsen, Ecofys)	3. Verify the numbers
13-322	A	16	0			section 13.2.1.4 does not discuss the issue of subsidies for the application of renewables, while this is also nit discussed under R&D subsidies which focusses only on R&D only. Subsidies for the application are important in the context of learning by doing (instead of learning by research) and include governmental subsidies for installment and or the production/supply of rewable energy and procurement programs, which are not dicussed at all in the chapter. (Marcel Berk, Netherlands Environmental Assessment Agency)	3. See comment 317
13-323	A	17	12			One often sees levels of subsidies provided to energy supply in various countries but it would be helpful to see what the size of the subsidy is net of other imposed	3. Address in a footnote. No data available

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						costs like taxes. While the point of allocation of subsidy and tax differ, it would still be valuable, from the position of the end-user to critique costs in a more comprehensive fashion. (John Nyboer, Energy and Materials Reseach Group, School of Resource and Environmental Management, Simon Fraser Univeristy)	
13-324	A	17	26	17	37	Section on agricultural subsidies can be skipped (seems to be superfluous in a report such as AR4). (Jos Sijm, ECN)	3. Shorten text.
13-325	A	17	39	17	41	Export credit guarantees are an important instrument to promote environmentally friendly technology transfer. It should have a greater focus in this forward looking report. (Reimund Schwarze, DIW Berlin)	3. Either strengthen (preferred) or drop
13-326	A	17	43	20	12	What is not covered well in this section is how combinations of R&D with other instruments could work effectively. Seems important in light of the findings in the chapters that R&D cannot do it alone. (Bert Metz, IPCC)	3. Addressed in section 13.2.2.6
13-327	A	17	54			Footnote 18 states R&D generally refers to research, development, demonstration and diffusion. In my observation, R&D generally refers to just research and development.Chapter 1 uses RDD&D to refer to research, development, demonstration and diffusion. (Koji Kadono, Global Industrial and Social Progress Research Institute)	1.
13-328	A	18	2	18	2	Justus and Philibert, 2005 (not "Justice") (Cédric Philibert, International Energy Agency)	1.
13-329	A	18	6	18	6	Justice and Philibert 2005 reference is missing from references. (Paul Baer, Stanford University)	1
13-330	A	18	8			"frequently" quantify with reference or delete; it is for sure the first time that I hear that someone things that innovation is linear; I cannot even imagine what linear innovation is; linear in what? (Richard Tol, Hamburg University)	1. hange “linear” to”sequential”
13-331	A	18	8	18	10	The definition of "innovation" given is rather limited. Innovation also refers to the improvement of esisting technology that meets the local condition at a lower cost or higher effiency (Kok Kee Chow, Malaysian Meteorological Deparment)	1.
13-332	A	18	13	18	16	Erratum: to change letter of notes	1 Change the footnotes to superscripts

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						(FÉLIX HERNÁNDEZ, IEG-CSIC)	
13-333	A	18	16			At the end of the para, it should be added " The energy sector can be characterised as a low innovation-intensive sector. Processing large amount sof energy may inherently invove big capital investment and long timescales, which naturally increases risk and deters private finance, and each stage of innovation chain can take a decade, and diffusion is equally slow." (Michael Grubb, "Technology innovation and climate change policy: an overview of issues and options", Keio Economic Studies,pp103-132 Vol.41, No.2, 2004) (Koji Kadono, Global Industrial and Social Progress Research Institute)	3. Consider in the redraft
13-334	A	18	20	18	20	This implies that there is an identifiable "optimal" level, which there is not for a variety of reasons. One might say "relative to a theoretically optimal level." (Paul Baer, Stanford University)	3. Review lines 18 to 24 and look for more recent references.
13-335	A	18	25	18	33	It is quite natural that subsidies to R&D do not address climate externalities since they should partly cover a positive externalities related to knowledge accumulation and technology diffusion. They are to cover Shumpeterian rent that inventor looses when society benefits from technological diffusion. (Alexander Golub, Environmental Defense)	4.
13-336	A	18	35	18	35	Should be "Sathaye et al.2005" (Paul Baer, Stanford University)	1.
13-337	A	19	6	19	6	What does IPR mean? (Jos Sijm, ECN)	3. Means “intellectual property rights”
13-338	A	19	26			Figure 13.4. Two updates: The KfW Fund has now 80mio EUR: Dow Jones Newsletter from November 8, 2005 or www.kfw.de/klimaschutzfonds. The European Carbon Fund has now EUR 175.5 million, Point Carbon News from December, 5, 2005. www.pointcarbon.com (Sonja Peterson, Kiel Institute for World Economics)	2. Comment refers to Table 13.4 , which is discussed on pp. 41-42. The text gives the date for which the information is current.
13-339	A	19	27			The figure should probably be inserted after the next paragraph… (John Nyboer, Energy and Materials Reseach Group, School of Resource and Environmental Management, Simon Fraser Univeristy)	1
13-340	A	19	32			I don't find Mansfield argument at all convincing. The mechanism is not clear, and the data are muddy. Besides, there is little reason to believe that there will be a "radical" technological change; we can build a carbon-neutral economy twice over with existing blueprints. (Richard Tol, Hamburg University)	3. Delete “convincing”

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
13-341	A	20	14			It occurs to me that I did not find anything in this chapter yet about the impact of policies on technology transfer and, in general, on third countries. For example, what should the boundaries for considering environmental effectiveness, cost-effectiveness and equity of policies (the 3 criteria on p. 5) be? It might be more cost-effective for the USA to adapt to climate change than to reduce emissions, but this decision will affect other countries. Similarly, although domestic reductions might lead to reductions in air pollutants and health impacts locally, the same money invested abroad might result in even greater GHG and pollutant emission reductions. Which is the "better" policy? The report should also address the issue of gray emissions embodied in traded products. A recent study in Energy Policy (Shui & Harriss, in press) calculated that China's CO2 emissions would be 14% lower, were it not for the products it manufactured for export to the USA (and US emissions would have been 6% higher). With respect to technology transfer, here is a relevant publication on the relationship between foreign direct investment and CDM: Arquit Niederberger, A., and R. Saner, Exploring the relationships between FDI flows and CDM potential, Transnational Corporations, 14(1), 1-40, April 2005. (Anne Arquit Niederberger, Policy Solutions)	4.
13-342	A	20	14	20	14	Delete the word "ODA" as the following paragraph refers to trade and FDI and no reference is made to ODA (Kok Kee Chow, Malaysian Meteorological Deparment)	1. Dennis to check ODA data Combine this section with section 13.3.2.7 and 13.3.4
13-343	A	20	14	20	24	In this paragraph, a volume of “Trade, foreign direct investment and ODA” is quite short although these are very much important in the international policy. (Masatake Uezono, Citizens' Alliance for saving the Atmosphere and the Earth)	1. See comment 342. Combine this section with section 13.3.2.7 and 13.3.4
13-344	A	20	14	20	44	What is these sections doing here. They give no insight in how trade and investment and other policies can be an instrument for cc mitigation or can affect emissions. A much better coverage of these issues is warranted because the point of non-climate policies is made extensively in chapters 4-12. (Bert Metz, IPCC)	2. See comment 342. Combine this section with section 13.3.2.7 and 13.3.4
13-345	A	20	14			ODA? (Diana Urge-Vorsatz, Central European University)	1. See comment 342. Combine this section with section 13.3.2.7 and 13.3.4
13-346	A	20	24			Galeotti and Kemfert was not peer-reviewed. (Richard Tol, Hamburg University)	2. Check the relevance of the reference. Combine this section with section 13.3.2.7 and 13.3.4
13-347	A	20	24	20	24	"See section 13.4.2.6 for additional information." There is no section 13.4.2.6.	4. Will be corrected when this section is

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						(Masatake Uezono, Citizens' Alliance for saving the Atmosphere and the Earth)	combined with 13.3.2.7 and 13.3.4
13-348	A	20	26			No mention is made of environmentally focussed policies affecting emissions of non-climate-altering materials, like criteria air contaminants, etc. These, of course, can have significant impact on GHG emissions. (John Nyboer, Energy and Materials Reseach Group, School of Resource and Environmental Management, Simon Fraser Univeristy)	3. Consider consolidating climate benefits of non-climate policies of all types in one shorter section
13-349	A	20	26	20	44	Section 13.1.1.7 - reference should be made to the impacts on climate change of the reductions of CFCs and HCFCs under the Montreal Protocol. The IPCC/TEAP Special report provides data within its SPM. (Nick Campbell, ARKEMA SA)	3. Consider consolidating climate benefits of non-climate policies of all types in one shorter section
13-350	A	20	44			Where das "This chapter" refer to? To UN reference or to the AR4? (Regina Annette Betz, University of New South Wales (UNSW))	1. Delete this sentence.
13-351	A	20	46			section 13.2.2 again comes up with criteria while they have to some extent already been implicitely used in the previous section. I would suggest that the authors consider restructuring the cahpter in starting the chapter after setting out more clearly its objectives (questions to be addressed) with giving an overview of criteria for evaluating policy instrunments and than explicitly apply them in the remaining sections on the basis of what is found in the literature (Marcel Berk, Netherlands Environmental Assessment Agency)	3. Consider in the redrafting of the section on criteria
13-352	A	20	48	24	29	It is rather surprising to read the criteria for evaluation after the instruments are discussed. To merge sections 13.2.2.2., 13.2.2.3 and 13.2.2.4 with section 13.1.2 "Criteria for Policy Choice" would add to the stringency of the chapter (Rainer Walz, Fraunhofer Institute Systems and Innovation Research)	3. Consider in the redrafting of the section on criteria
13-353	A	20	0			the section does nowhere discuss if there is a difference in the relevance and application of the various criteria at the national or international level; this should be discussed as well (Marcel Berk, Netherlands Environmental Assessment Agency)	3. Consider in the redrafting of the section on criteria
13-354	A	20	0			section 13.2.1.7 needs to be much further elaborated or be kept short by referring to Chapter 12 (on sustainable development and climate change). It does not mention the importance of spatial planning, transport policies, infrastructure etc. (Marcel Berk, Netherlands Environmental Assessment Agency)	3. Consider consolidating climate benefits of non-climate policies of all types in one shorter section
13-355	A	21	7	21	10	As I suggested previously, I think it's innappropriate to fold "equity" into political feasibility, and that the "additional critieria" are (mostly) sub-categories of economic efficiency.	3. Consider in the redrafting of the section on criteria

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						(Paul Baer, Stanford University)	
13-356	A	21	9			What is the difference between transaction costs and administrative costs? There is no definition and both seem to be rather similar. Transaction costs are based on institutional economics and might be broadly interpreted including administrative costs. Better to list other more different criteria such as competitive impacts, adaptability. If dynamic efficiency is not included explicitly at the beginning in the definition of cost effectivness it should be listed here. (Regina Annette Betz, University of New South Wales (UNSW))	3. Will define the different cost categories
13-357	A	21	9	21	17	This paragraph is unclear. Why refer to "experiments using human subjects"? What is "market efficiency". Do these things need to be discussed here, given this is a section on criteria? (Bert Metz, IPCC)	3. Note p. 22 line 9. Drop “using human subjects” Change “market efficiency” to “economic efficiency”
13-358	A	21	12	21	31	There are many index of Environmental effectiveness. It is necessary to take up some important index, for example, MIPS (Material input per unit of service). (Masatake Uezono, Citizens' Alliance for saving the Atmosphere and the Earth)	2. Don’t change the definition environmental effectiveness used in the paper.
13-359	A	21	13		31	The section relies on one study, although refers to "other literature" (line 26), with which it is consistent with. It would first be useful to list this "other literature". In addition, I am not sure if an analysis contrasting pollution abatement regulation and economic instruments can be entirely generalised to the environmental effectiveness of CC mitigation regulations. THe point is that energy efficiency regulation is different from pollution abatement regulation (as recognised in earlier parts of your chapter) due to the high level of barriers and market distortions that inhibit the market-based adoption of cost-effective energy efficienct technologies, especially in the residential and commercial sectors. If the author agrees with me that such an extrapolation of conclusions is questionable, I recommend this distinction should be made in the text. Many eNergy efficiency regulations have been extremely environmentally and cost-effective, for instance the US appliance standards. (if you need, I could try to dig up some literature documenting this. (Diana Urge-Vorsatz, Central European University)	3. Need more focused summary of the results of the Harrington book.
13-360	A	21	14	21	31	The explanation on environmental effectiveness lacks a definition, which may be necessary to understand the overall contents. In addition, environmental effectiveness here seems to refer to achivement of planned environmental objective, without considering cost-effectiveness which seems to be included in the explanation on environmental effectiveness in Page 5.	3. Need more focused summary of the results of the Harrington book. See comment 359

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						(Yoon-Young Kang, Korea Energy Economics Institute)	
13-361	A	21	17	21	18	I don't think it's necessary to give a definition of "hypotheses at this point. (Paul Baer, Stanford University)	1. Need more focused summary of the results of the Harrington book see 359
13-362	A	21	19	21	23	Paragraph unclear. (Bert Metz, IPCC)	3. Need more focused summary of the results of the Harrington book See comment 359
13-363	A	21	33			Table 13.2. The Table refers to all criteria and it is therefore questionable if it should be placed in this first chapter. Better to introduce later and refer in different chapters to or at the very beginning (e.g. 13.2.2.1 Introduction). (Regina Annette Betz, University of New South Wales (UNSW))	3. Need more focused summary of the results of the Harrington book. See comment 359
13-364	A	21	37	21	42	Add somethings along the lines: Generally, what is understood by economic efficiency is the equalization of marginal costs across polluters. In addition, the costs incurred running implementation of the instrument matter .... (Sonja Peterson, Kiel Institute for World Economics)	3. Kolstad to check the definition in the glossary and repeat in the text
13-365	A	21	44	21	49	To make this paragraphe generally understandable, it is necessary to define leakage. (Sonja Peterson, Kiel Institute for World Economics)	3. Move the para on leakage and CDM to international section. Leakage defined in the glossary , Refer to Box 13.7 and glossary
13-366	A	21	44	21	49	In my point of view, the discussion on leakage belongs more to the section on environmental effectiveness (13.2.2.2) than on economic efficiency (13.2.2.3). (Jos Sijm, ECN)	3. Move paras on leakage and CDM to the international section. Leakage defined in the glossary , Refer to Box 13.7 and glossary
13-367	A	21	44	21	49	What is this paragraph doing here? It is not on economic efficiency (Bert Metz, IPCC)	1. Move the paragraphs on leakage and CDM to international section.
13-368	A	21	44	21	49	It's worth specifiying here what "leakage rate" actually measures. (Paul Baer, Stanford University)	1. Move the paragraphs on leakage and CDM to international section
13-369	A	21	48	21	48	Tamechika(2005) is the master's thesis. It is not available in general. It is necessary to delete it. (Masatake Uezono, Citizens' Alliance for saving the Atmosphere and the Earth)	1. Delete the reference.
13-370	A	21	50	21	54	The statement "transaction costs of project based mechanisms will be higher compared to emissions trading" does not always hold. Betz 2005 has shown that under the EU ETS the costs for companies per tonne of reduction are higher compared to the transaction costs for creating an certified emissions reduction under the CDM. This is due to the fact, that under the EU ETS e.g. monitoring costs occur for each regulated company independent if the company is reducing emissions. If reductions compared to the projected development are rather small costs per tonne of reduction might be high under a cap and trade scheme and	2. Sentence is fine. Definitions of cost categories will help clarify the point.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						exceed the costs of a baseline and credit scheme. See Betz, R., 2005, "Emissions trading to combat climate change: The impact of scheme design on transaction costs", presented at the British Institute of Energy Economics (BIEE) Academic Conference in association with UK Energy Research Centre, www.ceem.unsw.edu.au. (Regina Annette Betz, University of New South Wales (UNSW))	
13-371	A	21	0			Innovation is always presented as a key issue in combatting climate change. In the criteria for assessing instruments, I recommend to add the extent to which the instrument enhances innovation. On this topic, Jaffe et al. (2002) state, in a survey article, that "... both auctioned and freely-allocated permits are inferior in their diffusion incentives to emission tax systems. Under tradable permits, technology diffusion lowers the equilibrium permit price, thereby reducing the incentive for participating firms to adopt". However, Fischer et al. (2003) have shown that additional elements, such as the degree of appropriation of the innovation rent, may change the result and Germain and van Steenberghe (2005) have recently emphasised that the type of environmental innovation may also affect the choice of the instrument. This comment could be added either as a proper subsetion of section 13.2.2 or within the 'Economic efficiency' subsection (page 21). PLEASE SEE THE REST OF THE COMMENT IN COMMENT 28 (Peter Wittoeck, Belgian Federal Administration)	3. Consider in redrafting the relevant section.
13-372	A	21	0			COMMENT 27 Continued: References: Fischer, C., I. Parry and W. Pizer (2003), "Instrument choice for environmental protection when technological innovation is endogenous", Journal of Environmental Economics and Management 45, 523-545. Germain, M. and V. van Steenberghe (2005), "Innovation under taxes versus permits: how a commonly made assumption leads to misleading policy recommendations", CORE Discussion Paper 2005/76, CORE, Université catholique de Louvain, Belgium (http://www.core.ucl.ac.be/services/psfiles/dp05/dp2005_76.pdf). Jaffe, A., R. Newell and R. Stavins (2002), "Environmental Policy and Technological Change", Environmental and Resource Economics 22: 41-69. (Peter Wittoeck, Belgian Federal Administration)	3. See comment 371
13-373	A	22	7	22	7	Small scale projects do already get special treatment at present so that should be reflected in the text CDM EB Source? (Andrei Marcu, IETA)	1. Add “and this has already been implemented.” The para will be moved and needs to be revised..
13-374	A	22	9	22	17	Since in lines 11-13 on page 22, it says “Bohm and Carlen (1999) showed that the	3. Needs to be addressed in the section on

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						market power problem is not as serious as other researchers suggested, …..," the market power issue should be discussed in more detail in the context of market efficiency: Maeda (2003) analytically shows that if the initial distribution of permits in an emission permit market satisfies certain conditions, then some emitters will hold effective market power and the market will yield prices that exclusively benefit these emitters. In particular, there is a threshold or border for market power to emerge; if excess permits are initially allocated to an emitter, and if the absolute volume of excess permits of the emitter exceeds the net shortage of permits in the market, then the emitter is entitled to have effective market power. The significance of these findings for the debate on the Kyoto Protocol is particularly great, for they show that anticipated excess rights in the international emissions trading regime (known as "hot air"), which Russia and Ukraine in particular are expected to hold, may affect the economic efficiency (or inefficiency) of the Kyoto mechanism. References: Maeda, Akira (2003). "The Emergence of Market Power in Emission Rights Markets: The Role of Initial Permit Distribution." Journal of Regulatory Economics 24(3): 293-314. (Akira Maeda, Kyoto University)	emissions trading. Market power not generally a problem for domestic GHG programs due to the number of participants, but Russia's market power could affect prices in domestic markets.
13-375	A	22	9	22	18	What kind of experiments are these? Students using play money? Noting that the experiments didn't include several features of GHG trading is probably less important than noting that they're extremely far removed from the actual world. (Paul Baer, Stanford University)	3. See 357
13-376	A	22	16	22	17	RECOMMENDATION: The text states "For example, once a country started to build a nuclear power plant, it is difficult to reverse the investment decision." It is important to note that in many countries nuclear power stations are constructed not by countries, but by private or publicly owned companies. Therefore, using this example is not a valid illustration of investment by a country in emissions abatement. (Jonathan Cobb, World Nuclear Association)	1. Change the sentence to say "Once a power plant"
13-377	A	22	30		44	A relevant analysis on the role of the scientific community in integrating scientific information into climate change decision-making, drawing on boundary organization and advocacy coalition framework theory: Arquit Niederberger, A., Science for climate change policy-making: applying theory to practice to enhance	2. Too detailed

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						effectiveness, Science and Public Policy,32(1), 2-16, February 2005. And another study that used the advocacy coalition framework to analyze how the business coalition in Switzerland took advantage of external perturbations to the climate policy subsystem to avoid the CO2 tax proposed by the government, ultimately entering into a voluntary agreement: Arquit Niederberger, A., The Swiss Climate Penny: An innovative approach to transport sector emissions, Transport Policy, 12(4), 303-313, July 2005. (Anne Arquit Niederberger, Policy Solutions)	
13-378	A	22	30	24	14	There should be a balance between how that burden is shared between the trading and main trading sectors is depending on many sectors. Your text should also consider that emission trading should deliver on environmental targets whilst helping industry with competativeness in a market that does not have a global coverage. We suggest that you consult the EU DIRECTIVE (Andrei Marcu, IETA)	3. Add text on competitiveness to balance text on lobbying.
13-379	A	22	35	23		If the focus of Box 13.3 is to highlight the political economic context of the UK climate change levy, it should be structured to focus and highlight such implications, and not ask questions such as "is the CC levy effective?" and "is it a good tax?" which detract from the illustration of the purely political economic context of the policy. Subheadings should instead highlight specific political economic factors, and how they influenced the structure of the climate change levy policy (or whatever is unique/interesting about this case). (Joanna Lewis, Pew Center on Global Climate Change)	3. Redraft Box based on more references
13-380	A	22	43	23	5	In box 13.3, we can read “The political economy literature argues that there is little point in comparing actual measures against ideal measures if the ideal measures could never be implemented”. I do not agree with this sentence. We have to speak about ideal measures simply because nobody knows where is the limit between what is politically acceptable and what is not. Moreover the frontier between acceptable and not acceptable measures is moving. New information on the climate change gives new public opinion about the possible responses. (Norbert LADOUX, University of Toulouse and IDEI)	3. Redraft Box based on more references
13-381	A	22	45			I guess you mean Pearce. The peer-reviewed version is forthcoming in Energy Economics. (Richard Tol, Hamburg University)	3. Redraft Box based on more references
13-382	A	22	45	22	45	This sentence does not run properly.	3. Redraft Box based on more references

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						(Jos Sijm, ECN)	
13-383	A	22	47			Box 13.3: The UK does not have an 'aspirational' goal of 60% CO2 emissions reduction by 2050 - this was a target suggested in a Royal Commission on the Environment Report (2000) and the current UK government has sought to put the UK "on a path" to achieve this. The 'aspiration' is to double renewables' share of electricity from the 2010 target (10%) by 2020 (DTI Energy White Paper February, 2003, page 7, para. 4.11. (Michael Jefferson, World Renewable Energy Network/Congresses)	3. Redraft Box based on more references
13-384	A	22	47	23	4	Box 13.3. This is too long and redundant. Make it shorter. (Mitsutsune Yamaguchi, Teikyo University)	3. Redraft Box based on more references
13-385	A	22	0	24		I would like to strengthen this paragraph. Its not just "one more criteria" you have to go through. This is a really decisive one - and in a very practical way. Not only may lobbies kill a proposal but almost worse they may water it down and alter it. The effect of an instrument depends not only on its type but also very heavily on its stringency or level. Taxes are not universally impossible to pass through parliaments but they often end up being too low. Prohibitions would be a great instrument but they end up having a lot of loopholes, exceptions and so forth. I have explored this in Sterner and Fredriksson (, "The Political Economy of Refunded Emission Payments", Sterner and Per Fredriksson, Economic Letters, 87 (2005) pp 113-119.). We show that, sometimes (as in the case of NOx emissions in Sweden), a refunded charge may be better than a tax because the former is more acceptable to industry and therefore may be set much higher than the highest acceptable tax. I also explored the issues of political acceptability of gasoline taxes in the paper already mentioned Hammar, H, Å Löfgren and Sterner, T., "Political Economy Obstacles to Fuel Taxation", Energy Journal, ISSN0195-6574, July 2004, Vol 25(3). We show that petrol taxes introduced gradually help to weaken the lobbies against gas taxes and instead strengthen the ones in favour. (Thomas Sterner, University of Gothenburg)	3. Redraft Box based on more references
13-386	A	22	0			In my view the Box 13.3 and the overall presentation of the UK Climate Change Levy is very misguided. The flavour of the writing is a nice idea (carbon tax) polluted by political economy. The importance of the CCL is that it changed the groundrules of negotiation with industry: all that followed (effective negotiated agreements; the pilot UK ETS; establishment of the Carbon Trust; etc) would not have been possible without it. It seems to me the big lesson is not to let the perfect be the enemy of the good, because the imperfect can still be a base for oter things,	3. Redraft Box based on more references

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						and can itself be improved over time (witness renewables exemptions etc in the CCL, which has come to look more like a carbon tax over time). (Michael Grubb, Cambridge University)	
13-387	A	23	6	24	29	These paragraphs give the impression due to wording that "lobbying" has had a significant negative impact on climate change measures. The section should be balanced at least with the reasons for the industry reactions against measures, in particular concerns for damage of both domestic and internatoinal competitiveness. (Nick Campbell, ARKEMA SA)	2 Retain “lobbying” but balance the text. Addressed by comment 378
13-388	A	23	6	24	29	see also Hamilton et al. in Grubb et al. (2003) 'The Kyoto to Marrakech System: A Strategic Analysis' for an analysis of the current and recent business lobby in US, EU, Canada and Japan. Reinforces some of the points made, and also of relevance to the 13.2.1.3 on Voluntary Agreements earlier, and Public Relations, 13.3.1.4, page 28-29. (Kirsty Hamilton, retainer to UK Business Council for Sustainable Energy; Associate Fellow, Chatham House.)	3. Check the reference
13-389	A	23	7	24	6	In a section regarding the political feasibility of implementation of climate change policies, Australia is used as an example of a country in which "industrial emitters managed to steer the country from a position supporting ambitious reduction targets to the request of an emissions increase". This statement is unnecessary for the context of the chapter, is not objective and should be removed. (Spencer Edwards, Australian Greenhouse Office)	3. Edit the tone of the paragraph. Change “shows how” to “submit that” Delete the next two sentences that begins “Due to lobbying…” In following sentence “lobbying that preceded the US” Blanke (2002) identifies, Storchman (2006) suggests that
13-390	A	23	0			In Box 13.3 second last line: Is there an indication of a unit like 27 Euro per tonne of CO2 missing? (Regina Annette Betz, University of New South Wales (UNSW))	1.
13-391	A	23	0			Box 13.3, last sentence from below: I do not understand the following sentence: The "auction" offerd subsidies of 360 million € and yielded a de-facto subsidy of 27 € (???) (Jos Sijm, ECN)	1.
13-392	A	24	6			The sentence about emitters arguing points has emitters arguing BOTH sides. Perhaps it should be something like "While PROPONENTS argued that no regrets …" (John Nyboer, Energy and Materials Reseach Group, School of Resource and Environmental Management, Simon Fraser Univeristy)	4. Addressed by eliminating the sentence.
13-393	A	24	31		49	Adaptation v mitigation is discussed in many other places in this report, so I	2. Add cross references.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						suggest you just cut it here. If not, please provide a serious discussion, with all elements and possibilities. Adaptation may increase or decrease emissions. Mitigation may increase or decrease impacts and vulnerability. (Richard Tol, Hamburg University)	
13-394	A	24	31	24	49	This should be a section on criteria for instruments; what is the criterion here? (Bert Metz, IPCC)	3. Revise outline and headings. This section could be moved out of the section on criteria
13-395	A	24	33	24	42	The chapter on mitigation/adaptation policies is far from comprehensive, e.g. insurance and hedging instruments are entirely missing. (Reimund Schwarze, DIW Berlin)	2. Not covering adaptation policies.
13-396	A	24	33	24	35	Please, refer also to the discussion on the interaction between mitigation and adaptation in Chapter 11 of WG III Report. (Jos Sijm, ECN)	1. And broaden beyond Chapter 11
13-397	A	24	44	24	47	The article referred to(New Zealand, 2004) is not found in the reference.It seems a report published by a country's government and I wonder if it is considered adequate literature. If possible and available, countries other than western developed countries should be provided as example. (Koji Kadono, Global Industrial and Social Progress Research Institute)	1. Check the reference
13-398	A	24	48	24	49	"optimum adaptation and mitigation strategies" is not coherently defined. To the extent that it is defined at all, it is in a game theoretic perspective in which all mitigation benefits which accrue to other countries should be ignored. This section should probably point out this contradiction between nationally "optimal" and globally "optimal" policy mixes. (Paul Baer, Stanford University)	1. Change text to “that have attempted to integrate”
13-399	A	24	51	25	50	Section 13.2.2.6 discusses examples of policy and instrument mixes. In this context, it would be interesting to briefly present and discuss the implemented Swiss approach, since the Swiss CO2 Law interestingly combines notably voluntary approaches, emissions trading and a CO2 tax. For a survey and a more detailed analysis and evaluation of the Swiss climate policy, cf . A. Baranzini, P. Thalmann & C. Gonseth (2004): “Swiss Climate Policy: Combining VAs with other instruments under the menace of a CO2 tax” In A. Baranzini & P. Thalmann (Eds), Voluntary Approaches in Climate Policy.Edward Elgar, Cheltenham (UK), pp. 249-276. (Andrea BARANZINI, Geneva School of Business Administration)	3. Check the reference.
13-400	A	24	51	25	54	This section could be bring out much clearer that an important criterium for	2. Respectively rejected. Link to chapter 12

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						evaluating instruments is how they fit the broader purpose of (sustainable) development. It should then draw on previous chapters (4-12) to illustrate how that can work. Most of the section is actually about instrument mixes. This might better be treated separately, since in reality that is often the preferred approach and it is different from fitting into broader goals.Try to answer the question what makes a succesful and efficient mix. The Danish example in lines 43-50 on page 25 could be a box. (Bert Metz, IPCC)	and chapter 2.
13-401	A	24	0			the section 13.2.2.5. on mitigation/adaptation does not fit here under evaluation criteria 13.2.2 (Marcel Berk, Netherlands Environmental Assessment Agency)	1 Restructure and move this sub-section out of the section on criteria
13-402	A	25	8	25	10	It is very regrettable in this respect that in Poverty Reduction Strategy Papers, which have been prepared for a great number of countries, hardly any reference is being made to the relationship between climate initiatives and poverty reduction efforts. It could be stressed that this is an omission which should be repaired. (Gert de Gans, Kerkinactie)	2. Should be addressed in Chapter 12 and maybe Chapter 2. Joyeeta to contact CLAs of those chapters
13-403	A	25	11	25	27	There is a paper on interaction of emissions trading with other policy instruments which seems to be valuable to be added in a footnote or in the text: Sorrell, S. / Sijm, J., 2003, Carbon Trading in the Policy Mix, in Oxford Review of Economic Policy, Vol. 19, No. 3, p. 420-437. (Regina Annette Betz, University of New South Wales (UNSW))	1
13-404	A	25	12		41	this section is very general and does not discuss any literature; it's purpose is not clear (Marcel Berk, Netherlands Environmental Assessment Agency)	4. Try to add references to this section
13-405	A	25	28	25	42	In the list the interaction between the different certificate systems seems to lack. See NERA report 2005: Interactions of the EU ETS with Green and White Certificate Schemes: Summary Report for Policy Makers http://europa.eu.int/comm/environment/climat/pdf/ec_green_summary_report051117.pdf (Regina Annette Betz, University of New South Wales (UNSW))	3. Check the reference
13-406	A	25	28	25	29	I do not understand why "R&D expenditiures are more important in a corbon tax instrument than in emissions trading scheme…". (Jos Sijm, ECN)	1. Check the reference and revise the text as necessary
13-407	A	25	28	25	41	This list of research results is precisely the kind of list that should have confidence	4. Revise this section of the text

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						or uncertainty qualifications associated with it. (Paul Baer, Stanford University)	
13-408	A	25	42			With the introduction of the EU-Emissions Trading System, the interactions between emissions trading and the other mitigation instruments gain additional importance. Re-ductions of CO2-emissions of the participants of the ETS, which are achieved by the other instruments, lead to lower prices for allowances within the emissions trading sys-tem. This leads to lower emission reductions within the emissions trading system. Thus the initial reductions of CO2-emissions by the other instruments are offset by lower emissions reductions triggered by the emissions trading system. Sorell and Sijm (2003) and Sijm (2005) argue that under these conditions, a mix of instruments can still be justified, e.g. if the other climate policy instruments are also used to achieve additional goals, or if the instruments help to overcome market imperfections of the trading sys-tem. In a case study for Germany, Walz (2005) demonstrates that the interaction effect between feed-in-tariffs and the EU-ETS can also lead to inefficiencies. The support of renewable electricity leads to lower emissions of electric utilities, and hence lower prices for allowances. Even if the initial emission cap between the trading and the non-trading sectors has been efficient from an ex ante view, with equal marginal abatement costs for both sectors, the reduction in prices for allowances leads to lower marginal abatement costs in the emissions trading sector. Thus, an initial efficient distribution of the national cap between the trading sector and the non-trading sector becomes ineffi-cient ex post. In order to account for this effect, the cap for the trading sectors has to be lower from the beginning. Literature: Sorrell, S. and J. Sijm (2003): Carbon trading in the policy mix, Oxford Review of Economic Policy, 19(3), 420-437. Sijm, J. (2005): The interaction between the EU emissions trading scheme and national energy poli-cies, in: Climate Policy, 5 (1), pp. 79-96 Walz, R. (2005): Interaktion des EU Emissions Trading Systems mit dem Erneuerbaren Energien Gesetz, Zeitschrift für Energiewirt-schaft 29 (4), pp.261-270. (Rainer Walz, Fraunhofer Institute Systems and Innovation Research)	3. Review the references
13-409	A	25	45			Denmark has been succesful in deploying wind turbines only in terms of their number and generation equivalent to about 19% of annual national electricity consumption. But in reality, due to the scale of exports of wind generated electricity to Sweden, Norway and Germany only about 4% of annual Danish electricity consumption is provided by wind energy (2003 data). Furthermore, electricity prices to the consumer have been running at about twice the level prevailing in	4. Edit and cross-reference discussion of Danish program in Chapter 4.

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						much of the rest of Western Europe and support of wind energy has been calculated as between DKr 3,500 billion and 10,000 billion annually. Despite this, Denmark anticipates falling short of its EU emissions bubble commitment under the Kyoto Protocol.The major success has been the creation of a domestic wind power industry. (Michael Jefferson, World Renewable Energy Network/Congresses)	
13-410	A	25	50			A good reference for the Danish system is: Meyer, N. I. (2004): Development of Danish wind power market, in: Energy & Environment, 15 (4), pp. 657-673. Also add with regard to the results for other countries: "In the same line of argument, analysis for the Netherlands, UK, Sweden, Germany and the U.S. (Bergek and Jacobsson 2003; Agterbosch 2004; Foxon et al. 2005; Walz 2006; Jacobsson and Lauber 2006; Astrand and Neij 2006) point to the importance of the various elements of the innovation system for fostering further development of wind turbines." Literature: Agterbosch, S. et al. (2004): Implementation of wind energy in the Netherlands: the importance of the social and institutional setting, in: Energy Policy Vol. 32, pp. 2049-2066; Bergek, A.; Jacobsson, S. (2003): The Emergence of a Growth Industry: A Comparative Analysis of the German, Dutch and Swedish Wind Turbine Industries, in: Metcalf, S; Cantner, U. (eds): Change, Transformation and Development. Physica-Verlag: Heidelberg, pp. 197-227. Foxon, T.J. et al. (2005): UK innovation systems for new and renewable energy systems: drivers, barriers and system failures, in: Energy Policy, Vol. 33, pp. 2123-2137. Walz, R. (2006): The role of regulation for sustainable infrastructure innovations: the case of wind energy in Germany and the U.S., International Journal of Public Policy, Vol. 2 (1). Jacobsson, S.; Lauber, V. (2006): The politics and policy of energy systems transformation - explaining the German diffusion of renewable energy technology, Energy Policy 34 (3), Astrand, K.; Neij, L. (2006): An assessment of governmental wind power programmes in Sweden - using a systems approach, Energy Policy 34 (3). (Rainer Walz, Fraunhofer Institute Systems and Innovation Research)	3. Consider references not related to Danish program for use in this section.
13-411	A	25	51	25	53	The Post-Kyoto Perspectives of the Kyoto Protocol's Instruments (CDM, JI, ET, Bubble) are also largely missing. (Reimund Schwarze, DIW Berlin)	2. This is a note to the reader,
13-412	A	26	6			Section 13.3 has scope to include discussion of the Asia-Pacific Partnership on Clean Development and Climate. It is submitted that to keep the WGIII report as comprehensive and up-to-date as possible this agreement could be used as an	

Chapter-Comment	Batch	From Page	From Line	To Page	To line	Comments	Considerations by the writing team
						example of a climate change agreement that includes the key major emitters (section 13.3.2.2) and is based in technology development and deployment (13.3.2.4). (Spencer Edwards, Australian Greenhouse Office)	
13-413	A	26	9	29	28	The paragraph about experimental analyses of emissions trading system may need a bit of "introduction" (for a suggestion see additional file schleich_experiments.doc; also, the topics covered (market power) are very selective and are far from covering the full range of design options (banking; information problems, uncertainty, market power in product markets...). In any case, given that lessons learnt from other systems can only be transferred within certain limits, it is bit surprising that prior to the implementation of the EU ETS no experiments had been conducted to test the system beforehand. (Joachim Schleich, Fraunhofer Institute Systems and Innovation Research)	3. Should be page 22, line 9. See comment 374
13-412	A	26	6			Section 13.3 has scope to include discussion of the Asia-Pacific Partnership on Clean Development and Climate. It is submitted that to keep the WGIII report as comprehensive and up-to-date as possible this agreement could be used as an example of a climate change agreement that includes the key major emitters (section 13.3.2.2) and is based in technology development and deployment (13.3.2.4). (Spencer Edwards, Australian Greenhouse Office)	Accepted. Will include its existence but no evaluations available yet.
13-413	A	26	9	29	28	The paragraph about experimental analyses of emissions trading system may need a bit of "introduction" (for a suggestion see additional file schleich_experiments.doc; also, the topics covered (market power) are very selective and are far from covering the full range of design options (banking; information problems, uncertainty, market power in product markets...). In any case, given that lessons learnt from other systems can only be transferred within certain limits, it is bit surprising that prior to the implementation of the EU ETS no experiments had been conducted to test the system beforehand. (Joachim Schleich, Fraunhofer Institute Systems and Innovation Research)	Noted. Refers to Page 22, line 9
13-414	A	26	10			Why is this list limited? Does climate policy not interact with energy, R&D, international trade, geopolitics? (Richard Tol, Hamburg University)	Accepted. List extended
13-415	A	26	15	29	27	The function of this section is unclear. There is a large overlap with the later section on criteria for evaluating agreements (13.3.3) and it seems it could be	Accepted. Will be covered by restructuring

						deleted, also because it has some paragraphs (e.g line 31-42 on page 26, 44 (26) to 7 (27) , line 14-21 on page 27, line 6-27 page 29 that do not make sense in the setting provided. relevant material could be moved to 13.3.3 (Bert Metz, IPCC)	
13-416	A	26	16	26	22	Differentitation should be made between drivers of climate change action (environmental goals, moral & religious beliefs, PR) and elements that need to be taken into account when developing climate regimes (equity, competitiveness) (Dian Phylipsen, Ecofys)	Partially accepted. Modified the text, but did not separate, because there is an overlap between the two
13-417	A	26	17	26	29	I think it's fair to say that environmental goals are the primary motivation for climate agreements. They may not be decisive in the shape of the agreement, but they are the main reason for even having such agreements. (Paul Baer, Stanford University)	Accepted
13-418	A	26	17	26	22	Greater emphasis could be given to energy security issues in this paragraph - as a key driver of energy policy, with important impact on emissions outcomes, and important linkages with mitigation approaches. This is mentioned further down the page under the sub-heading. (Kirsty Hamilton, retainer to UK Business Council for Sustainable Energy; Associate Fellow, Chatham House.)	Accepted. Added energy security in the text.
13-419	A	26	28	26	28	A bubble was alsow found in Ehrhart, K.-M., Hoppe, C., Schleich, J., and Seifert, S. (2003): Strategic aspects of CO2-emissions trading: Theoretical concepts and empirical findings, Energy & Environment 14 (5): 579-597. However the "experiments" conducted by Baron (2001) and Ehrhart et al. (2003) were not controlled experiments in the strict sense of experimental economics. Baron had no control group. Ehrhart et al had one control group. On the other hand, the "experiments" by Baron and Ehrhart et al. were conducted with actual decision makers, rather than students. In that sense, they conducted controlled field experiments. (Joachim Schleich, Fraunhofer Institute Systems and Innovation Research)	Noted. Refers to Page 22, line 9
13-420	A	26	30	26	40	Dangerous antropogenic interferance should be presented better. More coordination with WG2 is needed. Some reference to Schneider would be useful too. (Alexander Golub, Environmental Defense)	Accepted. Will be dealt with in restructuring
13-421	A	26	31		42	this section is too specific and the impacts of IAMs on policy making seems overstated; it should focus more broadly on the role of the scientific community /knowledge in the CC policy making (Marcel Berk, Netherlands Environmental Assessment Agency)	Accepted. Text modified
13-422	A	26	32			Why are the Toth studies highlighted? Tolerable Windows are studied in a few papers only. There are many more papers on, say, cost-benefit analysis, and more still on cost-effectiveness analysis, with opposite results. Why are these studies not listed? (Richard Tol, Hamburg University)	Accepted. Inserted reference to TAR discussion on cost benefit analysis.

13-423	A	26	32			Between GHG emissions and associated temperature, there should be "GHG concentration in the atomosphere" to be logically clear about the sequence. (Koji Kadono, Global Industrial and Social Progress Research Institute)	Accepted
13-424	A	26	32	26	36	This section overlaps fully with a similar section op page 31, line 10-13. (Jos Sijm, ECN)	Accepted. Para's merged
13-425	A	26	36	26	37	The original sentence is unclear for me. Reformulate sentence into: Meinshausen et al (2004) has examined the probability of exceeding certain temperatures (and hence environmental damages) if concentration stabilize at specific CO2-equivalent levels. (Michel den Elzen, The Netherlands Environmental Agency)	Accepted.
13-426	A	26	39			"the effect such studies have had" please provide evidence or delete; according to the reviews of Oppenheimer and Tol, WBGU/Hare is the most influential paper, not Meinshausen or Toth (Richard Tol, Hamburg University)	Rejected the comment, not yet in published peer reviewed literature
13-427	A	26	40	26	42	See above. (Shigeo Murayama, The Federation of Electric Power Companies)	"Above" not found
13-428	A	26	40	26	42	It is not appropriate to cite one region's political decision. If the one by the EU is to be included other countries' views on emissions/environmental gols need to be mentioned to be fair and neutral;For example,Japan's economics ministry states in its report "Sustainable future framework on climate change"in 2004 that it is not necessarily constructive to attempt to engage in negotiations toward gaining international agreements on specific values for a long-term target given the state of current scientific knowledge and that even if a target like EU's was set, the GHG concentration corresponding to the target and the emissions scenario for the concentration would considerably vary due to the uncertainties over climate sensitivity(Edmonds 2004) . According to New Zealand government's "Review of climate change policies" published in Nov 2005, NZ has taken no formal position on the desirability of a specific long-term temperature or concentration target in future climate change agreements. Neither has the Canadian government nor the US. (Koji Kadono, Global Industrial and Social Progress Research Institute)	Rejected. The EU is mentioned as it is the only country/group that has made such a statement.
13-429	A	26	40			Significance of discussing on long term targets based on the effects of GHG emissions and associated temperature and climate change impacts has been echoed by the 2nd Interim Report entitled Climate Regime Beyond 2012: Key Perspectives (Long-Term Targets) adopted by the Sub-Committee for International Climate Change Strategy, the Central Environmental Council of the Ministry of the Environment, Japan (which is available by publication as well as at http://www.env.go.jp/en/topic/cc.html). Even though this report has not probably represented the view of the entire Japanese government, it should be worthy being noted because the report is the rare, if not possibly the sole, official report which	We will check the report.

						considered and clearly mentioned such significance of long-term targets outside of European countries. And also expanding support for such long-term targets from some, but important private sectors from the perspective of carbon market and investment should be worthy of being mentioned. For example, UNEP Financial Initiative Working Group composed of experts from major banks and private financial institutions has expressed such support in its recommendations (see UNEP Finance Initiative, CEO briefing, December 2005). (Kenichi Oshima, Ritsumeikan University)	
13-430	A	26	41	26	41	"post kyoto" is a jargon for negotiation and should not be used as it does not convey the right meaning (Kok Kee Chow, Malaysian Meteorological Deparment)	Accepted.
13-431	A	26	42			Also refer to Tol (forthcoming, Energy Policy) (Richard Tol, Hamburg University)	No access to paper.
13-432	A	26	44	27	32	Section on development sits somewhat uncomfortably under 'emissions/ environmental goals'. It could form a specific sub section entitled 'development goals'. The last paragraph is on impacts, which could, together w the need for adaptation, form one of the 'context' subsections: the concern about consequences is an important part of the context. Section 13.3.1. then goes on to competitiveness, and to equity- both of which are given relatively a lot of 'space'. This section should be thoroughly revised, in my view. (Claire Parker, Environmental Policy Consultant)	Accepted. Included subheadings.
13-433	A	26	44	27	7	It seems this is one of the only places where the link between energy policy and climate policy is discussed--surely this is an important point that should be addressed elsewhere, perhaps earlier in the document, and even merits a separate section? There is also very little discussion of renewable energy policy which certainly is considered by many countries (developed and developing) to serve as climate change policy. This raises the question of whether, somewhere in this chapter, there should be a section or table summarizing the types of policy measures discussed in each of the other chapters of this report dealing with various GHG-emitting sectors. (Joanna Lewis, Pew Center on Global Climate Change)	Rejected. Covered in the national policies
13-434	A	26	48			It is always nice to assume that, if a nation or an individual saves money because they buy less fuel, they will spend it on other societal needs, the literature suggests that there will be a "rebound effect" that may actually increase energy consumption. (John Nyboer, Energy and Materials Reseach Group, School of Resource and Environmental Management, Simon Fraser Univeristy)	Rejected, does not belong here. Is covered in chapter 4.
13-435	A	26	0			Prior to the implementation of a new policy instrument, experiments can be conducted to test selected properties. Following the so-called testbedding method, policy instrument is tested in the laboratory, i.e. in a rather realistic but controlled	Noted. Refers to Page 22, line 9

						framework. This explorative approach may also lead to new findings which - because of the complexity of the environment - could not have been derived from theory. For a survey of emissions trading testbedding see, for example, Sturm and Weimann (forthcoming), Mestelman (2000), Muller and Mestelman (1998) and Muller (1999). Prominent objects of past investigations are market power, market organization and design questions (such as banking). Literature: Muller, R. A., Mestelman, S. (1998): What Have We Learned from Emissions Trading Experiments? Managerial and Decision Economics 19(4/5), 225-238. Mestelman, S. (2000): Environmental Policy: Lessons from the Laboratory. Department of Economics, McMaster University. Working Paper. Muller, R.A., 1999. Experimental methods for research into trading of greenhouse gas emissions. Working Paper, Department of Economics, McMaster University, Hamilton. Sturm, Bodo und Joachim Weimann (forthcoming), Experiments in Environmental Economics and some Close Relatives, Journal of Economic Surveys , . (Joachim Schleich, Fraunhofer Institute Systems and Innovation Research)	
13-436	A	26	0			section 13.3.1 is a very unclear section; it is unclear what questions are being addressed; if it is to address the context of international CC agreements one would expect a discussion of characteristics of the problem and its implications for dealing with it at the international level; if it is about what drives making international agreements on CC and the way these are shaped it completely ignores the issue of national and other interests and their role in international climate policy making. Clearly environmental concerns - more than environmental goals - are an important factor, but international equity is much less a clear driver for CC agreements, mainly - like development - a concerns that affects the shape of CC policies. The sections is rather strongly based on an idealistic/normative school of thought in international relations studies; a realistic school of thought would analyse the issue more from a interest-based and power base perspective. More genarally a more clear distinction between drivers and intervening factors in the development of international CC policies should be made. (Marcel Berk, Netherlands Environmental Assessment Agency)	Accepted. Will ask Detlef Sprinz to provide a paragraph on power politics.
13-437	A	27	10	27	10	"post Kyoto agreements" need to be clarified. New protocol or new commitment for second commitment period. (Kok Kee Chow, Malaysian Meteorological Deparment)	Accepted.
13-438	A	27	11			Perhaps include more recent literature citations? (Joanna Lewis, Pew Center on Global Climate Change)	Accepted. Included Bradley and Baumert 2005
13-439	A	27	13	27	21	I don't believe this academic discussion of discouunt rates belongs in this section. (Paul Baer, Stanford University)	Accepted. Deleted para.
13-440	A	27	14	27	21	Point needs further elaboration - unclear as it is (Dian Phylipsen, Ecofys)	Accepted. Deleted para.
13-441	A	27	15			Newell and Pizer is not on timing at all.	Accepted. Deleted para.

						(Richard Tol, Hamburg University)	
13-442	A	27	25			Similarly, a variety of scientists have concluded that damages are minimal below 2-3 degrees. Selective citation. (Richard Tol, Hamburg University)	Accepted. Deleted reference to specific damages at specific temperatures
13-443	A	27	28			The SRES report is not really on impacts. In fact, SRES has been criticised for being unsuitable for impact analysis. (Richard Tol, Hamburg University)	Deleted reference to SRES
13-444	A	27	29			Why only correlated? Why do impacts necessarily driven emission reduction? As impacts are externalities, there is nothing automatic about this. Besides, there is adaptation too. (Richard Tol, Hamburg University)	Accepted. Further explained
13-445	A	27	36			Why increasingly? (Richard Tol, Hamburg University)	Accepted. Deleted “increasilngly”
13-446	A	27	36			I'm not clear on what sorts of effects GHG constraints (or their absence) would show. Local competition between companies should not be affected since all companies in that region would ostensibly be under the same GHG constraint criteria; I can see that demand for their services may change overall and this, in itself, would affect competition, but no more than if demand for services were to change for other reasons not climate related. I only see possible effects of GHG constraints if the competition does not have to bear with similar constraints - an inter-regional or international market, for example. (John Nyboer, Energy and Materials Reseach Group, School of Resource and Environmental Management, Simon Fraser Univeristy)	Rejected. In a real world system there will always be competitiveness concerns.
13-447	A	27	36	28	13	The section discusses the implications of climate policies (namele the EU ETS) on the competitiveness of certain industries. The example used is the cement industry. It may be pointed out that problems of competitiveness on a national level (or within the EU) between companies subject to the EU ETS and those without regulation, either because the companies are too small to be covered by the EU ETS, or because their activities are not covered (but they may produce close substitutes to covered sectors). At the international level, the problem arisis, if there is competition with companies from countries which are not subject to carbon constraints/climate policies. As for the latter, there may be sectors which are hurt more than the cement sector, which exhibits fairly little intl. trade. The steel industry, chemical or alumininum industry (also as large electricity users) are likely to be hurt more. It would be interesting to see empirical evidence on these sectors, provided appropriate literature exists. (Joachim Schleich, Fraunhofer Institute Systems and Innovation Research)	Deleted the specific example on cement.
13-448	A	27	36			This important section needs to be coordinated with Chapter 11, and also to refer to the mainstream literature on competitiveness implicsations of the EU ETS (eg. Carbon Trust (2004), The European Emissions Trading System: implications for	May be included in the EUETS discussion

						industrial competitiveness, www.carbontrust.co.uk, with analysis expanded in the Carbon Trust (2005) report on the UK climate Change Programme. (Michael Grubb, Cambridge University)	
13-449	A	27	36	27	36	Change sentence to say "GHG constraints - and especially the regional differences of such contraints - …" (Andrei Marcu, IETA)	Accepted.
13-450	A	27	46	28	11	The effects on competition of the EU-ETS has been studied in-depth and comprehensively, e.g. http://www.oxera.com/main.aspx?id=239; Capros, Pantelis; Mantzos, Leonidas (2000): The Economic Effects of Industry-Level Emission Trading to Reduce Greenhouse Gases - Use of the model PRIMES, Report to DG Environment, 2000; Peterson, Sonja (2003): The EU Emissions Trading Scheme and its Competitiveness Effects for European Business - Results from the CGE Model DART, Kiel Institute for World Economics, Paper presented at the Joint Research Workshop “Business and Emissions Trading”, Wittenberg, 2003. The given example of the cement sector is miniscule in comparison. (Reimund Schwarze, DIW Berlin)	May be included in the EUETS discussion
13-451	A	27	46	27	47	Indeed there has been expectations from the industry on early mover advantage, but due to the allowance allocation based on absolute historic emissions and unequal treatment of installations, early movers did not reap the expected benefits. (Andrei Marcu, IETA)	Accepted. Reworded.
13-452	A	27	47	28	11	There is an enormous amount of work related to competitiveness effects of EU ETS. Seems quite selective to just pick one random study. Also message of the example is not clear. (Dian Phylipsen, Ecofys)	Accepted. example deleted.
13-453	A	27	47	27	47	We presume the author, might think about e.g. wind energy, but there are more important cases where subsidies rather suport high CO2 intensive production, for example the German subsidies to brown coal mining and power generation. The industry however would look at an effective market instrument versus subsidies. (Andrei Marcu, IETA)	Accepted. Paragraph modified.
13-454	A	27	52	28	11	I belive this level of detail is irrelevant here, particularly since it's just one (presumably very uncertain) modeling study, and at least should be relegated to a footnote. (Paul Baer, Stanford University)	Accepted. example deleted.
13-455	A	27	54	28	7	How relevant is it to discuss about an EU15 trading scheme while it is a EU25 scheme? The total cost to the cement industry and the net buyer / seller position does not only depend on price, it depends on allowance allocation (method and especially total cap), difference in reduction burden to cement industry and other industries, transport prices etcetera. It can be questioned whether with high allowance prices the cement industry would be a significant buyer or become a net importer of cement.	Accepted. example deleted.

						(Andrei Marcu, IETA)	
13-456	A	27	0			This and adjacent pages should be carefully edited by someone who (a) speaks English and (b) has a minimal understanding of mathematics. The language is very sloppy. (Richard Tol, Hamburg University)	Noted.
13-457	A	28	6			50M figure is only meaningful in the context of the cost of meeting the target without emission trading (perhaps as a % reduction). The same applies for the 67M and 99M figures later. (Catherine Beard, Greenhouse Policy Coalition (NGO representing energy intensive sector))	Accepted. Example deleted.
13-458	A	28	7	28	8	The system is today an EU-25 scheme, and the price is around 25 – 27 Euro/ton. We doubt that the accession of Bulgaria and Rumania will cause a 10 Euro/ton price drop. (Andrei Marcu, IETA)	Accepted. example deleted.
13-459	A	28	13	28	52	The discussion of equity is rather shallow. There is no reference made to historical responsibilities, access to technology and impacts of non-equity on many small island states and LDCs. The paragraph on religion is included to patch up the poor percetion of equity. The paragraph shoud indeed adress the difficulties of attaining equity in climate change when the adverse impacts will be worst for least developed countires (Kok Kee Chow, Malaysian Meteorological Deparment)	Accepted, will be revised an placed in introduction
13-460	A	28	15			This is speculative. Please provide evidence or delete. (Richard Tol, Hamburg University)	Rejected. Not speculative. Based on almost every intervention of negotiators of developing countries.
13-461	A	28	16			Seems inconsitency with text on page 54 (line 13-19). (Michel den Elzen, The Netherlands Environmental Agency)	Addressed in the rewrite
13-462	A	28	16			Section 13.3.1.3. I miss some literature about equity principles and the link with a future regime. Suggested text: Many different categorizations of equity principles can be found in the literature and, when not contradictory, cannot in general be easily reconciled (e.g., Banuri et al. (1996); Rose (1998); Ringius et al. (1998; 2002)). Ringius et al. (2002) in search for the politically most salient equity principles for distributive fairness, conclude that three principles stand out as the most relevant elements for a widely accepted regime to target differentiation in future international climate negotiations: • Need: Mitigation efforts or emission ceilings should leave room to eradicate poverty and attain a reasonable standard of living or, in other words, should respect the equal rights of humans to develop. • Capability: mitigation efforts should be distributed in proportion to each country's ability to pay and to its mitigation opportunities. • Responsibility: mitigation efforts should be distributed in proportion to a country's share of responsibility for causing the problem. Den Elzen et al. (2003) have extended this set, with the basic needs	Will be included.

principle as a special expression of the capability principle: i.e. the least capable Parties should be exempted from the obligation to share in the emission reduction effort so as to secure their basic needs.
REFERENCES: Ringius, L., Torvanger, A. and Holtsmark, B. (1998), 'Can multi-criteria rules fairly distribute climate burdens? - OECD results from three burden sharing rules', Energy Policy 26 (10), 777-793.
Ringius, L., Torvanger, A. and Underdal, A. (2002), 'Burden sharing in international climate policy: principles of fairness in theory and practice', International Environmental Agreements: Politics, Law and Economics 2, 1-22.
Rose, A., Stevens, B., Edmonds, J. and Wise, M. (1998), 'International Equity and differentiation in Global Warming policy', Environmental and Resource Economics 12 (1), 25-51.
Den Elzen, M.G.J., Berk, M.M., Lucas, P., Eickhout, B. and Vuuren, D.P. van, 2003. Exploring climate regimes for differentiation of commitments to achieve the EU climate target. MNP-report 728001023, Netherlands Environmental Assessment Agency (MNP), Bilthoven, the Netherlands

(Michel den Elzen, The Netherlands Environmental Agency)

13-463	A	28	16	Other missing literature on equity principles and link post-2012 regimes, see: Ringius, L., Torvanger, A. and Holtsmark, B. (1998), 'Can multi-criteria rules fairly distribute climate burdens? - OECD results from three burden sharing rules', Energy Policy 26 (10), 777-793.; Ringius, L., Torvanger, A. and Underdal, A. (2002), 'Burden sharing in international climate policy: principles of fairness in theory and practice', International Environmental Agreements: Politics, Law and Economics 2, 1-22.; den Elzen, M.G.J. and Berk, M.M., 2003. How can the Parties fairly and effectively establish future obligations under long-term objectives? In: D. Michel (Editor), Climate policy for the 21st century: meeting the long-term challenge of global warming. Center for Transatlantic Relations, Washington, D.C., pp. 79-112.; Höhne, N., Phylipsen, D., Ullrich, S. and Blok, K., 2005. Options for the second commitment period of the Kyoto Protocol, research report for the German Federal Environmental Agency. Climate Change 02/05, ISSN 1611-8855, available at www.umweltbundesamt.de, ECOFYS Gmbh, Berlin. Ringius, Lasse, Torvanger, Asbjorn and Holtsmark, Bjart, 1998. Can multi-criteria rules fairly distribute climate burdens? OECD results from three burden sharing rules. Energy Policy, 26(10): 777-793.; Torvanger, A. and Godal, O., 2004. An evaluation of pre-Kyoto differentiation proposals for national greenhouse gas abatement targets. International Environmental Agreements: Politics, Law and Economics, 4(65-91). Torvanger, Asbjorn and Ringius, Lasse, 2002. Criteria for Evaluation of Burden-sharing Rules in International Climate Policy. International Environmental Agreements: Politics, Law and Economics, 2(3): 221-235.; den Elzen, M.G.J. and	Will be accomodated

						Lucas, P., 2005. The FAIR model: a tool to analyze environmental and costs implications of climate regimes. Environmental Modeling and Assessment, 10(2): 115-134; (Michel den Elzen, The Netherlands Environmental Agency)	
13-464	A	28	22	28	25	many concepts are introduced without any explanation (Dian Phylipsen, Ecofys)	Will be rewritten
13-465	A	28	24			Dworkin (Richard Tol, Hamburg University)	Accepted.
13-466	A	28	32	28	33	partial paricipation is violation of equity' - quite controversial statement to make without any further explanation. Some will argue that equity considerations would actually results in some parties not participating (yet), e.g. sub-saharan africa. (Dian Phylipsen, Ecofys)	Will be rewritten
13-467	A	28	32	28	45	On this paragraph, we suggest to add the following information: “Another strand of the same literature does not analyse the formation of coalitions of countries but, using cooperative game theory, focuses on the stability (coalitional rationality) of the grand coalition (the global agreement). Chander and Tulkens (1997) show that the global agreement can be sustained, providing that specific transfers are implemented. Using the RICE model in a similar set-up, Germain and van Steenberghe (2003) then look at how much alternative so-called equitable permits allocations rules (such as per-capita, grandfathering, …) need to be modified in order to ensure that the global agreement is profitable to each country. They find that the deviation from the initial allocation rule is usually large, except for the grandfathering rule.” PLEASE SEE THE REST OF THE COMMENT IN COMMENT 25 (Peter Wittoeck, Belgian Federal Administration)	Rewrite with paragraph on game theory
13-468	A	28	32	28	45	(COMMENT 24 - Continued): Please note that much more could be said on this topic. On the differences between the non-cooperative (see Carrraro and Siniscalco (1993)) and the cooperative game theory approaches to climate change agreements, see Tulkens (1998). Such a discussion could be included in a sub-section of section 13.3.3.4 Political feasibility and could be named: Stability. References: -Chander, P. and H. Tulkens (1997), "The Core of an Economy With Multilateral Environmental Externalities", International Journal of Game Theory 26, 379-401 -Germain, M. and V. van Steenberghe (2003), “"Constraining equitable allocations of CO2 emission quotas by acceptability", Environmental and Resource Economics 26 (3) 469-492. -Tulkens (1998), "Cooperation vs. free riding in international environmental affairs: two approaches", chapter 2 (pp. 330-44) in N. Hanley and H. Folmer (eds), Game Theory and the Environment, Elgar, London, 1998. (Peter Wittoeck, Belgian Federal Administration)	Rewrite with paragraph on game theory

13-469	A	28	32	28	33	This comment about "non-participation implies some violation of equity" is unhelpfully vague. It doesn't distinguish between the participation of those (like the US) who would have obligations to pay globally under (say) Kyoto, and countries (like China and India) who would not. (Paul Baer, Stanford University)	Considered in rewrite
13-470	A	28	32	28	35	It is worth pointing out that the reason that not all countries have economic incentives to participate is because countries can currently externalize the harm caused by their pollution onto other countries. Thus the current global situation violates fundamental notions of justice and equity. (Paul Baer, Stanford University)	Considered in rewrite
13-471	A	28	40	28	40	"…"lose" by ratifying the agreement" - this is RICE model problem. RICE model understates economic damages. Therefore it understates benefits too. New version of RICE model is expected to be out this summer. Also, RICE model doesn't include other elements of international trade. (Alexander Golub, Environmental Defense)	Considered in rewrite
13-472	A	28	43	28	44	'equity principles' - not clear that this refers to so-called 'sub-elements' mentioned before (Dian Phylipsen, Ecofys)	Considered in rewrite
13-473	A	28	43	28	44	What/where are the "above equity principles"? (Paul Baer, Stanford University)	Considered in rewrite
13-474	A	28	46	28	46	There is no reason to think that need would lead to equal per capita allocations; quite the contrary. (Paul Baer, Stanford University)	Considered in rewrite
13-475	A	28	52			Why is the work by Muller, Rose and Tol ignored? (Richard Tol, Hamburg University)	No access to paper. If old paper then in the TAR
13-476	A	28	52			Since 1988 the World Council of Churches has been very active in addressing climate change issues from an equity and distributive justice perspective via its Climate Change Programme and Working Group on Climate Change. See also David G. Hallman, Spiritual Values for Earth Communities, WCC Publications, Geneva, 2000 and http://www.wcc-coe.org/wcc/what/jpc/earthdocs.html#cc (Gert de Gans, Kerkinactie)	Considered in rewrite
13-477	A	28	52			not sure what 'this community' refers to. It would be good to see both 'moral' and 'religious' concerns mentioned, as separate but complementary elements. (Claire Parker, Environmental Policy Consultant)	Considered in rewrite
13-478	A	29	13			and the type of cooperation (not the degree) (Claire Parker, Environmental Policy Consultant)	Need to check paper
13-479	A	29	14			what is meant by compensation? (Dian Phylipsen, Ecofys)	Need to check paper
13-480	A	29	19	29	23	text not understandable (Dian Phylipsen, Ecofys)	Moved to 13.4.1.1 and revised

13-481	A	29	31	29	41	It might be stressed here that experience from other international instruments/ agreements can be used in analysing elements of cliamte change agreements. In the rest of section 13.3.2 more on these other agreements should be said (now only in lines 7-22 on page 35). (Bert Metz, IPCC)	Additional reference to be added. Space constraints limit full discussion.
13-482	A	29	33			Tol and Verheyen do not evaluate any agreement. They look at liability for impacts. How many more paper did you cite without having read them? (Richard Tol, Hamburg University)	Deleted reference
13-483	A	29	35	29	36	I fully agree that agreements related to climate change but not specifically focused on GHG mitigation are a research subject greatly understudied. (Reimund Schwarze, DIW Berlin)	Noted
13-484	A	29	0			The structuring of elements used in section 13.3.2 and also included in textbox 13.4 acomplicates the analyses in this chapture of regime approaches: this is because it attemps to discuss under actions both types of commitments as well as regimes approches, while the later generally extend beyond the issue of actions, including elements of participation and allocation related to equity and efficiency concerns.It is there for advised to first discuss possible goals, then types of commitments and then include partication in discussing regime approaches. The later might be combined with equity issues under the element of "differentiation of commitments". (Marcel Berk, Netherlands Environmental Assessment Agency)	Reverse order.
13-485	A	30	1	30	5	Box 13.4. For the consistency of the text it would be better to use the sequences and the different headings here, the same as the headings of the sections in the text. (Michel den Elzen, The Netherlands Environmental Agency)	Accepted
13-486	A	30	1	30	5	Box 13.4. Actions replace by types of commitments (Michel den Elzen, The Netherlands Environmental Agency)	Rejected. Kept “actions” because it is broader
13-487	A	30	7	30	7	Section 13.3.2.1. Goals what is the relationship between this section and 13.3.1.1. I do not understand this (Michel den Elzen, The Netherlands Environmental Agency)	Issue addressed. Merged sections.
13-488	A	30	7	32	48	For the discussion of goals it should be made clear what the difference is between long-term goals (art 2, how useful? Can it be operationalised? etc) and short term goals (targets and timetables; this is covered in 13.3.2.3). On the first, the question how important long-term goals are for an agreement and if they are effective, is not addreessed well. The treatment on long-term targets is mainly focussing on concentration or temperature targets, with a brief reference to "hedging approaches". Cost-benefit approaches are not mentioned (be careful, chapter 1 and 3 also address these issues to some extent). Numbers on redutions required for different stabilisation levels (and the risk of overshooting temperature targets) are covered in ch 3 ; no need to repeat that here. Referencing is ok. (Bert Metz, IPCC)	Accepted. Added para .

13-489	A	30	8	32	49	Under this para "Goal", the authors have carried out a thorogh research to conclude the limitation of 2 deg temperature increase. This good stuff should rightly be included in WGI report. Since this is a chapter on polices and instrument and cooperative measures, material related to goal shoudl be restcited to policy and not scientfic modelling outcomes. (Kok Kee Chow, Malaysian Meteorological Deparment)	Rewritten so that comment no longer applies. This discussion on 2°C is now only in Chapter 3.
13-490	A	30	9			In addition to the elements already pointed out in Box 13.4, International Relations literatures often point out the importance of "norm" and "decision-making procedure" as elements for international agreements. Particularly important may be "decision-making procedure" in the context of the Assessment Report and of the chapter. Conventions and agreements have different decision-making rules and procedures, which also affects the results (such as goals and actions). Also important is financial mechanisms. As it sometimes is financial mechanisms that create issue linkage and inter-linkages between various multilateral environmental agreements, pointing out financial mechanisms here is particularly important. GEF is a very good example for this. As GEF is a financial mechanism to four of the conventions in Table 13.3, it can create, and has already created inter-linkages between MEAs at a project (or implementation) level, which, in turn, creates efficiency of climate governance. Such a linkage can eventually create forces to change decision-making procedure as well. Therefore, financial mechanism and decision-making procedure should be included as one of the important elements for climate change agreements. (Norichika Kanie, Tokyo Institute of Technology)	Accepted. Clarified in the box and included under institutions.
13-491	A	30	17	31	7	The same comment as above. Plus, repetition of the EU's 2-degree target is not necessary or relevant in view of the character of the IPCC report. (Koji Kadono, Global Industrial and Social Progress Research Institute)	Moved 2°C, so comment no longer relevant
13-492	A	30	17	31	7	See above. (Shigeo Murayama, The Federation of Electric Power Companies)	“Above” was not found
13-493	A	30	0			Text box 13.4 - pretty much an open door (Dian Phylipsen, Ecofys)	Noted.
13-494	A	30	0			The section on goals is rather unbalanced starting with specific stabilisation oriented targets and then indicating that there are various options for defining goals. It would seem more logical to first set out the various approaches to climate policy target setting and then elaborate on these. These include in fact a broader range: 3 top-down approaches: (1a) setting a long-term temperature or concentration stabilisation target and than deduct (costs-effective) pathways to meeting them (this includes the Safe landing analyses and TWA), (2) a cost-benefit approach where the optimum pathway is determined on the basis of discounted cost and benefits.(3) taking a probabilistic approach or a hedging approach where short-term actions are based on the changes of forclosing options;	Added the elements in the existing structure

						Next there are two more bottom-up approaches: (1) action on the basis of willingness to pay, and (2) technology oriented targets that don't focus on environmental goals. This section thus misses economic and technology oriented approaches (Marcel Berk, Netherlands Environmental Assessment Agency)	
13-495	A	31	5			See also Tol (forthcoming, Energy Policy). In this context, it may be worthwhile to remind the reader of the Lisbon Agenda, milk and olive quota, the Growth and Stability Pact and other paper tigers from Europe. (Richard Tol, Hamburg University)	Text moved, comment no longer relevant.
13-496	A	31	6			it would be important to mention when these statements were made (Claire Parker, Environmental Policy Consultant)	Accepted.
13-497	A	31	9	31	29	This chapter is not supposed to discuss targets. In addition the description of 2 degree and the concentration levels to achieve that temperature without showing the cost here may mislead the readers to think 2 degrees are appropriate. Target should be decided politically. Therefore delete whole sentences discussing any particular figures (such as 2 degrees). (Mitsutsune Yamaguchi, Teikyo University)	Text moved, comment no longer relevant.
13-498	A	31	9	31	32	these two paragraphs are obviously interlinked by their content but there is some unnecessary (and somewhat unclear) repetition- the last sentence of the first para. should probably be left out in favour of the secons sentence of the second para. Moreover, see next comment, the content gets repeated later on. (Claire Parker, Environmental Policy Consultant)	Text moved, comment no longer relevant.
13-499	A	31	9	31	18	Overlap with section 13.3.1.1 (Dian Phylipsen, Ecofys)	Modified
13-500	A	31	10			Again, you single out tolerable windows, which is a minority opinion in the literature. (Richard Tol, Hamburg University)	Modified
13-501	A	31	10	31	35	The problem of overshooting concentration should be discussed here with the reference to Schneider. (Alexander Golub, Environmental Defense)	Text moved, comment no longer relevant.
13-502	A	31	13	31	18	Other results of the analysis than that of 2degrees should also be presented. Otherwise, it may be regarded as policy-prescriptive that the text suggests 2degrees be a long-term target. (Koji Kadono, Global Industrial and Social Progress Research Institute)	Text moved, comment no longer relevant.
13-503	A	31	13	31	18	It might not be proper to show the case of 400ppm as a representative example, because some authors have shown a range of 400 to 550 ppm to restrict the temparature increase below 2 degree and the case of 400ppm could be an extreme one. (Shigeo Murayama, The Federation of Electric Power Companies)	Text moved, comment no longer relevant.
13-504	A	31	15	31	15	Include also; den Elzen, 2002; Reference: Den Elzen, M.G.J., 2002. Exploring	Text moved, comment no longer relevant.

						climate regimes for differentiation of future commitments to stabilise greenhouse gas concentrations. Integrated Assessment, 3(4): 343-359 (Michel den Elzen, The Netherlands Environmental Agency)	
13-505	A	31	16	31	16	Change: Den Elzen and Meinshausen, 2005b into Den Elzen and Meinshausen, 2006. Reference: den Elzen, M.G.J and Meinshausen, M., 2006. Multi-gas emission pathways for meeting the EU 2 C climate target. In: H.J. Schellnhuber, W. Cramer, N. Nakicenovic, T. Wigley and G. Yohe (Editors), Avoiding Dangerous Climate Change. Cambridge University Press, Cambridge, UK. (Michel den Elzen, The Netherlands Environmental Agency)	Text moved, comment no longer relevant.
13-506	A	31	17	31	18	Reformulate sentence into: In his analysis, in order to limit temperature change to 2 C or less with a probability of 80% or more, concentrations needs to stabilize at about 400 ppm CO2-equivalent. (Michel den Elzen, The Netherlands Environmental Agency)	Text moved, comment no longer relevant.
13-507	A	31	17	31	18	Note that this says "his" when one of the citations is Hare and Meinshausen; also, it is not that concentrations can't rise above 400 ppm CO2 e, it is that they must be stabilized at or below 400 CO2 e. The next paragraph addresses the overshoot conditions. Note: My dissertation came to the same conclusion (Baer 2005, see citations attached) (Paul Baer, Stanford University)	Text moved, comment no longer relevant.
13-508	A	31	20	31	32	Suggest reformulation to specify the needed global emission reductions in more detail, to make the following steps. 1. First specify concentrations needed to meet 2 degree 2. To calculate the resulting global emission reductions, and then to calculate the regional emission implications. Finally, you may also need to say something about the regional costs implications. Therefore, suggested text; In order to meet the 2 degree target, global emissions need to peak around 2015-2020 in order to avoid global reduction rates exceeding more than 2.5%/year, followed by substantial overall reductions by as much as 30 to 60% in 2050 compared to 1990 levels (den Elzen and Meinshausen, 2005; Meinshausen et al., 2005). (Michel den Elzen, The Netherlands Environmental Agency)	Text moved, comment no longer relevant.
13-509	A	31	20	31	27	A "2 degrees" target is mentioned again. It seems the same author's work is provided repeatedly, namely that of Meinshausen. Other views by different authors are needed to secure a neutral assessment that the IPCC is supposed to make. (Koji Kadono, Global Industrial and Social Progress Research Institute)	Text moved, comment no longer relevant.
13-510	A	31	20	31	27	These sentences describe the concentration levels under the assumption of the 2 degC limit. Other global mean temperature levels correspond to the other concentration levels. If the sentences are described, other concentration levels under other global mean temperature targets should also be described. However, I think that the sentences are not appropriate from the chapter and section titles, and therefore, recommend rather deleting the sentences. (Keigo Akimoto, Resaerch Institute of Innovative Technology for the Earth	Text moved, comment no longer relevant.

						(RITE))	
13-511	A	31	20	31	32	Another example of the emission pathways is provided by Yasuaki Hijioka by AIM Impact [policy], a policy support tool for the comprehensive analysis of global warming control targets. The anaysis has shown that 475ppm Co2-eq stabilization is needed in order to reach 2C target. (Norichika Kanie, Tokyo Institute of Technology)	Text moved, comment no longer relevant.
13-512	A	31	20	31	32	Businesses looking for forward clarity on climate policy, tend to support clear goals across a material timeframe (ie not the five year 'Kyoto' period) eg out to 2020-2025, for example Defra (2005) Business Insights, other references. There are several references available to recent business views in this area, and may also be relevant to the analysis of emissions trading 13.3.2.3.3, given the linkage between Kyoto compliance and the EU ETS. (Kirsty Hamilton, retainer to UK Business Council for Sustainable Energy; Associate Fellow, Chatham House.)	Accepted point. In new text.
13-513	A	31	21			I'm not sure that this chapter should discuss this at all. If you do, please refer the authoritative study of EMF21. (Richard Tol, Hamburg University)	Text moved, comment no longer relevant.
13-514	A	31	23	31	24	Meinshausen et al. (2005) and den Elzen and Meinshausen (2006) conclude that lower concentration stabilization targets (ranging from 400to 450 ppm CO2-eq.). Reference: Meinshausen, M., 2006. What Does a 2 C Target Mean for Greenhouse Gas Concentrations? A Brief Analysis Based on Multi-Gas Emission Pathways and Several Climate Sensitivity Uncertainty Estimates. In: H.J. Schellnhuber, W. Cramer, N. Nakicenovic, T. Wigley and G. Yohe (Editors), Avoiding Dangerous Climate Change, Cambridge, UK. (Michel den Elzen, The Netherlands Environmental Agency)	Text moved, comment no longer relevant.
13-515	A	31	25			Why is this discussion limited to a single target? Suggestive example. (Richard Tol, Hamburg University)	Text moved, comment no longer relevant.
13-516	A	31	26	31	27	concentrations may first increase to an ‘overshooting’ concentration level up to 480 or 500ppm before stabilizing at 400 or 500ppm CO2-equivalet, respectively. (Michel den Elzen, The Netherlands Environmental Agency)	Text moved, comment no longer relevant.
13-517	A	31	27	31	29	Allowance are made for overshooting in part to attempt to avoid drastic, immediate reductions in the present emission pathways, but also as a direct result of the already substantial concentration levels. (Michel den Elzen, The Netherlands Environmental Agency)	Text moved, comment no longer relevant.
13-518	A	31	37	31	37	One option is a long-term greenhouse gas concentration or temperature stabilization level. (Michel den Elzen, The Netherlands Environmental Agency)	Accepted.
13-519	A	31	37	31	37	long term goal of stabilization is desired (e.,g., den Elzen et al., 2005). Reference: den Elzen, M.G.J., Höhne, N., Brouns, B., Winkler, H. and Ott, H E., 2005c. Differentiation of countries’ future commitments in a post-2012 climate regime. An	Accepted. Added reference

						assessment of the “South–North Dialogue” Proposal. Global Environmental Change (submitted). (Michel den Elzen, The Netherlands Environmental Agency)	
13-520	A	31	40			to gain a wider (or global) agreement….- as the EU already has such an agreement (Claire Parker, Environmental Policy Consultant)	Accepted.
13-521	A	31	40	31	41	see later at p32 lines 45-48. (Andrew Dlugolecki, university of east anglia)	Noted.
13-522	A	31	42	31	47	There are also many advantage of setting a long-term target, as discussed in Pershing and Tudela, 2003; may be this need to be described briefly here. (Michel den Elzen, The Netherlands Environmental Agency)	Accepted, added.
13-523	A	31	43	31	47	A more important disadvantage is that unless the individual "action targets" were set with some reference to allowable emissions/concentrations, there is no way of claiming that they would have any identifiable likelihood of preventing catastrophic climate impacts. (Paul Baer, Stanford University)	Accepted.
13-524	A	31	44			It is simply unrealistic to refer to the elimination of carbon emissions from the energy sector by 2060, and to do so undermines the credibility of the chapter and 4AR. (Michael Jefferson, World Renewable Energy Network/Congresses)	Rejected. Example from literature.
13-525	A	31	49	31	54	Isn't hedging an operationalisation of the safe landing concept or they earlier mentioned tolerable windows approach? (Dian Phylipsen, Ecofys)	Rejected. These are distinct concepts.
13-526	A	31	54	31	54	Add: Such maximum quantity of permissible greenhouse gas emissions can be based upon uniform or regional PSRs (Performance Standard Rates) for industrial sectors globally taking into account the enduse growth (Schyns, 2005 b and d). (Vianney Schyns, DSM & SABIC)	Rejected. Too detailed and not exclusive.
13-527	A	32	5	36		The discussion here is under the broader heading "Elements of international agreements and related instruments", yet it is practically exclusively concerned with schemes of differentiation and graduation of (absolute) Kyoto-style emissions targets. It is important to realise that there are possibilities for international agreements and instruments other than emissions targets and trading, as discussed in other parts of the chapter, and link back to that discussion. The existing text would perhaps fit better under a heading "possible futures of the Kyoto Protocol". Related to this, Box 13.5 uses the heading "future architectures of international climate agreements" but lists four different systems of differentiating future emissions targets. Future architectures cover a much broader scope than that. (Frank Jotzo, Australian National University)	Taken on board restructuring
13-528	A	32	11	32	21	this is a more thorough treatment of the information given in the two paragraphs to which the previous comment refers. Section should be rationalised. See next comment	

						(Claire Parker, Environmental Policy Consultant)
13-529	A	32	11	32	21	There is also an attempt to introduce scenario planning approach to emission allocations in the future climate regime. The approach introduces scenarios for future international relations and looks at possible international regimes in the respective scenarios, thereby trying to calculate the allocation among nations. See for example, “Backcasting from 2050”, Research Project on Establishing of Methodology to Evaluate Middle to Longterm Environmental Policy Options toward Low Carbon Society in Japan", December 2005, a report distributed at COP/MOP. http://2050.nies.go.jp/index_e.html (Norichika Kanie, Tokyo Institute of Technology)
13-530	A	32	12	32	15	Suggest to drop the last part of the sentence, which is; "including the EU goal of limiting----level to 2C". (Koji Kadono, Global Industrial and Social Progress Research Institute)
13-531	A	32	12	32	19	There are a lot of analyses for the CO2 concentration target at 550 ppmv (corresponds to around 2.5 degC). If the sentences are described, the literatures relating other CO2 concentration or other temperature levels should also be described. However, I think that the sentence is inappropriate from the chapter and section titles, and therefore, recommend rather deleting the sentences. (Keigo Akimoto, Resaerch Institute of Innovative Technology for the Earth (RITE))
13-532	A	32	12		47	this section does not fit here: it discusses not just (global) targets, but also issues of allocation and participation already; as indicated before I would suggest to reorganise the sections in this chapter. In any case , the approaches to allocation discussed only concern allocation rule-based approaches and not outcome based approaches. (Marcel Berk, Netherlands Environmental Assessment Agency)
13-533	A	32	15			Why are there so few papers by economists in this list? People like Boehringer, Carraro, Edmonds, Fisher, Nordhaus, Richels, Tol have done studies like this. (Richard Tol, Hamburg University)
13-534	A	32	15			Again, you single out a particular target. The IPCC should assess the literature in an even-handed and neutral way. This is abuse of your position. (Richard Tol, Hamburg University)
13-535	A	32	15	32	18	You are citing many studies, but all these studies have their own, specific, interesting findings. I would include more of these findings in this section. I think this is also inconsistent with the rest of the Chapter, as there you see that some studies are cited in much more detail. (Michel den Elzen, The Netherlands Environmental Agency)
13-536	A	32	28	32	48	this set of conclusions is clear and user- friendly and should replace earlier treatment (Claire Parker, Environmental Policy Consultant)

13-537	A	32	29			Again, you highlight a particular target. What is your stake in this? (Richard Tol, Hamburg University)	Will be rewritten to include more options
13-538	A	32	29	32	42	Suggest to drop the two paragraphs. As mentioned above many times, a 2-degree target is not the only option decision makers could take. Therefore, it is irrelevant to provide the conclusions like this that are based on the 2-degree target. It is policy-prescriptive. (Koji Kadono, Global Industrial and Social Progress Research Institute)	Will be rewritten to include more options
13-539	A	32	29	32	42	Deletion suggested (to avoid any misunderstandings). Refer to my comment on page 31 lines 9-29. (Mitsutsune Yamaguchi, Teikyo University)	Will be rewritten to include more options
13-540	A	32	34			To seriously consider studies which require of the developing countries up to a 90% emissions reduction from 1990 levels by 2050 again is unrealistic and undermines credibility. (Michael Jefferson, World Renewable Energy Network/Congresses)	Commentator misunderstood the text.
13-541	A	32	37			And again, you highlight the same target. Is the an IPCC chapter or a policy document by the European Commision? (Richard Tol, Hamburg University)	Will be rewritten to include more options
13-542	A	32	45	32	48	this is a key point. Should be referred to under p 31 lines 40-41. (Andrew Dlugolecki, university of east anglia)	Done
13-543	A	32	46			Why is the list capped at 650 CO_2eq? The literature ranges to 750 CO_2. (Richard Tol, Hamburg University)	Accepted.
13-544	A	32	50	38	28	These sections are not well-organised. Reference to other fora than UNFCCC and KP should be made(for example, the Asia-Pacific Partnership on Clean Development and Climate). (Koji Kadono, Global Industrial and Social Progress Research Institute)	Added. Figure 13.5 deleted.
13-545	A	32	50	33		According to the scenario planning approach for future international relations and climate regime, idealism and realism decides the direction of future international efforts on the one hand, and individualism and communitarianism becomes another axis to determine the direction of future climate regime. This approach provides with another perspective to categolize emissions allocation schemes. See for example, “Backcasting from 2050”, Research Project on Establishing of Methodology to Evaluate Middle to Longterm Environmental Policy Options toward Low Carbon Society in Japan", December 2005, a report distributed at COP/MOP. http://2050.nies.go.jp/index_e.html (Norichika Kanie, Tokyo Institute of Technology)	Noted.
13-546	A	32	50	35	22	The section on participation lacks clear conclusions. (Bert Metz, IPCC)	Added conclusind para
13-547	A	32	0			the section on participation is hampered by the fact that participation is related to the allocation/differentiation of commitment issues and difficult to separate (Marcel Berk, Netherlands Environmental Assessment Agency)	Noted, but disagreed

13-548	A	32	0			Footnote 26 - it should be pointed out that 450 ppm CO2 only would keep temperature increase below 2ºC if the climate even if there is no additional forcing only if the climate sensitivity is below 3ºC, which is roughly even odds; with even modest non-CO2 forcings (e.g., 50 ppm CO2-e), 450 ppm CO2 will keep temperature increase below 2ºC only if the climate sensitivity is below 2.3ºC, which is well below median estimates. Thus why 450 is used as a proxy is something that should be explained. See Baer and Athanasiou (2004) and Baer (2005). (Paul Baer, Stanford University)	Text adapted to speak only of concentrations.
13-549	A	33	7			Figure 13.5 and 13.6 are reversed. (John Nyboer, Energy and Materials Reseach Group, School of Resource and Environmental Management, Simon Fraser Univeristy)	Noted
13-550	A	33	8			Should this be Torvanger, A., M. Twena and J. Vevatne (2004), Climate policy beyond 2012 - A survey of long-term targets and future frameworks, Report No. 2, CICERO, Oslo? (Asbjørn Torvanger, CICERO)	Accepted.
13-551	A	33	9			the results of the Pew Centre's Pocantico dialogue could be added to those mentioned (Claire Parker, Environmental Policy Consultant)	Idea of major emitters group included
13-552	A	33	10	33	24	Kazakhstan experience could be explored more here. This experience highlighted the problem of the absence of mechanism to negotiate Annex B target. (Alexander Golub, Environmental Defense)	Accepted.
13-553	A	33	11	33	24	In the discussion of "groups" it should be noted that such groups could fall around various allignments such as developing/developed coutries, geographical regions, etc. but most importantly, groups tend to be formed to allign with interests with respect to the international agreement. The paragraph could discuss the divisions in the UNFCCC, and then discuss the literature highlighting other interest groups that could be formed around this issue: e.g. trade partners could allign to address competitiveness concerns, countries in certain ecological impact zones could allign for adaptation agreements, etc. (Joanna Lewis, Pew Center on Global Climate Change)	Accepted.
13-554	A	33	11	34	8	It is necessary to examine other examples. See, Kameyama, Yasuko (2004), "Future Climate Regime: A Regional Comparison of Proposal", International Environmnetal Agreements: Politics, Law and Economics 4: pp.307-326. NIES/IGES (2005), The Future Climate Regime: Using Scenario Planning Approach to Develop Options, NIES/IGES Research Project Final Report. (Masatake Uezono, Citizens' Alliance for saving the Atmosphere and the Earth)	No but already covered.
13-555	A	33	19			those whose geographical borders changed' is incorrect 'adding newly formed States and deleting those that had ceased to exist' ? (Claire Parker, Environmental Policy Consultant)	Noted

13-556	A	33	25	33	38	Blok, K., N. Høhne, A. Torvanger, and R. Janzic (2005), Towards a post-2012 climate change regime - Final report, 3E, Brussels (http://europa.eu.int/comm/environment/climat/pdf/id_bps098.PDF) could be referred to. (Asbjørn Torvanger, CICERO)	Not included.
13-557	A	33	28			Torvanger et al. 2005 missing in ref.list. (Asbjørn Torvanger, CICERO)	To check
13-558	A	33	29			There is no Multi-stage by RIVM only by Berk and Den Elzen (Marcel Berk, Netherlands Environmental Assessment Agency)	Reworded, No more relevant
13-559	A	33	33	33	34	It seems unreasonable to suggest on the basis of one author's review that "trade sanctions may be too strict". Given what's really at stake - that countries are asserting the right to ignore the harms that their actions are causing to other countries - that the strongest possible international sanctions might be worth considering. (Paul Baer, Stanford University)	To be weakened
13-560	A	33	40	33	47	See also the multi-track approach discussed in "Beyond 2012: Report of the Climate Dialogue of Pocantico" published by the Pew Center. (Joanna Lewis, Pew Center on Global Climate Change)	Idea of major emitters group included
13-561	A	33	49	35	22	I am missing a section on the responsibility approach. A reference missing is: Rive, N., A. Torvanger, and J.S. Fuglestvedt (2006), Climate agreements based on responsibility for global warming: Periodic updating, policy choices, and regional costs, accepted for publication in Global Environmental Change. (Asbjørn Torvanger, CICERO)	Check reference
13-562	A	33	49	34	8	The triptych approach belongs to this "single type of commitment"approach as well; note that this approach is include in textbox 13.5, but not mentioned in the text itself. (Marcel Berk, Netherlands Environmental Assessment Agency)	To be considered in the rewrite of box
13-563	A	33	54	33	54	Criticism of the Contraction and Convergence concept can be found in IEA 2002, IEA 2005 and Philibert 2005, more explicitely than in Philibert and Pershing (IEA 2002, Beyond Kyoto; IEA 2005, Act Locally Trade Globally, IEA/OECD, Paris; Philibert, Cédric, 2005, Approaches to future international Co-operation, OECD and IEA Information Paper, Paris) (Cédric Philibert, International Energy Agency)	Take one reference
13-564	A	34	5			The sentence with Bode is grammatically incorrect. (Richard Tol, Hamburg University)	Reworded
13-565	A	34	5	35		[Same comment as for Ch13 p.54] It would be useful to refer to analysis that questions the political realism of normative schemes for differentiation of targets for equity objectives. For example, Baumert et al.(2003) argue that North-South equity concerns cannot be fully addressed through differentiated targets under emissions trading. REFERENCE: Baumert, K. A., Perkaus, J. F. and Kete, N.	Comment taken into account under “actions”

						(2003), "Great expectations: can international emissions trading deliver an equitable climate regime?" Climate Policy 3: 137-148. (Frank Jotzo, Australian National University)	
13-566	A	34	5	34	6	sentence reflecting Bode's findings is unclear (Claire Parker, Environmental Policy Consultant)	Reworded
13-567	A	34	5	34	5	text does not read well (Andrew Dlugolecki, university of east anglia)	Reworded
13-568	A	34	8			Another proposal to equal per capita allocations has been to divide the intrinsic capacity of the earth to absorb carbondioxide from the air (roughly 12 billion tons per year) among all world inhabitants (based on the reference year 1990, about 6 billion people) in combination with a CO2-tax above this footprintlevel. (See Hallman, Spiritual Values for Earth Communities, WCC Publications, Geneva, 2000, page 78). (Gert de Gans, Kerkinactie)	Included at other place
13-569	A	34	8	34	8	Add: The disadvantage of a per capita approach is that nations with a favourable score (China, India, Brazil, etc.) acquire a competitive advantage for their industries active on global markets. Given the fact that technologies are readily available globally, producers in developed nations are confronted with a competitive disadvantage even when they have a same excellent enviromental performance. Therefore alternatively, a global trading scheme based on PSRs (Performance Standard Rates, efficiency requirements per unit of output) is proposed (Schyns, 2005 b, c and d). As a transition for 10-20 years, regional PSRs can be applied (for EU-25, USA + Canada, China, India, etc.). Care should be taken for globally traded goods and timely adjustments should be made in case of (unexpected) distortions of trade flows. For sectors outside the trading scheme (households, transportation, etc.) states should adopt relative targets of emissions similarly based on indicators such as GDP per capita, taking into account the projected growth and the need to achieve absolute reductions. (Vianney Schyns, DSM & SABIC)	Issue of critique on C&C included.
13-570	A	34	13	34	22	Another indicator proposed besides ofcapability and potential is historical responsibility, cf. Ott et al. 2004 (taking only the years from 1990 - 2000 because of considerations that making countries responsible for their emissions since industrialization (i.e. before climate change was known) might be unfair). (Hermann E. Ott, Wuppertal Institute for Climate, Environment and Energy)	Included
13-571	A	34	13	34	22	Contraction and convergence has the advantage of a simple emissions rule, and easily linked incentives, so it can provide both push and pull (see lines p 34 lines 24-33 and also p 54 lines 32-39) (Andrew Dlugolecki, university of east anglia)	Rejected. Not new
13-572	A	34	19			The approach of Mueller 2001 does not fit here as it has nothing to do with participation criteria/thresholds	Agreed. Deleted

						(Marcel Berk, Netherlands Environmental Assessment Agency)	
13-573	A	34	21	34	22	there seems to be an illogicism in these two sentences, or else it needs rephrasing (Claire Parker, Environmental Policy Consultant)	Accepted. Rewritten
13-574	A	34	22			generally unacceptable? (Michael Jefferson, World Renewable Energy Network/Congresses)	Accepted. Rewritten
13-575	A	34	31			The sentence with Charnovitz is grammatically incorrect. (Richard Tol, Hamburg University)	Accepted. Rewritten
13-576	A	34	37			The idea of a dynamic or conditional threshold for developing country participation is much older: see e.g. Berk and den Elzen, The Brazilian proposal and other options for burden sharing, RIVM, 1998. (Marcel Berk, Netherlands Environmental Assessment Agency)	Accepted. Included
13-577	A	34	41	34	41	I think Berk and den Elzen were the first starting with the world average per capita emission threshold and its thresholds (much earlier then the study of Höhne), and delete: Den Elzen (2002) has also analyzed thresholds based on the Annex I average. Also Criqui et al. (2003) have analyzed this threshold, but the original reference is Berk and den Elzen. Therefore, it is better to include here: Berk and den Elzen (2001) have earlier analyzed such a participation threshold, since it ensures timely participation of developing countries; (2) it rewards developing countries that keep emissions low (while growing economically) that they do not have to participate and (3) it rewards Annex I mitigation action by bringing the threshold-level down. This was also analyzed in den Elzen (2002). (Michel den Elzen, The Netherlands Environmental Agency)	Accepted. Included
13-578	A	34	42	34	43	those two lines reflect a truism- not worth mentioning (Claire Parker, Environmental Policy Consultant)	Accepted. Sentence deleted.
13-579	A	35	1	35	1	Please also refer to an enormous common effort of many institutes being done on countries' contribution to temperature increase (den Elzen, Fuglestvedt and Höhne and others, 2005; ESP paper). This work was mentioned in the zero-order draft. In general I would say more about the studies focusing on responsibility in this Chapter (See: UNFCCC 1997, Filho and Miguez 2000, Rosa and Ribeiro (2001), Rosa et al. (2004), Trudinger and Enting (2004), Andronova and Schlesinger (2004), Höhne and Blok (2005), Den Elzen et al. (2004b), Den Elzen et al. (2005)) (Michel den Elzen, The Netherlands Environmental Agency)	Will have new box
13-580	A	35	1	35	1	Box 13.5. Why not giving the main/ most original REFERENCES here and discuss some of the variants (see for example Philibert, 2005). You can contact me (michel.den.elzen@mnp.nl) for text suggestions Still you neglect many approaches, such as grand-fathering, multi-sector convergence, multi-criteria convergence, CSE convergence, Brazilian Proposal, capability to pay/jacoby rule and intensity target approach (see Bodanksky, 2004 for an overview). I would suggest to a more extensive overview of all the different architectures of post-2012 regimes, similar as has been done by Philibert (2005) -	Will have new box

						Approaches to future international cooperation (Chapter 3), i.e. mention the main regime and its variants. This gives a much better overview of the nice work that has been done since the IPCC-TAR on the various post-2012 regimes, and is well described in the literature (see Bodanksky, 2005; den Elzen and Lucas, 2005; Höhne et al., 2005; Philibert, 2005; etc. (Michel den Elzen, The Netherlands Environmental Agency)	
13-581	A	35	1	35	1	Box 13.5. Still you neglect many approaches, such as grand-fathering, multi-sector convergence, multi-criteria convergence, CSE convergence, Brazilian Proposal, capability to pay/jacoby rule and intensity target approach (see Bodanksky, 2004 for an overview). I would suggest to a more extensive overview of all the different architectures of post-2012 regimes, similar as has been done by Philibert (2005) - Approaches to future international cooperation (Chapter 3 in Philibert's report), i.e. mention the main regime and its variants. This gives a much better overview of the nice work that has been done since the IPCC-TAR on the various post-2012 regimes, and is well described in the literature (see Bodanksky, 2005; den Elzen and Lucas, 2005; Höhne et al., 2005; Philibert, 2005; etc.You can contact me (michel.den.elzen@mnp.nl) for text suggestions (Michel den Elzen, The Netherlands Environmental Agency)	Will have new box
13-582	A	35	1	36	24	Box 13.5 and related section on types of future architectures for international climate agreements seems incomplete: see Bodansky (2004) "International Climate Efforts Beyond 2012: A Survey of Approaches" published by the Pew Center on Global Climate Change; also new literature by Sugiyama (2005), among others... (Joanna Lewis, Pew Center on Global Climate Change)	Will have new box
13-583	A	35	7			Wording in this paragraph should be considered more carefully. Another important feature of bilateral agreements is that "almost equal bargaining power" is usually not possible. Starting with "The anatomy of influence" (Cox and Jacobson, 1974), international studies literatures have shown that power of nations (and regions) varies from country to country, and therefore, some countries prefer decision-making at multilateral arena. In addition, even in case of "equal bargaining power", when those powers are heading to different directions, if not hostile directions, bilateral agreements becomes less effective. In such a case reciprocal interests may exist, but the size of that may be small. For the case of recent climate politics, please see the following: Hovi, Skodvin and Andersen (2003) "The Persistence of the Kyoto Protocol: Why Other Annex I Countries move on Without the United States" in global environmental politics Nov. 2003, Vol3. No.4., Norichika Kanie "Current Policy Directions and the Beyond 2012 Climate Regime - Implications of the EU and the US Directional Leadership -", ISA 2005, March 2005, Guri Bang, Gorild Heggelund and Jonas Vevatne "Shifting strategies in the global climate negotiations", CICERO Report 2005:08	Seek additional input from Detlef Sprinz

				(Norichika Kanie, Tokyo Institute of Technology)	
13-584	A	35	7	here the text changes subject and discusses more genaral issues of international multilateral environmental agreement; this should be discussed elsewhere in the chapter	Accepted.
				(Marcel Berk, Netherlands Environmental Assessment Agency)	
13-585	A	35	15	Much more careful and comprehensive review and reference is needed when discussing whether climate change agreements would be effective (meaningful or successful, whichever) and what factors would determine effectiveness of climate change agreements compared with other international agreements, especially in case of generalizing lessons from other international agreements. 1) First of all, as for effectiveness (or success) of international agreements, an enormous number of articles and books have been published, starting with the ones written by Oran Young, R. B. Mitchell and so on. They should be worthy being reviewed. Based on these achieved studies, measuring and appreciating, even more comparing effectiveness is not at all easy. It differs according to from what point of view or criteria we appreciate "effectiveness", for instance, in term of compliance with established rules or in term of solving problem. Major powers' participation could improve effectiveness rather than no their participation in the same agreement. However, even though all major countries would participate in a climate agreement which only achieve the very low level of performance and barely changes States' behaviour, we could not say that the agreement is effective. Another example is that whether being encouraged by related agreement or not, countries could guarantee (better) protection of the environment under national laws and regulation without officially ratifying related international agreements. Participation of major countries could be only one of the factors determining effectiveness of a regime and other important factors such as level of obligations and commitments clearly influence effectiveness of international agreements. The effectiveness of international agreements is determined by interaction among number of factors which vary from issue to issue. As for the example of case studies having being realized in order to identify such factors influencing effectiveness, for instance, Oran R. Young ed., The effectiveness of International Environmental Regimes, MIT (1999)). For that reason, putting too much emphasis on and making reference only to participation factor on part of major emitters would be misleading. 2) For the above reasons, especially the sentence that "a climate change treaty is meaningful only if commitments are adopted and implemented by major emitters" should be reconsidered. For instance, without ratification by the U.S., is the International Covenant on Economic, Social and Cultural Rights not meaningful? So are all of the Vienna Convention on the Law of Treaties, the United Nations Convention on the Law of the Sea, Biodiversity Convention? We cannot probably conclude so and majority of scholars will not share such view.	Look at new sources.

						(Kenichi Oshima, Ritsumeikan University)	
13-586	A	35	20	35	22	The reason(s) why only there countries (from line 21-22) are chosen is not explicitly presented, and the list looks biased and one-sided. Importance of looking at vulnerability and impact of climate change, as well as growing importance of adaptation policies is mentioned in other parts of the chapter, and this paragraph creates imbalance with that part. Some insights into this aspect, therefore, may be needed. The lists of countries also give impression that climate change is only an issue of "big countries" and disregard the importance of middle to small countries. (Norichika Kanie, Tokyo Institute of Technology)	Text adjusted
13-587	A	35	24	44	10	The section on commitments and actions does not cover "policies and measures" as a form of committed action (to some extent that is in the treatment of sectoral approaches, but not clearly). This option was part of the Berlin mandate, has found its way in the Kyoto protocol (not very prominent) and seems to become more ppopular again through the interest in sectoral commitments (either targets or agreed policies) and also through the "regulated technology approach" that is the subject of the Asia Pacific initiative (see recent ABARE study presented at Capetown meeting) exploring the mitigation through a series of mandated technology policies). The policies and measures approach merits separate treatment. What is also missing from this section is the linking of various commitment forms to the longer term goals; are all of these approaches equally effective in terms of effectiveness in getting to low level stabilisation/ deep emissions reductions in relatively short timeframes? The policy makers need to know that. The treatment of sectoral commitments for developing countries is limited to so-called "no-lose" (or "no-pay") sectoral targets. That seems an unnecessary limitation. Sectoral targets can also fit in regular commitments, not just in "no-lose". (Bert Metz, IPCC)	Section on P&Ms exists Will include a table linking actions to long term goals Developing country commitments not limited to "no lose".
13-588	A	35	0			Why is Box 13.5 limited to these four approaches? There are many more, some very different. (Richard Tol, Hamburg University)	Agree
13-589	A	35	0			the section on commitments and actions is very long and extensive; like in the section on national policy instruments this is partly because the instruments are not just decribed but also (implicitely) being evaluated. This set up could be followed but should than be made more explicite. (Marcel Berk, Netherlands Environmental Assessment Agency)	Restructured. Made more explicit
13-590	A	35	0			The definitions in textbox 13.5 are not referenced and seem defined rather loosely (compared to the original definitions) (Marcel Berk, Netherlands Environmental Assessment Agency)	Is revised
13-591	A	36	9	13	24	I would consider sectoral targest, also a flexible target. I do not understandwhy this is discussed in a separate section.	Kept separate section, Clarified

						(Michel den Elzen, The Netherlands Environmental Agency)	
13-592	A	36	9	13	24	I miss here quite some literature on types of targets (See Philibert, 2005) (Michel den Elzen, The Netherlands Environmental Agency)	Check literature
13-593	A	36	10	36	12	Please refer to this option as "non-binding targets (or 'no-lose', or 'one-way' targets)". I do not understand what "positively binding" may mean. The original reference is Philibert, Cédric, 2000. How could emissions trading benefit developing countries, Energy Policy, 28: 947-956. Viguier (Viguier, Laurent, 2004. A proposal to increase developing country participation in international climate policy, Environmental Science & Policy 7: 195–204) suggested that non-binding targets for developing countries could be set below business as usual trends so that benefits from the selling of emissions below the targets would cover not only the cost of additional reductions but also the cost of the abatement needed to achieve the non-binding target. Philibert 2005 (New commitment options: compatibility with emissions trading) provides for a numerical illustration on the basis of a modelling exercise undertaken at the CNRS LEPII-EPE where developing countries get a positive benefit from accepting non-binding targets set at -10% below baseline trends in 2030 and -20% in 2050 (Cédric Philibert, International Energy Agency)	Non-binding not included because could be misunderstood. Deleted positively binding. Inserted reference. Having a no loose targets would change the global market and market price and therefore it is unclear whether a benefit will occur if allocated below BAU.
13-594	A	36	10	36	12	This option is also known as "non-binding" emissions targets. SUGGESTION: Insert "or non-binding" (Frank Jotzo, Australian National University)	Non-binding not included because could be misunderstood. Deleted positively binding. Inserted reference.
13-595	A	36	10	36	12	this sentence should mention that these targets would be envisaged in a system still with two types of Parties (e.g. AI- non AI) as otherwise there would be no buyers... (Claire Parker, Environmental Policy Consultant)	Added
13-596	A	36	13	36	15	"Dual" targets are really just a variant of dynamic/intensity targets discussed in lines 18-20. SUGGESTION: Move the text in lines 13-15 on 'dual' targets to a footnote after line 20, starting "A variant of intensity targets are 'dual' targets, in which...." (Frank Jotzo, Australian National University)	Rejected. No a subset.
13-597	A	36	18	36	20	Please specify that "intensity targets" are only one possible form of indexation of assigned amounts to the GDP, as Ellerman and Wing (paper referenced in the draft) made clear. More generally, it seems that the complexity of using indexed targets, and the conflicting views about the possible results, seems to require further elaboration on the basis of a growing analytical litterature. It seems important to distinguish, in particular, analyses focusing on "output-based" regimes for companies, from analyses focusing on country-wide indexed targets. (Cédric Philibert, International Energy Agency)	Point already taken
13-598	A	36	18	36	20	Terminology not fully consistent with earlier mention of intensity targets on p. 12. SUGGESTION: Swap terms "intensity targets" and "dynamic emissions targets", so the sentence starts with "Intensity targets, where targets…" and include the word	Accepted.

						"dynamic emissions targets" in brackets. (Frank Jotzo, Australian National University)	
13-599	A	36	18	36	20	SUGGESTION: Include reference to Jotzo and Pezzey (2005). REFERENCE: Jotzo, F. and Pezzey, J. C. V. (2005), "Optimal intensity targets for emissions trading under uncertainty", Economics and Environment Network Working Paper EEN0504, Australian National University, Canberra; also published as PESD working paper no.41, Stanford University. [Note: This was submitted for publication in June 2005.] Paper attached. (Frank Jotzo, Australian National University)	Ref added.
13-600	A	36	24	36	24	Please add the followings; Pledge (with review) and review. This is different from ordinary pledge and review in the sense that the pledge itself (to introduce policies and measures) should include its numerical emission reduction and/or removal enhancement targets, and total numerical effects of all parties' pledge are reviewed by an international institution and will be asked to revise them, if overall effects will be deemed insufficient. Then after, say, 5 to 10 years review of the outcome by the international experts is undertaken. For developing countries only pledge to introduce policies and measures are required for the first stage and no review at any point. (Yamaguchi 2005) Yamaguchi, Mitsutsune (2005), A proposal for the Future Framework after Kyoto. Mita Gakkai Zasshi, Volume 98 No.2, The Keio Economic Society, 2005 pp.5-33 (in Japanese) (Mitsutsune Yamaguchi, Teikyo University)	Reference added.
13-601	A	36	24	36	24	Excessive allocation of allowances (like to Russia, Ukraine and Former Socialist Countries) could be mentioned as a way to address the problem of accomodation economic growth under emission cap. (Alexander Golub, Environmental Defense)	Added to the list.
13-602	A	36	25	36	28	A crucial element is missing here: an assessment of the trade-off between costs and certainty on emission levels. It has been argued, in particular by Pizer 2002 (reference already in the draft) and Newell and Pizer (Newell, Richard G., and William A. Pizer, 2003. Regulating stock Externalities under uncertainty. Journal of Environmental Economics and Management 45: 416-432), on the basis of a classic result by Weitzman (Weitzman, M. L., 1974, Prices vs. Quantities, Review of Economic Studies, vol.41, October) that in case of climate change or, more generally, stock pollutant issues, short term certainty is of little value. It has been further argued (IEA 2002) that this flexibility could facilitate the adoption of more ambitious targets by countries (with lower expected costs). This has been confirmed in case of indexed targets by Jotzo and Pezzey (see comment made on FOD chapter 13 page 13). The relevance of the analysis is not changed by the possibility of climate catastrophes, as the existence and the level of possible thresholds for non-linear responses remain unknown (Pizer, William A. 2003,	Added reference

						Climate Change Catastrophes, discussion paper 03-31, Resources for the Future, Washington D.C). (Cédric Philibert, International Energy Agency)	
13-603	A	36	31	13	31	Why again a reference to Hohne report? I think the ideas summmarised here, are also decribed in other, earlier reports. (Michel den Elzen, The Netherlands Environmental Agency)	Deleted reference
13-604	A	36	42	36	42	Add after third bullet: Sectorial approaches could be based on a uniform formula, with a possible transition period of 10-20 years by regional carbon or energy efficiency targets. These relative targets or performance standards (PSRs) must take into account the projected production growth and the PSRs need to be adapted annually for future years if the realised productions deviate from projections (Schyns, 2005 b, pages 31-37 and 2005 d, pages 45-47). (Vianney Schyns, DSM & SABIC)	Rejected, too specific.
13-605	A	36	43	36	43	Better to add information on the Plan of Action adopted at the Gleneagles Summit in 2005, which invite, for example, the IEA to develop its work to assess efficiency performance. (Mitsutsune Yamaguchi, Teikyo University)	Reference added under R&D
13-606	A	36	45	37	49	Section also should incorporate new literature on sectoral approaches, including the IEA sectoral paper, and Figueres' recent papers (2004, 2005) on sectoral CDM. (Joanna Lewis, Pew Center on Global Climate Change)	IEA paper was referred to already
13-607	A	36	45	37	49	It is felt that a more ballanced approach should be employed in discussing sectoral approach (Andrei Marcu, IETA)	Noted
13-608	A	36	49	36	49	Add: On the other hand, sectorial targets seem to be most logical for sectors facing global competition (steel, cement, major chemicals, etc.). Such targets should be deducted from targets of nations while the role of nations is to ensure compliance by adequate penalty regimes such as in the current EU ETS (Schyns, 2005 b, pages 1-4). (Vianney Schyns, DSM & SABIC)	Table added to this extent
13-609	A	37	28	37	32	sentence sits badly under transportation sub heading (Claire Parker, Environmental Policy Consultant)	Text replaced
13-610	A	37	42	37	48	It would be useful to include the latest work from Ned Helme and the Center for Clean Air Policy in this section. It is available on their website. (Nick Campbell, ARKEMA SA)	Source rejected.
13-611	A	37	51			How does one address an issue by flexibility? (Richard Tol, Hamburg University)	Reworded
13-612	A	37	52			Some policy makers have done all that is in their power to restrict flexibility. (Richard Tol, Hamburg University)	Reworded
13-613	A	37	0	38		We suggest to add the following paragraph at the end of section 13.3.2.3.2 Flexibility/Market Mechanisms:	Check reference

						"In its article 3.13, the Kyoto Protocol allows parties to make use of the "when" flexibility in the sense that countries are allowed to bank unused emission permits. Using a simple simulation model, van Steenberghe (2005) analyses the costs of alternative post-2012 commitments and shows that such a banking mechanism reduces the total compliance costs by at least 10%, even if future commitments are not very ambitious in terms of emission reductions." Reference: van Steenberghe, V. (2005), "CO2 abatement costs and permits price: exploring the impact of banking and the role of future commitments", Environmental Economics and Policy Studies, 7 (2) 75-108. (Peter Wittoeck, Belgian Federal Administration)	
13-614	A	38	7			What flexibility usually refers to the gas; how flexibility to the instrument. (Richard Tol, Hamburg University)	Accepted.
13-615	A	38	10	38	11	Please, specify where in WG III Report questions of "what" flexibility are examined. (Jos Sijm, ECN)	Chapter 3
13-616	A	38	15	38	17	IET as defined under KP is between countries, emissions trading in general can be countries, companies or other entitites (Dian Phylipsen, Ecofys)	Added
13-617	A	38	16			between governemnts who have adopted emission caps (Claire Parker, Environmental Policy Consultant)	Added
13-618	A	38	20	38	22	rules have only been established for CDM, not yet for JI (Dian Phylipsen, Ecofys)	Rejected, by the time of publication, JI rules will be in place.

13-619	A	38	30	40	38	Some additional literature on the EU ETS related to the impliactions on the electricity prices - also discussed as windfall profits - might be worthwhile mentioning. Sijm et al. 2005 analysed the linkages between emissions trading in the European Union and power prices, particularly the "free allocation of emission allowances for the price of electricity in countries of North-western Europe (Belgium, France, Germany and the Netherlands). The study finds that a significant part of the costs is passed on consumers, and argues that such free allocation of emission allowances is a "highly questionable policy option." It argues that auctioning might offer a better alternative. See http://www.ecn.nl/docs/library/report/2005/c05081.pdf In addition Bonacina and Gulli 2005 did some work on the market power and the impact on electricity pricing. They found out that the higher the market power and the more pollutant the plant as lower is the impact of emissions trading compared to a situtation of perfect competition. See Bonacina, Monica and Gulli, Francesco, 2005, Modelling power pricing under trading of CO2 emissions allowances, presented at the BIEE/UKERC	3. Check references. Box should address impact on electricity prices

						Conference in Oxford, 22-23 September 2005, see http://www.biee.org/ (Regina Annette Betz, University of New South Wales (UNSW))	
13-620	A	38	30	40	42	EU ETS has merits and demerits. It is necessary to describe some important problems, for example, the lawsuit. See, The EU Emission Trading, Climate Policy 5, 2005. (Masatake Uezono, Citizens' Alliance for saving the Atmosphere and the Earth)	3. Cover merits and demerits. Lawsuit may not be covered
13-621	A	38	30			Section 13.3.2.3.3 - The EU ETS is interestingly discussed within the chapter. The system currently displays, in its present implementation one example of inconsistencies mentionned in teh last comment, that would need to be corrected in the future: On one hand, the promotion of a CO2 market (EUTS) should be aimed at providing the players with incentives to use more CO2 free technologies; On the other hand, recurrent negotiations have been established for annual initial allowances based on recent observed emissions, and initial allowances tend to be given for free to new CO2 emitting projects (gas and even coal); both of these practices could appear to be "good" incentives to produce more CO2 emissions, if they would be pursued on the medium and long term. In this respect, the draft provides interesting insights on EUTS, with its promising advantages as well as some of its current drawbacks. Free allocation to new projects in accordance with their CO2 emissions is one major drawback: although the inefficiency of the rule is mentioned by the draft, it seems that the full consequences are not fully developed (an investment in a CO2 emitting technology is a kind of long term commitment to emit more), and should be stressed a little bit more. At the same time, the draft analysis of the allocation mechanisms includes quite interesting "fairness" arguments. These arguments could also be used to emphasize relationship with the concept of "fair competition" among players in Europe (which might point out the need for more European consistency between each Member State national energy policy). (Jean-Yves CANEILL, Electricité de France)	4
13-622	A	38	32		35	I agree. As it is already often confused with Art. 17 Emission Trading, I find it helpful if a distinction is made how the ETS is different from the scheme we refer	4.

						to as international emission trading (art 17 and the alike). To me it is more similar to a national emission trading scheme than the international one as defined by the KP. (Diana Urge-Vorsatz, Central European University)	
13-623	A	38	33	38	33	EU-ETS should be discussed in Chap. 13.2. for the reason afore mentioned (it is a "national policy" in the sense of Wiener 1997). (Reimund Schwarze, DIW Berlin)	3. Putting EU ETS in a Box
13-624	A	38	35	38	39	With the implementation of the the Kyoto Protocol there is a fully global trading system in a AAUs and there is substaintial amount of international emission trading in the EU ETS. (Andrei Marcu, IETA)	2. Text on nearly global project based trading is clear and differentiated from a full global trading system with all sources having caps
13-625	A	38	45	38	50	There is an incorrect implication that what ever adjustment that need to be made to correct market imperfections can not be implemented. (Andrei Marcu, IETA)	3. Text needs to be clarified
13-626	A	39	7			in the absence of a global trading regime being operational under a ratified international agreement (Claire Parker, Environmental Policy Consultant)	1. Delete "in the absence of a ratified international agreement"
13-627	A	39	10	39	15	Section should discuss this issue of linking domestic and international trading systems--an emerging area of research, particularly in light of new US regional markets (which also should be discussed in text). (Joanna Lewis, Pew Center on Global Climate Change)	3. A paragraph on linkage should be included in the section on domestic tradable permits. The text on lines 10-15 is a good start.
13-628	A	39	11	39	14	We feel that the statement that the current systems do not yet provide sufficient incentive for emission reductions is a too strong a statement. What we feel is correct to say is that there are still incentives but that improvements are need to optimise these incentives (Andrei Marcu, IETA)	3. Check the reference to see what this part of the sentence means
13-629	A	39	14			The mentioning of "There is room for improvement" could be substantiated by referring to the innovation incentive aspects of the European Emissions Trading Scheme. Schleich and Betz 2005 did evaluate the EU ETS according to its potential innovation incentives and came to the following conclusions: Allocation rules of the EU ETS in the first phase 2005-2008 provide only modest incentives for technological innovations. Based on the findings in their paper, policy recommendations in terms of innovation for the subsequent phases are: more auctioning combined with new entrant buying on the market instead of getting the allowances for free, closed installations should be allowed to keep their allocation. The latter rule would spur the closures of old plants, leaving space for new, more efficient technologies. Finally,future allocation rules and emission targets should be known long time in advance to be more in line with the length of innovation cycles. Schleich, J. / Betz, R.: Incentives for energy efficiency and innovation in the	3. Check references

						European Emission Trading System, in: Proceedings of the 2005 eceee Summer Study – What works and who delivers?, Mandelieu, France, 2005, p. 1495 (Regina Annette Betz, University of New South Wales (UNSW))	
13-630	A	39	17	39	22	EU burden sharing also takes into account differences in economic and energy sector structure. Use of phrase 'idiosyncracies' is inappropriate, these are relevant national circumstances (Dian Phylipsen, Ecofys)	1. Replace “idiosyncracies” with “sectoral structure”
13-631	A	39	26	39	27	Anyone can buy and sell allowances, including individuals. Only the mentioned plants are allocated allowances by the government (Dian Phylipsen, Ecofys)	1. Text needs to be clarified
13-632	A	39	32		39	More interesting figures would refer to % change for whole ETS compared to BaU emissions, see e.. Phylipsen at all 2005, NAP evaluation report (Dian Phylipsen, Ecofys)	3. Check reference
13-633	A	39	36	39	39	I do not think the explanation to figure 13.6 fits to what is actually shown in this figure. And I do not understand the figure. (Sonja Peterson, Kiel Institute for World Economics)	1.
13-634	A	39	37			reference in footnote is not original source! Is Ecofys analysis (Dian Phylipsen, Ecofys)	1. Correct reference
13-635	A	39	39	39	39	Additional Literature which provides overviews of the outcome of the allocation efforts within the EU ETS are : (1) 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. (2) Betz, R., Eichhammer, W. and Schleich, J. (2004), ‘Designing National Allocation Plans for EU emissions trading – A First Analysis of the Outcomes’, Energy & Environment 15, 375-425. A short overview is also included in(3) COMMUNICATION FROM THE COMMISSION (2005): “Further guidance on allocation plans for the 2008 to 2012 trading period of the EU Emission Trading Scheme”, COM(2005) 703 final, Brussels, 22.12.2005. (Joachim Schleich, Fraunhofer Institute Systems and Innovation Research)	3 Check references
13-636	A	39	41			Figure 13.5 and 13.6. Wrong figure captions. (Matti Melanen, Finnish Environment Institute)	1. Correct the titles
13-637	A	39	41	39	41	Erratum: Figure 3.5 or 3.6 or 3.5 nd 3.6? (FÉLIX HERNÁNDEZ, IEG-CSIC)	1. Correct the titles
13-638	A	39	41	39	41	Fig. 13.6: The percentages stated in the text can not be extracted from this figure. (Reimund Schwarze, DIW Berlin)	1. Correct this
13-639	A	39	41			Is seems that figure 13.5 and Figure 13.6 are interchanged. (Regina Annette Betz, University of New South Wales (UNSW))	1. Correct the titles
13-640	A	39	41			Figures 13.5 and 13.6: Titles of these figures have been mixex. (Jos Sijm, ECN)	1 Correct the titles

13-641	A	39	42	40	10	This paragraph seems to be related to international emissions trading and not the EU ETS. Since under the EU ETS companies can't account for Assigned Amount Units from russia or Ukrain it would be better to move this paragraph at the end of the chapter. Thus the price assessment of the EU ETS follows directly. (Regina Annette Betz, University of New South Wales (UNSW))	3. Move text on Russia to the section on international emissions trading
13-642	A	39	43	40	9	section on IET is out of place here in the middle of text on EU ETS (Dian Phylipsen, Ecofys)	3. Move text on Russia to the section on international emissions trading
13-643	A	39	43	39	45	Maeda (2003) shows that surplus of emissions permit in the international emissions trading regime—known as "hot air"—which Russia and Ukraine in particular are expected to hold may affect the economic efficiency of the Kyoto mechanism; all economies in transition forming a cartel together, Ukraine forming a cartel with Russia, or even Russia alone may be able to hold effective market power in the market. References: Maeda, Akira (2003). "The Emergence of Market Power in Emission Rights Markets: The Role of Initial Permit Distribution." Journal of Regulatory Economics 24(3): 293-314. (Akira Maeda, Kyoto University)	Issue of cartel included, reference to be checked, include other references to the topic.
13-644	A	39	43	40	9	SEE COMMENTS FROM CHARLES IF ANY RECEIVED (Andrei Marcu, IETA)	Noted with amusement.
13-645	A	39	0			Section 13.3.2.3.3 International Emissions Trading - part on EU ETS Can be relevant, because of lack of IET, EU ETS is used as example as most advanced system so far to learn about effectiveness of system, practicalities of implementation, etc. Would need to be introduced as such. However, current text does not address any of the issues that would make this text relevant in the context of the EU ETS - now only a factual description of what is in or out. (Dian Phylipsen, Ecofys)	
13-646	A	40	11			Update for whole year 2005. (Michael Jefferson, World Renewable Energy Network/Congresses)	
13-647	A	40	14	40	14	Add two references at the end of line 14: Christiansen, A.C., A. Arvanitakis, K. Tangen, H. Hasselkippe (2005). Price determinants in the EU emissions trading scheme. Climate Policy 5:1-17. Sijm, J.P.M., S.J.A. Bakker, Y. Chen, H.W. Harmsen, W. Lise (2005). CO2 price dynamics: The implications of EU emissions trading on the price for electricity. Energy Research Center of the Netherlands (ECN) Report ECN-C-05-081. September 2005. Amsterdam. (Sonja Peterson, Kiel Institute for World Economics)	3. Check reference
13-648	A	40	15	40	20	Some empirical results could be inlcuded, for example, an analysis of the Allocation Plans suggests that only few member states used the EU ETS to actually	3. Redraft

						cut emissions. The Annex includes a graph adopted from Höhne (2005), but text is missing in the main body of the report. For the first trading period (2005-2007), most Member States allocated more to the installations covered under the EU ETS than those installations emitted in recent years. More specificalle, using 2001 as the average base year for all countries, the sectors falling under the EU emissions trading directive may grow about 1% p.a. without the necessity of reduction efforts (DEHSt (2005) see Nr. 32). (Joachim Schleich, Fraunhofer Institute Systems and Innovation Research)	
13-649	A	40	15	40	35	list misses some of the most important factors determining current carbon prices: limited market liquidity, increasing fuel prices, influence of electricity companies on the market (Dian Phylipsen, Ecofys)	1. Redraft based on available literature
13-650	A	40	21	40	25	Annex I governments can also use IET, leaving more JI/CDM credits available for companies. Point on relaxed constraints leadingto higher share of project credits in companies' compliance does not make any sense. Relaxed constraints does indeed lead to lower demand for EAUs on the market but proportionally also to lower demand for project-based credits. (Dian Phylipsen, Ecofys)	3 Bullet needs to be redrafted
13-651	A	40	23	40	24	The statement starting with "However, relatively …" is not understood by us what the raisoning behind this statement is. (Andrei Marcu, IETA)	1. See comment 650
13-652	A	40	31	40	35	Closure rules are only one of many elements in NAPs that influence carbon prices and incentives for clean technologies. Others are new entrant rules, allocation methodologies (benchmarking, required reduction compared to historic emissions), early action bonuses, clean technology bonus, etc (Dian Phylipsen, Ecofys)	1 Address as the Box on EU ETS is drafted
13-653	A	40	33	40	35	The problem of disincentives to close down existing plants can not be discussed in separation from the choice of the treatment of newcomers. If newcomers are given free allocations (as in the EU-ETS), existing sources can not retain the right to emit after closing down within a given framework of emissions. The dis-/incentives debate within ETS often lack comprehensiveness by picking out single effects as such. (Reimund Schwarze, DIW Berlin)	1 Address as the Box on EU ETS is drafted
13-654	A	40	33	40	35	Some other regulation features might be usuful to mention: a) Banking and borrowing rules might have had an impact on price developments and volume at the beginning of the EU ETS. Since borrowing within the period 2006-2007 is allowed companies don't need to buy allowances today and therefore especially small companies are not taking part in trading in early years. If this is the case, higher trading volumes will be seen in the beginning of 2008 because no borrowing is	3. Check the reference. Discuss new entrants, closures and release of surplus new entrant reserves to the market in the box.

						possible between phases and banking between the first and second periods is only partially allowed in Poland and France, which will most likely lead to a price decline if weather and fuel prices are developing as usual. b) The total amount of allowances in the market is not known precisely, since the reserves for new entrants are sometimes cancelled and sometimes auctioned. A big share of allowances are held in reserves for which there is no information what will happen with the surplus. This makes price projections even more difficult. See Betz and MacGill 2005: Emissions trading for Australia: Design, transition and linking options, CEEM discussion paper, Sydney. Available from www.ceem.unsw.edu.au (Regina Annette Betz, University of New South Wales (UNSW))	
13-655	A	40	35	40	36	The main impact from the lack of the international transaction log is that CERs were not be able to be traded spot. This might be worthwhile to mention, since it might explain some of the price differences between CERs and EUAs in 2005. (Regina Annette Betz, University of New South Wales (UNSW))	2. There were virtually no CERs issued so there could not be a spot market
13-656	A	40	37	40	42	It should be noted that speculation plays significant roles only when the opportunity of intertemporal trading is available under uncertainty about the future. Maeda (2004, 2001) examines the behavior of permit forward markets on the way to the analysis of bankable permit in an uncertain world. Maeda shows that when participation in a permit forward market is limited only to regulated emitters who need permits for compliance purpose, the market is a contango, meaning that the forward price is greater than the expected value of the future spot market price. In contrast, when unregulated agents, who need not permits for their own use but are willing to participate in the forward market, are in the majority, the market behaves like a typical financial market in which forward prices are less than the expected future spot market prices. References: Maeda, Akira (2004). "Impact of Banking and Forward Contracts on Tradable Permit Markets." Environmental Economics and Policy Studies 6(2):81-102. Maeda, Akira (2001). Domestic Greenhouse Gas Emissions Trading Markets: Forward Pricing and Banking Impacts. IIASA Interim Report: IR-01-048. International Institute for Applied Systems Analysis, Laxenburg, Austria. 32pp. (Akira Maeda, Kyoto University)	2. Literature applies to a hypothetical situation; trading limited to participants with compliance obligation
13-657	A	40	39	40	43	In a liquid market there is always players that are speculative of nature but this statement is not founded and currently the market is based on more fundamental parameters such as weather and power prices. (Andrei Marcu, IETA)	1. revise sentence on "speculation"
13-658	A	40	45	43	47	CDM: This section should contain a discussion of policy or programmatic CDM, in light of new text released during the UNFCCC COP11 COP/MOP1 meetings that	Will be updated

						speaks to expanding the scope of CDM to encompass programmatic crediting based on the implementation of national, regional or local policies. (Joanna Lewis, Pew Center on Global Climate Change)	
13-659	A	40	46			Footnote 34: In Schleich and Betz 2005 are those details described if a reference is necessary. (Regina Annette Betz, University of New South Wales (UNSW))	1. Incorporate reference into footnote
13-660	A	41	14			the CDM allows early crediting (i.e. before the start of the 2008-2012 commitment period) of project based etc (Claire Parker, Environmental Policy Consultant)	Included
13-661	A	41	14	41	34	This information needs to be updated and as reference the "Carbon Finance - IETA / The World Bank, State and Trends of the Carbon Market 2005" (Andrei Marcu, IETA)	Update as per end of cut of date.
13-662	A	41	17			My paper was not about the CDM and relied on secondary sources; there are far better analyses of likely CDM size and I suggest you use them (Michael Grubb, Cambridge University)	Deleted sentence
13-663	A	41	25	41	34	It should be acknoledged that not all CDM projects approved by CDM board will be implemented. Also, some expected reduction would be "lost" on the certification stage. (Alexander Golub, Environmental Defense)	Added sentence
13-664	A	41	25	41	33	In view of the recent circumstances that new registrations of CDM project are rapidly increasing, it would be better to reflect the situation. Replace those lines with updated figures. (Mitsutsune Yamaguchi, Teikyo University)	Update as per end of cut of date.
13-665	A	41	25	41	33	Including projects in an earlier stage of development (not all in the public domain) shifts the share of (renewable) energy projects in emission reductions considerably higher (Ecofys/Ecosecurities analysis) (Dian Phylipsen, Ecofys)	Added sentence
13-666	A	41	26			How can you read of Figure 13.7 224 Mt pre-2008? The title is referring only to the period 2008-2012. This is confusing. (Regina Annette Betz, University of New South Wales (UNSW))	Figure 13.7. to be replaced by UNFCCC numbers.
13-667	A	41	37			First sentence seems totally useless (Dian Phylipsen, Ecofys)	Sentence dropped.
13-668	A	41	38	41	41	More recent work available from IISD, A. Cosbey (Dian Phylipsen, Ecofys)	Reference not relevant
13-669	A	41	43	41	45	Not really fair to say that early concerns were invalid, as in fact there are many governments' funds purchasing credits and if it hadn't been for those funds, no credit market demand would have been generated and the unilateral projects would not have been started. (Dian Phylipsen, Ecofys)	Rejected. Unilateral projects started before government funds were available.

13-670	A	41	46	41	46	Figure should be updated to EURO 3.0 Billion (Andrei Marcu, IETA)	Will be updated
13-671	A	42	9			Page 109, Table 13.5., concerning Carbon Funds of the Government of Japan: The timing for launching the Japanese funds (in fact, it's not the funds, but the up-front payment scheme to cover a part of the costs necessary in implementing CDM project activities and to obtain the credits in exchange for the payment) should be April 2003; and the amount of investment shoud read JPY 22-57 billion per annum. (MASAHIRO NISHIO, Ministry of Economy, Trade and Industry)	Added footnote in the table. Tables need to be updated as cutoff date.
13-672	A	42	11	42	12	is the reference to Yamada really necessary? Is purely a requirement from the mentioned UNFCCC docs (Dian Phylipsen, Ecofys)	Accepted.
13-673	A	42	11	41	21	Like to provide additional reference "IETA Postion Paper on Addtionality". Also this issue was an open depate at COP/MOP 1 please see CDM decision from COP/MOP and update paragraph accordingly. (Andrei Marcu, IETA)	Not an appropriate source. COP/MOP decisions will be updated.
13-674	A	42	16	42	17	more types of additionality have been discussed, see e.g. CDM gold Standard documentation (Dian Phylipsen, Ecofys)	Mention Gold standard at other section on sustainable development
13-675	A	42	23	42	24	COMMENT: The sentence should be deleted. REASON: The sequence between demonstration of additionality and determination of baseline is not defined. The COP/MOP 1 decision for CDM, in para.25(a), implies the possibility of combination of the both processes at the same time. (MASAHIRO NISHIO, Ministry of Economy, Trade and Industry)	The sequencing is current practice. We will wait for COP MOP decision
13-676	A	42	23	42	24	The sentence should be deleted. REASON: The sequence between demonstration of additionality and determination of baseline is not defined. The COP/MOP 1 decision for CDM, in para.25(a), implies the possibility of combination of the both processes at the same time. (MASAHIRO NISHIO, Ministry of Economy, Trade and Industry)	The sequencing is current practice. We will wait for COP MOP decision
13-677	A	42	30			reference to benchmarking is not clear here. What does benchmarking mean in this context? (Dian Phylipsen, Ecofys)	Accepted. Replaced “benchmarking”. Added current practice of CDM
13-678	A	42	38	42	40	Can baselines for the electricity sector that ' depend on country specific characteristics, the project type, and whether it provides new or existing demand' be considered standardised? (Dian Phylipsen, Ecofys)	Rephrased
13-679	A	42	53	43	6	COMMENT: The sentence should be deleted. REASON: The Marrakech Accords for CDM, para.48(a), defines "existing actual or historical emissions" as one of the approaches for baseline determination. In this view, "the current technology" can be the baseline, reflecting likely future trends.	MA speak about the approach to the baseline, while the comments speaks to a specific baseline.

						(MASAHIRO NISHIO, Ministry of Economy, Trade and Industry)	
13-680	A	42	53	43	6	The sentence should be deleted. REASON: The Marrakech Accords for CDM, para.48(a), defines "existing actual or historical emissions" as one of the approaches for baseline determination. In this view, "the current technology" can be the baseline, reflecting likely future trends. (MASAHIRO NISHIO, Ministry of Economy, Trade and Industry)	MA speak about the approach to the baseline, while the comments speaks to a specific baseline.
13-681	A	43	8	43	12	There is another disadvantage of baseline and credit schemes which needs to be mentioned. Buckley et al 2004 assess the theoretical prediction that aggregate output and emissions are significantly greater under a baseline-and-credit trading plan than under a comparable cap-and-trade plan, because a variable baseline is equivalent to an output subsidy. This phenomenon has already been demonstrated by the HFC23 CDM projects where there was a decision in Montreal to be able to distinguish between new HFC23 plants and existing plants which increased their capacity use after CDM crediting. See: Neil J. Buckley, Stuart Mestelman and R. Andrew Muller, Implications of Alternative Emission Trading Plans: Experimental Evidence, Pacific Economic Review, forthcoming, http://socserv.mcmaster.ca/econ/mceel/. (Regina Annette Betz, University of New South Wales (UNSW))	To be addressed in the context of baseline credit discussion. 1. Address this reference in the section that deals with baseline and credit programs. Review the reference if relevant. The HFC 23 issue is for projects, not a baseline and credit trading program.
13-682	A	43	10	43	12	system boundaries and leakage are not an issue of additionality but of the amount of emission reductions calculated for the project. (Dian Phylipsen, Ecofys)	Text on additionality deleted.
13-683	A	43	39	43	47	The issue of policy baselines for annex 1 and non-annex 1 countries has been clarified in the literature and UNFCCC decisions--should be incorporated here. (Joanna Lewis, Pew Center on Global Climate Change)	Issue not relevant for the discussion on the para.
13-684	A	43	39	43	40	A key weakness is the lack of any assurance about post-2012 polkicy -see UNEPFI CCWG CEO Briefing from COP11 (Andrew Dlugolecki, university of east anglia)	Point added.
13-685	A	43	42	43	42	The reason METI (2004) is quoted is obscure, and the way to quote is not suitable. It is necessary to delete this sentence. (Masatake Uezono, Citizens' Alliance for saving the Atmosphere and the Earth)	Sentence delete sine position of one government.
13-686	A	43	45	43	47	COMMENT: The sentence should be deleted unless it refers to the analysis by Olsen and Painuly (2003). REASON: The post-Kyoto framework is subject to negotiations of the UNFCCC, and not concluded yet. This sentence appears to prejudge the future framework in the sence that developing countries would still benefit from participating in CDM project activities as host countries even if their emissions are to be capped under the framework. (MASAHIRO NISHIO, Ministry of Economy, Trade and Industry)	Text clarified that it is the analysis of the paper.
13-687	A	43	45	43	47	The sentence should be deleted unless it refers to the analysis by Olsen and Painuly (2003).	Text clarified that it is the analysis of the paper

						REASON: The post-Kyoto framework is subject to negotiations of the UNFCCC, and not concluded yet. This sentence appears to prejudge the future framework in the sence that developing countries would still benefit from participating in CDM project activities as host countries even if their emissions are to be capped under the framework. (MASAHIRO NISHIO, Ministry of Economy, Trade and Industry)	
13-688	A	43	51			Novikova, A., Ürge-Vorsatz, D. (2005). Kyoto Flexibility Mechanisms in an enlarged EU: will they make a difference? European Council for an Energy Efficient Economy Summer Study 2005, ECEEE, France. (Diana Urge-Vorsatz, Central European University)	To be taken into account if peer reviewed by cut off date.
13-689	A	43	51			Joint implementation has raised high hopes of mobilising investment, technology and capacity transfer to capture some of the major cost-effective energy-efficiency potentials in the former communist countries. However, experiences to date have not indicated that JI will be able to play a major role in unlocking these potentials. Novikova and Urge-Vorsatz (2005) have investigated the outlook for the flexibility mechanisms in the former communist countries that have joined and will join the European Union, and concluded that joint implementation is likely to play a positive, but rather limited role. Instead, project-based emission-trading or green investment schemes may pick up speed. (Diana Urge-Vorsatz, Central European University)	To be taken into account if peer reviewed by cut off date.
13-690	A	43	51			Consider using the text above on JI - JI also may deserve this added attention. Sorry that I messed up the cells, I cannot fix them…. The above 4 cells should be merged. (Diana Urge-Vorsatz, Central European University)	Covered before.
13-691	A	43	51			(Diana Urge-Vorsatz, Central European University)	Covered before.
13-692	A	43	51			(Diana Urge-Vorsatz, Central European University)	Covered before.
13-693	A	43	51			(Diana Urge-Vorsatz, Central European University)	Covered before.
13-694	A	43	53	43	53	"new member states" should be "new EU member states". (Jos Sijm, ECN)	Accepted.
13-695	A	44	10			The concept of the Green Investment Scheme would deserve its own paragraph in this chapter, as it may play an important role by 2010. While it is presently mainly on the proposal stage, there is a lot of hype about it, and many CEE countries are seriously considering GIS. Consider using literature from the World Bank, Charlotte Streck, or others. Bulgaria will probably introduce the first GIS in the world in the near future. (Diana Urge-Vorsatz, Central European University)	New para on GIS with literature.
13-696	A	44	12	51	13	This section should be on technology agreements (R&D and diffusion/transfer), but it also covers (through Barrett 2001, 2003 and theough section 13.3.2.7) the coordinated policies and measures approach. This is confusing, because that is in principle contained in section 13.3.2.3. The issue of coordinated international R&D	- potential overlap woth P&Ms noted - moved Box to technology agreements - added discussion on env effectiveness and economic efficiency.

						is not clearly separated from diffusion/ transfer (the reference to agreements in lines 14-15 on page 45 and the box belong to the R&D paragraph). No assessment of the effectiveness of such agreements is given and that is a serious omission in the light of the political differences that exist on the best way forward under the UNFCCC. On technology transfer the section does not at all make reference to the IPCC Special report on technology Transfer, although that is probably still one of the most comprehensive and still relevant overviews of the main issues. A reference to Ch 2 on this is also necessary. On financing the emphasis is too much on the financing mechanisms per se and not enough on how financing arrangements can be part of international agreements (the focus of this section of the chapter). The literature base for the assessment of finance mechanisms is rather weak; are there no other studies? (Bert Metz, IPCC)	- link to SR nad CH made -
13-697	A	44	19			There are many more studies on technology agreements, by Edmonds, Galeotti, Tol (Richard Tol, Hamburg University)	Will have more analysis
13-698	A	44	32			13.3.2.4.2 : M.Grubb,Technology innovation and climate change policy: an overview of issues and options, "Keio Economic Studies", Vol.41, No.2 2004 summerises a range of technology agreements from clean energy R&D fund and "stepping stones" agreement to strategic deployment agreement and technology transfer agreement. (Koji Kadono, Global Industrial and Social Progress Research Institute)	Will have more analysis
13-699	A	44	37	45	20	Alternative future of climate regime have been explored by scenario analysis approach for technology track , binding cap approach as well as "cleaner development" approach. While the ultimate regime is likely to be the combination of all three elements, there are two strategies for the immediate future, namely, either "Cap frist stragegies" or "Empower first strategy" to which technology track belongs. See: Sugiyama, Taishi ed.(2005a), Governing Climate: The Struggle for a Global Framework Beyond Kyoto, ISBN 1-895536-83-9; Sugiyama, Taishi ed.(2005b) Scenarios for the Global Climate Regime after 2012 Special Issue, International Environmental Agreements 5:1-3 Springer (ISSN1567-9764). (Taishi Sugiyama, CRIEPI)	Ref and text included
13-700	A	44	39	44	42	"The UNFCCC and the Kyoto Protocol already include funds and project activities, although contribu-tions to and participation in those are mostly voluntary. It also includes provisions for technology transfer, but volumes of financial flows are not defined." These two extremely vague sentences must be deleted. They do not carry any meaning at all. If there is fund and activities under the FCCC and KP for tech transfer, name them. Article 4.3, 4.5 and 4.7 contain the provision for the technology transfer and if the authors are unable to define the volume of finance,(so are the Annex I Parties), I suggest that the sentence be deleted. (Kok Kee Chow, Malaysian Meteorological Deparment)	Rephrased

13-701	A	44	44	45	6	This section is disappointing in describing the work of the EGTT. It should be augmented with information from the proceedings of its workshops at COP-9 in Milan and also its Financing workshop both of which appear in UNFCCC SBSTA literature. (Nick Campbell, ARKEMA SA)	Will be revised
13-702	A	44	0	45		I think it should be emphasized that both R&D support and correct price signals are needed. This is sometimes phrased more as an either / or issue. However there are 2 market failures: The first of these is of course that the disposal of carbon in the atmosphere is an un-owned and un-priced resource which creates global externalities. The second is that the fruits of research in this (and many other) areas are hard to appropriate (if someone finds a good way of producing carbon free energy it will probably be copied and the researcher will not necessarily receive his "due" fees or profits. For this reason, there will not be much research - at least not sufficient research from private sources. This is a reason for positive intervention (publically funded or supported research). Hence it is not appropriate just to use one instrument. If only carbon emission price signals are used (taxes or permits) then there will be insufficient R&D and with a lack of suitable technology it will be politically impossible to even set the tax (or permits) to an appropriately stringent level. If only R&D support is used then researchers will do good Research and publish papers (as we like to do) but there is no mechanism that makes sure the technology researched is really the technology that helps solve a practical problem of energy supply at a given shadow price of carbon emissions! If you want references on this then see for instance Christian Azar & Björn A. Sandén and Thomas Sterner "Technology, policy and climate change" New Academy Review, special edition on Climate Change, april 2004. (Thomas Sterner, University of Gothenburg)	Para added
13-703	A	44	0			the section on technology is rather brief on technology agreements; there is much more literature on this issue (see e.g. publications by the IEA and Den Elzen and Berk (2004c). technology transfer is no clear policy instrument; coordinated international R&D is; thus a change of heading is suggested. (Marcel Berk, Netherlands Environmental Assessment Agency)	Will check refs
13-704	A	45	8	45	12	The section on technology transfer should discuss the issue of intellectual property rights--how lack of IPR protection in many countries has served as a barrier to TT, one the private sector views as highly problematic in many case studies. (Joanna Lewis, Pew Center on Global Climate Change)	Will check refs
13-705	A	45	15			Relating to the first sentence, this has been pointed out by other articles which should also be referred. One of the first comprehensive studies may be the one published in Inter-linkages: The Kyoto Protocol and the International Trade and Investment Regime (W. B. Chambers ed.: UNU (2001)), especially 3 articles written by Chambers, Werksman and Werksman and Santoro.	Will check refs

						(Kenichi Oshima, Ritsumeikan University)	
13-706	A	45	33	47	39	This is an important section which may need streamlined, in particular a sub-heading for ECAs, linked more closely to the section on MDBs, which tend to both work to more commercial terms than ODA. The former have a potentially very important role to play in buying down risk, and the cost of capital for private sector players entering emerging/developing country markets, and additionally in small scale financing. A report is in press by SEFI (Sustainable Energy Finance Initiative) with a preliminary article (Environmental Finance October) referenced that outlines issues in this area (local government also has an important role in this regard). (Kirsty Hamilton, retainer to UK Business Council for Sustainable Energy; Associate Fellow, Chatham House.)	Reference added.
13-707	A	45	0			the section on financing is still very general and could be more focussed on climate relevant investment decisions (Marcel Berk, Netherlands Environmental Assessment Agency)	Noted
13-708	A	46	8	46	20	See also Gallagher, Kelly Sims (2003, 2005) on how FDI can hurt sustainable development by reducing the incentive to innovate, and the incentive to increase environmental standards at risk of hurting domestic industry. (Joanna Lewis, Pew Center on Global Climate Change)	Check paper
13-709	A	46	20			An indication how much the 2 billion are as a percentage of total FDI would be helpful to interpret the dimension. (Regina Annette Betz, University of New South Wales (UNSW))	Accepted. Will be included
13-710	A	46	29	46	39	I think that this paragraphe is over pessimistic, since there is mixed empirical evidence. Milenik & Goldemberg (2002) analyze the relationship between the decline in energy intensity of GDP and FDI flows in 20 developing countries. Their result is that there is a clear correlation between the two variables and that 87% of the variations in energy intensity are explained by FDI/GDP. Eskeland & Harrison (2003) look amongst others on the influence of ownership on energy intensity in production and on the use of cleaner energy defined as the share of electricity in a plant's total energy use. They use plant level data in the chemical, petroleum refining, wood and lumber and non-electrical machinery sector for Cote d'Ivore, Mexico and Venezuela. Their main result is that foreign owenership is associated both with less energy use as well as with the "cleaner end" of the range of energy types in all three countries. Blackman & Wu (1999) analyze the role of FDI in the Chinese power sector based mainly on a survey on American investment in the Chines Power sector. One of their main results is that FDI is likely to have a positive impact on energy efficiency. Almost a third of the 20 FDI plants in their survey sample use advanced energy efficiency-enhancing gerneating tehcnologies, and a fifth are clean cogeneration plants. Country or case studies also show that technology transfer via private investment in developing countries is in fact taking	Include reference.

						palce. A study on the transfer of clean coal technologies to China for example (Watson et al. 2000) concludes that "international companies are already engaged in the transfer of cleaner coal technologies and skills to Chinese enterprises through a variety of collaborative arrangements". References: Milnik, O. & J. Goldemberg (2002). Foreign direct investment and decoupling between energy and gross domestic product in developing countries. Energy Policy 30:87-89. Eskeland, G. & A.E. Harrison (2003). Moving to greener pastures? Multinationals and the pollution haven hyopothesis. Journal of Development Economics 70:1-23. Blackman, A. & X. Wu (1999). Foreign direct investment in the Chinese power sector: trends, benefits and barriers. Energy Policy 27: 695-711.Watson, J. et al. (2000). International perspectives on clean coal technology transfer to China. Final Report of the Working Group on Trade and Environment CCICED. (Sonja Peterson, Kiel Institute for World Economics)	
13-711	A	46	42	47	13	A good reference which gives an overivew over the issue of ODA and tehcnolgoy transfer is Heller, T. & P.R. Shuka (2003). Development and Climate: Engaging developing countries. In: Aldy et al. (2003). Beyond Kyoto - Advancing the international effort against climate change. Pew Center on Global Climate Change, Arlington, Va. (Sonja Peterson, Kiel Institute for World Economics)	Include reference
13-712	A	47	14			This comment is also related to page 57 from line 12. Although "of modest scale", by being financial mechanisms to four conventions, GEF efforts try to create inter-linkages and synergies of climate issue with issues covered by other conventions. See Jake Werksman"Consolidating global environmental governance: New lessons from the GEF?" in Norichika Kanie and Peter M. Haas eds. "Emerging Forces in Environmental Governence", 2004, UNU Press (Norichika Kanie, Tokyo Institute of Technology)	Rejected.
13-713	A	47	22	47	30	There have been suggestions for reforming the GEF to improve its performance with regard to climate change mitigation financing. For example, Grafton et al. (2004) proposed a rules- and incentive-based system for determining contributions to and disbursements from the GEF, which might improve the chances to address large-scale emissions sources such as tropical peat fires through GEF financing. REFERENCE: Grafton, R. Q., Jotzo, F. and Wasson, M. (2004), "Financing sustainable development: Country Undertakings and Rights for Environmental Sustainability CURES", Ecological Economics 51(1-2): 65-78. (Frank Jotzo, Australian National University)	Considered in text.
13-714	A	47	32	47	39	One valuable effort is from EBRD which is insisting that loans to industrial users must feature a survey of energy efficiency , which may then lead to a supplementary loan for that purpose. (Andrew Dlugolecki, university of east anglia)	Check EBRD website on requirement

13-715	A	47	43	47	45	Stdy has been done on institution capacity and capacity building needs related to CDM in Latin America by Christina Figueras for the IADB (Dian Phylipsen, Ecofys)	Well be dealt with in CDM section
13-716	A	47	47			The word "building" is missing after "Capacity". (Regina Annette Betz, University of New South Wales (UNSW))	Accepted.
13-717	A	48	13			What does "unlearn" mean? The sentence is difficult to understand. (Regina Annette Betz, University of New South Wales (UNSW))	Rephrased
13-718	A	48	18	48	19	Last sentence should logically foloow afterv the first sentence of the para, without the however. ..from outside a country. Since capacity issues etc. (Claire Parker, Environmental Policy Consultant)	Accepted
13-719	A	48	21	49	51	sub section 13.3.2.7 is relatively too long and seems to cover only the tax/ trade aspects of harmonising policies. (Claire Parker, Environmental Policy Consultant)	Text shortened
13-720	A	48	21	49	51	given that the same countries negotiate WTO/GATT rules and the climate regime, certainly it's worth pointing out that WTO/GATT rules could be changed to allow rational climate policies? Do none of the articles cited suggest this? (Paul Baer, Stanford University)	Text revised
13-721	A	48	29	48	34	We do not understand the reason for the descrition that a tax is often considered an "appropriate" instrument to address climate change. Also we do not understand the relation to the section 13.3 (Shigeo Murayama, The Federation of Electric Power Companies)	Para deleted
13-722	A	48	0			the section on coordinated policies and measures (PAMs) is much too narrowly and extensively focused on taxation and trade issues only; there are many other options possible like international technology standards (e.g. energy efficiency); (Marcel Berk, Netherlands Environmental Assessment Agency)	Added
13-723	A	49	49	49	49	What does TRIMs mean? (Jos Sijm, ECN)	Accepted.
13-724	A	49	0			it is not clear to me why a section on compliance fits in here; it is neither an action nor commitment; the section discusses in fact compliance as a criterion for designing regimes; it thus would fit in much better under the section on criteria fvor evaluating agreements (Marcel Berk, Netherlands Environmental Assessment Agency)	Changed the hierarchy of the section.
13-725	A	50	15			It is true that traditional enforcement model of compliance has some limits to ensure compliance of multilateral environmental agreement and that importance of a "management" model of compliance has been increasing. But in reality, a mixed approach, in other words, "carrot-and-stick" approach has been often adopted. Especially "stick" has effect to deter non-compliance. Even in case of the Montreal Protocol, non-compliance procedure under the Protocol provides for suspension of rights and privileges as a consequence to non-compliance, which some scholars classifies as sanction (for instance, Chayes and Chayes consider as membership	Review refs

						sanctions (The New Sovereignty: Compliance with international Regulatory Agreement)).What kind of compliance procedures and mechanisms are to take shape beyond the year 2012 --- it much depends on what the whole regime is like, including the nature of obligations, to whom these obligations are to be addressed, the other regime elements such as the Kyoto mechanism. Emissions trading schemes, by nature, require effective enforcement of compliance sufficient to deter non-compliance in order to keep the carbon market operating soundly, which has been broadly recognized by scholars (for instance, Haites 2005*) as well as by lessons from the precedents such as the U. S. SOx emissions trading scheme (Ellerman et al. 2003, Commission of the European Communities 2001**) . That is indicated by The Future Climate Regime: Using the Scenario Planning Approach to Develop Options (NIES/IGES Research Project Final Report, October 2005, p. 11 et s.) as well as TAKAMURA, Y, "Legal Issues Relating to a Future Climate Change Regime Beyond the First Commitment Period of the Kyoto Protocol" in Jurist No. 1296, 2005.9.1, p. 75 (in Japanese). It should be noted that this first order draft itself has well confirmed it (p. 13, l. 35 et s.). * Haites, E. (2005) Conclusion: Mechanisms, linkages and the direction of the future climate regime, in Yamin, F. (2005) Climate Change and Carbon Markets 321, 329, Eartshcan; Commission of the European Communities (2001) at 16.**Ellerman, A. D. et al. (2003) Emissions trading in the U.S.: Experience, Lessons, and Considerations for Greenhouse Gases, Pew Center on Global Climate Change, in particular, p. 45-46; Commission of the European Communities (2001) Proposal for a Directive of the European Parliament and of the Council establishing a scheme for greenhouse gas emission allowance trading within the Community and amending Council Directive 96/61/EC, at 14, COM(2001) 581 final, 2001/0245 (COD), Brussels, 23.10.2001. (Kenichi Oshima, Ritsumeikan University)	
13-726	A	50	25			Why does the developing countries need to get help from Facilitation Branch. Only developed countries have targets and will be judge from the Facilitation Branch. (Regina Annette Betz, University of New South Wales (UNSW))	Will check
13-727	A	50	49	50	51	I strongly recommend to replace the reference to Murase 2002 with Brewer, Thomas L. "The trade regime and the climate regime: institutional evolution and adaptation," Climate Policy, Vol. 3, pp. 329-341, and Werksman, Jacob (1999) "Greenhouse Gas Emission Trading and the WTO," Review of European Community and International Environmental Law, Vol. 8 No. 3, pp. 251-264, or Meinhard Doelle (2004) "Climate Change and the WTO: Opportunities to Motivate State Action on Climate Change through the World Trade Organization," Review of European Community and International Environmental Law, Vol. 13 No.1, pp. 85-103, because the original article by Werksman was written earlier than Murase 2002, and these three articles are more comprehensive than Murase 2002. More to add, Murase 2002 is not a peer-reviewed article. It would be definitely better for	Accepted. Originally wrong citation

						the IPCC's quality and readability to refer to English-written and peer-reviewed articles if the non-English and non-peer-reviewed article could be replaced with those. (Atsushi Ishii, Tohoku University)	
13-728	A	51	10	51	14	I strongly recommend to replace the reference to Murase 2002 with Biermann, Frank and Steffan Bauer (eds.) (2005) A World Environment Organization: Solution Or Threat For Effective International Environmental Governance?, Ashgate, because this book is more comprehensive than Murase 2002. More to add, Murase 2002 is not a peer-reviewed article. It would be definitely better for the IPCC's quality and readability to refer to English-written books if the non-English and non-peer-reviewed article could be replaced with those. (Atsushi Ishii, Tohoku University)	Accepted. Originally wrong citation
13-729	A	51	15			Title seems appropriate for these crucial means of assessment. (Catherine Beard, Greenhouse Policy Coalition (NGO representing energy intensive sector))	Changed
13-730	A	51	15	51	15	The criteria for evaluating international agreements must be entirely different from the criteria to evaluate national policies (because of the government-governance difference mentioned before). I have many problems with this chapter and in particular with Table 13.6. (p.51) which presents an “indicative” assessment prone to many subjective value judgements. (Reimund Schwarze, DIW Berlin)	Considered, tables deleted.
13-731	A	51	15			The “timing/state-dependency” of evaluation criteria should be explained. For example, the relative importance of economic efficiency as a criterion for industrialised countries (with developed formal institutions, high marginal costs of abatement) vs. the relative importance of enforceability as a criterion in developing countries (with less developed formal institutions, lower MC of abatement). (Reimund Schwarze, DIW Berlin)	Miss a reference on it
13-732	A	51	15	54	43	Several parts of description of criteria are overlapping with those in National Policy Instruments (13.2.2.). Therefore should focus here only on the points that are different from domestic ones. (Mitsutsune Yamaguchi, Teikyo University)	Noted.
13-733	A	51	15	57	10	The title for this sub-section should be "Evaluation of Effective Implementation of Policies and Measures". This sub-section should be condesed as many of the facts related to effectiveness criteria have been explained in earlier sub-section. (Kok Kee Chow, Malaysian Meteorological Deparment)	Considered in restructuring
13-734	A	51	15	51	15	The word agreements is too general. Please, try to be more specific, e.g. (international) environmental/climate change agreements. (Jos Sijm, ECN)	Accepted
13-735	A	51	15	57	10	This section should help decision makers/ negotiators to draw lessons from the literature on what approaches for international agreements for the post-2012 period	Adressed in discussing the various options. Added a summary table. More quantitative

						might work. That requires a more detailed discussion of how approaches perform vis a vis criteria. One important criterion is delivery of substantial reductions over time. Not all approaches are equally effective in realising such significant reductions (they would lead to slow reductions that would rule out certain low stabilisation levels to be reached). This is very important to show. Ideally it would be nice if these things can be quantified through some modelling exercise. If that is not possible a more in-depth qualitative analyses is needed. (Bert Metz, IPCC)	results. No new modelling exercise
13-736	A	51	15	57	10	An important criterion that seems to be missing in this section is whether an agreement helps sustainable development. This is fundamental in the political debate and seems to be an essential element of an acceptable agreement. This issue now seems hidden in the section on political feasibility , but it may be better to make it explicit. There is now ample literature (see eg ch 2 and 12) for possible ways to bring this into international agreements. Another criterion that needs discussion is the consistency with / limitations provided by other international agreements. In particular the relations with the International Trade Agreements (now discussed in 13.3.4 where it does not belong) requires attention, as is illustrated by box 13.8 (certain approaches may not be compartible with current WTO rules) (Bert Metz, IPCC)	.Will be addressed through restructuring
13-737	A	51	20	51	22	Torvanger and Ringius (2000) and Torvanger and Ringius (2002) are essentially the same. (Asbjørn Torvanger, CICERO)	Accepted
13-738	A	51	20	51	20	Please specify 'evaluation criteria': for what? (Jos Sijm, ECN)	Text adapted.
13-739	A	51	24	51	26	Quite some new literature has been published recently (reports of METI, IGES, IISD, etc.) (Michel den Elzen, The Netherlands Environmental Agency)	Will review the reports.
13-740	A	51	26			Table 13.7 is only part of Table A1 of Aldy et al. Since 2003, more proposals have emerged; Ray Kopp and Steve Peck have excellent suggestions. (Richard Tol, Hamburg University)	Deleted table
13-741	A	51	26	51	26	The “policy alternatives” in column 1 of Tab. 13.7 are not defined; the literature stated in this column is not cited in the list of references (some by chance only). (Reimund Schwarze, DIW Berlin)	Deleted table
13-742	A	51	27	51	27	Table 13.6: Why choose the Table of the Hohne report (is already cited many times), and there are other reports (as cited above) that have done the same. It would be better to ocmbine the efforts of the others in one Table (Michel den Elzen, The Netherlands Environmental Agency)	Deleted table
13-743	A	51	27	51	27	Table 13.6: I think such a Table needs to be included, but then you also need the approaches in more detail in Section 13.3. Otherwise the Table is inconsistent with	Deleted table

						the earlier text, as many approaches are not discussed. I would suggest contacting the authors, and coming up with a nice Table that represents the view of all these studies. Of course, as I already suggested before, you also need the approaches in more detail. (Michel den Elzen, The Netherlands Environmental Agency)	
13-744	A	51	27			Table 13.7: Hypothesis 9 is missing. (Jos Sijm, ECN)	Deleted table
13-745	A	51	31	51	31	the multi-sector convergence and triptych regime. (Michel den Elzen, The Netherlands Environmental Agency)	Accepted
13-746	A	51	36		41	In their summary of the literature the authors introduce the term social resilience, including reducing inequality. I cannot agree that that is to be found in the literature on climate change regimes: regimes should deal with equity to be socially/politically acceptable, but it goes much further to state that CC policies should (help) reduce inequality. (Marcel Berk, Netherlands Environmental Assessment Agency)	Weakened language
13-747	A	51	38			'Strengthen social resilience" seems like a rather liberal interpretation of the elements of climate change agreements mentioned by the authors (Dian Phylipsen, Ecofys)	Weakened language
13-748	A	51	39	51	41	There is no consensus as to the fact that equity is a necessary ingredient for successful international agreements. In fact, there is plenty of literature that shows that only unequitable side-payments are successful in solving problems of asymmetries in non-cooperative games (e.g., Hoel, Michael: Efficient Climate Policy in the Presence of Free Riders, JEEM 27, pp. 259-274). (Reimund Schwarze, DIW Berlin)	Will review paper
13-749	A	51	43			it is unclear to me what is meant with saying that the procedures and processes to be followed for evaluating agreements will vary from country to country. Does it mean that countries will judge proposals differently depending on their circumstances or that this should be the case? (Marcel Berk, Netherlands Environmental Assessment Agency)	Agreed. No change necessary
13-750	A	51	51			Overlap with section 13.2.2. Combine? (Dian Phylipsen, Ecofys)	Accepted.
13-751	A	51	51	51	51	The word agreements is too general. Please, try to be more specific, e.g. (international) environmental/climate change agreements. (Jos Sijm, ECN)	Accepted.
13-752	A	51	0			Again a set of criteria for evaluating agreements is proposed, different from those for national instruments. This should be more clearly discussed in the set up of the chapter (Marcel Berk, Netherlands Environmental Assessment Agency)	Accepted
13-753	A	52	8			Please provide references. As far as I know this literature, then the methodologically sound papers all point in the same direction, with a handful of	Will add references. Added para on effectiveness

						unsound papers disagreeing on flimsy grounds. (Richard Tol, Hamburg University)	
13-754	A	52	37			Efficiency and cost-effectiveness are not the same. (Richard Tol, Hamburg University)	will be rewritten
13-755	A	52	39			Efficiency is an extremum; something cannot be more or most efficient, or less or least (Richard Tol, Hamburg University)	will be rewritten
13-756	A	52	40			Efficiency would not minimise costs, but net costs. (Richard Tol, Hamburg University)	Rejected. Global=net
13-757	A	52	41			Efficiency does not imply flexibility; flexibility may imply efficiency. (Richard Tol, Hamburg University)	Agreed. But text does not have to be changed.
13-758	A	52	45			Why would efficiency imply certainty? (Richard Tol, Hamburg University)	Accepted. Sentence deleted.
13-759	A	52	45		46	cost effectiveness is mainly affected by: flexibility, participation and transaction costs; I don;t see why certainty about costs plays a role here as well. (Marcel Berk, Netherlands Environmental Assessment Agency)	Accepted.
13-760	A	52	53			most efficient should be cost-effective (Richard Tol, Hamburg University)	Rejected. Efficiency and effectives are not equivalent.
13-761	A	53	13	53	13	Add to box: Alternatively, global trading regimes with sectorial participation on the basis of (regional) performance standards (PSRs) and ex-post control would remedy leakage of emissions and provide for unambiguous incentives for efficiency improvement and innovation (Schyns, 2005 b and d). (Vianney Schyns, DSM & SABIC)	Rejected since too specific and not peer reviewed.
13-762	A	53	13			Box 13.7 The Glossary has an excellent summary of the issues that comprise leakage and it would be useful to include that here too. (Catherine Beard, Greenhouse Policy Coalition (NGO representing energy intensive sector))	Referred to glossary
13-763	A	53	15			Under the section "Political Feasibility", there ought to be be a subsection on uncertainty. The greater uncertainty about compliance costs, the greater the political obstacles to adoption of a mitigation policy. (See above; references: Kim and Baumert 2002, Philibert and Pershing 2002, and many others.) (Frank Jotzo, Australian National University)	Discussed in TAR. Will ask Frenc Toth for contribution on new literature on decision under uncertainty
13-764	A	53	17			Why is equity subsumed under feasibility? (Richard Tol, Hamburg University)	To be restructured
13-765	A	53	17	54	43	Priciples of equity and fairness have in recent years also received considerable attention specifically in relation to climate change. See for a very important survey article: Stephen M. Gardiner, Ethics and Climate Change, Ethics, 114 (April 2004): 555-600. (Gert de Gans, Kerkinactie)	To be restructured
13-766	A	53	17	53	17	Here equity is included as a part of political feasibility criteria. Equity, however,	To be restructured

						should be treated independently as one of the criteria. Equity and economic efficiency has the same feature to affect political feasibility. Therefore, if economic efficiency is treated independently, equity should also be treated in the same manner. (Mitsutsune Yamaguchi, Teikyo University)	
13-767	A	53	17	54	43	13.3.3.4.1 Equity - overlap with section 13.3.1.3? (Dian Phylipsen, Ecofys)	To be restructured
13-768	A	53	19			Section 13.3.3.4.1 Equity. As already mentioned, this section is well presented. It could usefully be used to strengthen---if not, in fact, largely replace----Section 1.5.7 on equity and ethics in Chapter 1 (Introduction) (Pat Finnegan, Grian)	To be restructured
13-769	A	53	0			Torvanger et al. (2004) in Box 13.7 is missing in ref.list. (Asbjørn Torvanger, CICERO)	Accepted.
13-770	A	53	0			Box 13.7, last section: Sijm (2004) is mentioned in the text but not included in the list of references. (Jos Sijm, ECN)	Accepted.
13-771	A	53	0			The section on equity should be a little more systematic in its approach. It does not distinquish between allocation-bases, outcome based and procedural equity, nor equity regarding dealing with mitigation and with impacts. The literature discussed seems somewhat randomly selected (e.g. the work of Leimbach). Moreover the implications of the application of various equity principles is not discussed; while their is sufficient literature that has quantitatively done so (Marcel Berk, Netherlands Environmental Assessment Agency)	To be restructured
13-772	A	54	13	54	19	Why is this issue of equity principles not discussed earlier in Section 13.3.1.3 (Michel den Elzen, The Netherlands Environmental Agency)	To be restructured
13-773	A	54	13		19	in Den Elzen et al, 2003 I concluded that the UNFCCC explicitly supports the principles of responsibility and capability,and implicitly supports the basic need principle. In addition, it is clear that no distribution of commitments or of the measures taken to implement them should result in abnormal and disproportional burdening of some countries. This means that also an outcome based criterium is to be met. i also argued that the concept of "need" as used by Torvanger at al 2001 is rather ambigious and should not be equalised with the equalitarian concept of equal per capita rights to emissions (Marcel Berk, Netherlands Environmental Assessment Agency)	To be restructured
13-774	A	54	14	54	19	I suggest to change the sequence to "need, capacity, responsibility" to better reflect the relative importance of these three fairness principles. (Asbjørn Torvanger, CICERO)	To be restructured
13-775	A	54	20	54	40	[Same comment as for p. 32-33] It would be useful to refer to analysis that questions the political realism of normative schemes for differentiation of targets for equity objectives. For example, Baumert et al.(2003) argue that North-South	To be restructured

						equity concerns cannot be fully addressed through differentiated targets under emissions trading. REFERENCE: Baumert, K. A., Perkaus, J. F. and Kete, N. (2003), "Great expectations: can international emissions trading deliver an equitable climate regime?" Climate Policy 3: 137-148. (Frank Jotzo, Australian National University)	
13-776	A	54	21			You describe Tol (2001), not Kemfert and Tol (2002). (Richard Tol, Hamburg University)	Deleted para, since stating the obvious
13-777	A	54	21	54	30	It should be noted that Kemfert and Tol 2002 is a modeling study, and the results need to be assumed to be model dependent. (Paul Baer, Stanford University)	Deleted para, since stating the obvious
13-778	A	54	25	54	30	This bears the hallmark of academic unreality.See Dlugolecki's short paper on liability in Tang "Financing Climate Change". There are several practical objections to this idea of using damage as the basis, and it should not be seriously included- attribution is one problem, timing (ie damage comes well after emissions), force majeur- no powerful nation would accept it, and then of course several major developing nations will become major emitters (soon (not to mention the question of ancient emissions from clearing Mesopotamia etc) (Andrew Dlugolecki, university of east anglia)	Deleted para, since stating the obvious
13-779	A	54	34		39	as far as I know Marian Leimbach is a he not a she (Marcel Berk, Netherlands Environmental Assessment Agency)	Accepted.
13-780	A	55	21	55	30	This paragraph doesn't describe Nordhaus and Yang 1996 as I recall it (whereas the next paragraph describes it correctly). (Paul Baer, Stanford University)	Para deleted as old literature. (page 56)
13-781	A	55	25			This subsection could be better organised following some recent literature review articles, such as (1) Folmer, H., Hanley, N. and Missfeldt, F. (1998), “Game-theoretical modelling of environmental and resource problems: an introduction”, in Hanley N. and Folmer H. (eds.), Game Theory and the Environment, Edward Elgar; (2) Wagner, U. J. (2001), “The design of stable international environmental agreements: economic theory and political economy”, Journal of Economic Surveys, 15: 377-411.(3) Missfeldt, F. (1999), “Game-theoretic modelling of trasnboundary pollution”, Journal of Economic Surveys, 13: 287-321. (Juan Carlos Ciscar, IPTS, European Commission)	Need to check refs
13-782	A	55	33	55	49	Whole part on policy integration is not clear (Dian Phylipsen, Ecofys)	Review the papers and revise accordingly
13-783	A	55	39			The paragraph starting with "Den Elzen… " up to the end seems to be repeated again in the next paragraph and needs therefore to be deleted. (Regina Annette Betz, University of New South Wales (UNSW))	Accepted
13-784	A	55	39	56	8	Text ("Den Elzen….coalition") is repeated twice. (Jos Sijm, ECN)	Accepted
13-785	A	55	44			Kemfert is an outlier. There are many papers on issue linkage, most with the	Rejected.

						opposite conclusion. In fact, it has been shown that linking a commons good (climate change) to a club good (technology) cannot work. (Richard Tol, Hamburg University)	
13-786	A	55	50	55	55	Repeated text (see line 41-43) (Michel den Elzen, The Netherlands Environmental Agency)	Accepted
13-787	A	55	50	56	8	repeat of previous section (Dian Phylipsen, Ecofys)	Accepted
13-788	A	55	0			the section on issue-linkage / side payments is a mixed bag: it hardly addresses the issue of side payments as a way of equalising gains from international cooperation as explored in game theory by economists. It also does not discuss the practise of issue linking, such as in the case of Russia signing the KP for support for its membership of the WTO (like in section 13.3.4). Instead it discusses our work on bottom-up approaches and technological cooperation that should be included elsewhere in the chapter, e.g. section 13.3.2 on environmental effectiveness. Moreover, there is repetition of this paragragh in the text. (Marcel Berk, Netherlands Environmental Assessment Agency)	Will be rewritten
13-789	A	56	5			Again, you refer to Kemfert, who is an outlier. The notion that the US can be lured with the promise of foreign technology is fairly absurd. (Richard Tol, Hamburg University)	Covered by existing text.
13-790	A	56	22			Nordhaus and Yang do not use a two-country model. This whole review of the game theory literature is very poor. You have missed some 95% of the relevant papers. (Richard Tol, Hamburg University)	Para deleted
13-791	A	56	0			the section on technical implication issues is very general and rudimentairy still. It does not discuss issues related to conditions for and implications of regime approaches for monitoring, implementation, verification, and enforcement requirements and institutional and capacity building requirements. (Marcel Berk, Netherlands Environmental Assessment Agency)	To be revised
13-792	A	57	11	57	11	Chap. 13.3.4 looks into the interaction between "overlapping" international policies, not "national" and international policies: the WTO is an international agreement, not a national trade policy. (Reimund Schwarze, DIW Berlin)	Accepted.
13-793	A	57	12			The issues covered in this section, “interaction between national and international policies and agreements”, have gained lots of attentions in the recent literature of international relations as "vertical linkage" or "vertical interplay". Some work focuses on institutional linkage and interplay, while other focuses on climate negotiation and impact of domestic policy on global negotiation process. Mentioning to scientific work in that field may be of benefit to the report. Examples are: Kanie (2003) “Leadership in Multilateral Negotiation and Domestic Policy : The Netherlands’ at the Kyoto Protocol Negotiation", International	Check Kanie 2003

						Negotiation Vol8.No.2., pp.339-365, Schreurs and Economy (1997) The internationalization of Environmental Protection, Cambridge University Press, Young (2002) The Institutional Dimensions of Environmental Change, MIT Press, Kanie and Haas (2004) Emerging Forces in Environmental Governance, UNU Press. (Norichika Kanie, Tokyo Institute of Technology)	
13-794	A	57	12	61	16	he trade issues are better treated under the criteria for judging climate agreement elements (see other copmments) and the section on bilateral agrements does not add much to the discussion of international agreements in its current form. It may be useful to seriously explore in how far bilateral or limited multilateral agreements could be an alternative to broad multilateral agreements. Particularly the effectiveness would be a key point to investigate. (Bert Metz, IPCC)	Added sentences: in TAR, new studies but no new conclusions.
13-795	A	57	14			Recent study of environmental governance also addresses climate change issue in relation to other issues. Those studies have mainly conducted in the context of wider institutional reform on environmental governance, but also suggests one of the future directions of climate regime in multilateral context. See, for example, Esty and Ivanova (2002) Global Environmental Governance, Yale School of Forestry and Environmental Studies, Chambers and Green (2005) Reforming International Environmental Governance, UNU Press, Kanie and Haas (2004) Emerging Forces in Environmental Governance, UNU Press, and Biermann (2005) A World Environment Organization: Solution Or Threat For Effective International Environmental Governance? (Norichika Kanie, Tokyo Institute of Technology)	Text to be moved and modified.
13-796	A	57	16	57	47	More recent work available from IISD, A. Cosbey (Dian Phylipsen, Ecofys)	To be considered
13-797	A	57	19	57	22	Umm, isn't consultations between WTO members and UNFCCC parties the wrong framing of the issue - as I noted above, these are the same countries! (Paul Baer, Stanford University)	Addressed earlier in text
13-798	A	57	27	57	39	Inter-linkage between climate regime and WTO has been studied also at UNU. They have fairly big project, and may be of your interests to look them up. Global Climate Governance: Inter-linkages between the Kyoto Protocol and other Multilateral Regimes(http://www.geic.or.jp/climgov/content.html), Sampson (2005) The WTO and Sustainable Development, UNU Press (Norichika Kanie, Tokyo Institute of Technology)	To be considered in moving text
13-799	A	57	40			Table 13.8: The abbreviation EKC should be spelled out. Environmental Kuznets Curve is not familiar to everybody. (Regina Annette Betz, University of New South Wales (UNSW))	Table deleted
13-800	A	57	40			Table 13.8: Most readers probably do not know where the abbreviation stands for. Please, clarify.	Table deleted

						(Jos Sijm, ECN)	
13-801	A	58	10	58	11	It's worth explaining what this exception clause says - is it potentially releveant or not? (Paul Baer, Stanford University)	To be considered in moving text
13-802	A	58	14	58	18	The authors should refer to Article 3, principle 5 in their discussion on trade measures under FCCC and KP (Kok Kee Chow, Malaysian Meteorological Deparment)	To be considered in moving text
13-803	A	60	5			Box 13.8. The explanation on top-runner program should be modified more exactly. Japanese "Top Runner Standard" have the distinctive feature that the target values are set based on the most energy efficient model on the market at the time of the value-setting process and the weighted average values using shipment volume is used as the target value. Reference: http://www.eccj.or.jp/top_runner/ High energy efficiency standard encourage manufacturers to make technology development and enhance competitiveness of the products. Such a positive aspect should also be addressed. (Yoshiyuki Shimoda, Osaka University)	Accepted
13-804	A	60	5	60	5	Box 13.8: A useful example to demonstrate the conflict between climate and trade agreements. (Reimund Schwarze, DIW Berlin)	Noted
13-805	A	60	5	60	5	Yamaguchi (2005) does not exist in the reference. (Masatake Uezono, Citizens' Alliance for saving the Atmosphere and the Earth)	Add reference
13-806	A	60	0			text box 13.8 - a case study of what? (Dian Phylipsen, Ecofys)	Accepted
13-807	A	61	10			Providing only a few examples of `climate "related" efforts' does not look scientific. They could be anything, if one use widest dfinition. Should you wish to put example, the list should be complehensive. (Norichika Kanie, Tokyo Institute of Technology)	Text be moved and revised
13-808	A	61	16	66	19	I am a bit confused as to the evaluation of these instruments (“subnational, non-governmental initiatives”) in this chapter 13.4 (= modestly positive) and in the introduction (P.4) where they are marked as “insignificant” as regards their environmental effect. This is just another example that the “timing of instruments” is very much neglected in the current draft (as self-reflected in the Note to the Readers of the FOD on p. 25). (Reimund Schwarze, DIW Berlin)	

13-809	A	61	41			P. Thalmann & A. Baranzini (2004) also extensiveley review and discuss the drivers of voluntary environmental actions, see P. Thalmann & A. Baranzini (2004): "An Overview of Voluntary Approaches in Climate Policies" In A. Baranzini & P. Thalmann (Eds) , Voluntary Approaches in Climate Policy. Edward Elgar, Cheltenham (UK), pp. 1-30. (Andrea BARANZINI, Geneva School of Business Administration)	4. Check reference and avoid duplication
13-810	A	61	51			P. Thalmann & A. Baranzini (2004) also extensivley review and discuss the drivers of voluntary environmental actions, see P. Thalmann & A. Baranzini (2004): "An Overview of Voluntary Approaches in Climate Policies" In A. Baranzini & P. Thalmann (Eds) , Voluntary Approaches in Climate Policy. Edward Elgar, Cheltenham (UK), pp. 1-30. (Andrea BARANZINI, Geneva School of Business Administration)	Comment duplicated
13-811	A	61	0	62		This section on voluntary corporate action and Box 13.2 (and/or section 2.1.3 on voluntary agreements) might include the following reference to a voluntary program implemented in October 2005: Arquit Niederberger, A., The Swiss Climate Penny: An innovative approach to transport sector emissions, Transport Policy, 12(4), 303-313, July 2005. It is an example of an entire industry coooperating to take responsibility for emissions from its primary product, motor fuels. The paper also reviews the drivers behind the joint action. (Anne Arquit Niederberger, Policy Solutions)	3. Check reference
13-812	A	61	0			In this chapter, it would also be interesting to mention the Topten consumer information system, which was originally launched in Switzerland by two NGOs, the Swiss Agency for Efficient Energy Use and WWF Switzerland) and is now being implemented under the Energy Intelligent Europe program in 10 EU countries (see www.topten.info and, in particular, www.topten.ch (the most advanced site) for details), with plans to expand to China and Latin America. The system provides up-to-date information on the very most efficient consumer products and services available on local markets (serving a "market-pull" function to encourage manufacturers to continue to develop more efficient products), far beyond the most efficient level required by law. The system has been used to specify terms for government and private sector procurement programs. So, it is a good example of NGO - private sector - government cooperation to reduce information barriers. (Anne Arquit Niederberger, Policy Solutions)	3. Check reference
13-813	A	61	0			Section 13.4.1 - overlap with Section 13.2.1.3 (Dian Phylipsen, Ecofys)	4. Clarify difference between sections
13-814	A	62	5	62	7	The description here is irrelevant (refer to my comment on page 14 lines 38-40). The voluntary initiative of Japanese Keidanren should be classified as a "Voluntary Agreement" (refer to page 417, TAR WG3 Chapter 6). Delete lines 5-7 in page 62.	1

						(Mitsutsune Yamaguchi, Teikyo University)	
13-815	A	62	5	62	7	Suggest to drop the sentence and put the case in Box 13.2. "Examples of national voluntary agreements" because Japan Keidanren's action plan is well recognised by the Japanese government and is part of the government's KP target achievement plan with follow-up assessment on a regular basis by the government. Thus, it is not merely an "unilateral action" to avoid mandatory regulation and government intervention as stated here but can be categorised as a voluntary agreement(M.Yamaguchi, "Environmental effectiveness of voluntary agreement to cope with climate change-an evaluation methodology-",Mita Journal of Economics, Vol 96 No2,2003). (Koji Kadono, Global Industrial and Social Progress Research Institute)	1
13-816	A	62	5			Description regarding Keidanren Voluntary Action Plan, there is a serious mistake. The mistake is two-fold. First of all, the Keidanren's measure is more than a "voluntary action" but is a "voluntary agreement", which is explained in detail in TAR Chapter 6, Box.6.3 on page 418. Second, as the Keidanren's action was designed for the purpose of implementation of Kyoto Protocol and formulated through the government's involvement at various stages, it is by no means designed "to avoid mandatory regulation and government intervention". This is diametrically opposed to what the Keidanren Plan actually is. (Makoto Kaibara, Matsushita Electric Industrial Co., Ltd.)	1
13-817	A	63	35	63	41	True for some of the states, not across the board. RGGI is in early stage. Only 7 states have made decision to implement, other 2 have not yet. (Dian Phylipsen, Ecofys)	1.
13-818	A	63	35	63	41	This should be updated if possible to include RGGI. (Joanna Lewis, Pew Center on Global Climate Change)	1
13-819	A	63	38	63	38	It is 7 States and not 9 States now. (refer to http://www.rggi.org/) (Mitsutsune Yamaguchi, Teikyo University)	1
13-820	A	63	41	63	46	Australian State and Territory Governments have announced their intention to develop a multi-jurisdictional ETS. More information can be found: http://www.cabinet.nsw.gov.au/greenhouse/report.pdf More information on the NSW scheme in Australia can be found in Iain MacGill, Hugh Outhred and Karel Nolles, 2006, "Some design lessons from market-based greenhouse gas regulation in the restructured Australian electricity industry," Energy Policy, Vol. 34, p. 11-25. (Regina Annette Betz, University of New South Wales (UNSW))	1
13-821	A	64	15			13.4.1.3 does not seem related to other subsections under 13.4.1. (Koji Kadono, Global Industrial and Social Progress Research Institute)	1. True. Writing team needs to discuss where to address this.
13-822	A	64	15			13.4.1.3 Litigation related to climate - legal pressures can also work the other way	3

						around (i.e. against environmental goals), see e.g. all the court cases in Germany related to EU ETS allocation (Dian Phylipsen, Ecofys)	
13-823	A	64	25	65	18	The following book might be valuable to add since Philippe Sands is examining the prospects for the Kyoto Protocol and which WTO rules may provide an indirect means for the Kyoto standards to be imposed on parties. Philippe Sands, 2005, Lawless World: America and the Making and Breaking of Global Rules, Allen Lane. (Regina Annette Betz, University of New South Wales (UNSW))	3
13-824	A	64	32	64	34	The Australian court case cited, (Australian Conservation Foundation v Minister for Planning [2004] VCAT 2029) related to climate change only insofar as it is authority for the proposition that a state Minister did not have the power to direct a planning approval panel to exclude considerations about greenhouse gas impacts. This was an administrative law question that focussed more on the power granted in legislation rather than a specific comment upon greenhouse gas impacts and therefore, may not be relevant to the chapter. (Spencer Edwards, Australian Greenhouse Office)	3
13-825	A	64	34			Canada has include GHGs under the Canadian Environmental Protection Act, treating GHGs in a way similar to that proposed by various states in the US arguing that GHGs be under EPA's Clean Air Act. For details, see http://canadagazette.gc.ca/partI/2005/20050903/html/regle4-e.html (John Nyboer, Energy and Materials Reseach Group, School of Resource and Environmental Management, Simon Fraser Univeristy)	3 To be checked
13-826	A	65	30	65	31	It is quite certain that the ISO standards will be published by the time of publication of this report (now it is at the stage of Final Draft International Standard). Please update accordingly. Also footnote 60 should include ISO 14064 Part 2, Greenhouse Gases: Specification with guidance at the project level for quantification, monitoring and reporting of greenhouse gas emission reductions or removal enhancements. This standard is aimed to be used for CDM/JI projects as well as other projects. (Mitsutsune Yamaguchi, Teikyo University)	1 Accept and update as late as possible
13-827	A	65	30	65	31	The ISO standard have been approved therefore the tense needs to be changed: ISO developed standards for quantification, reporting and verification of greenhouse gases and greenhouse gases enhancements for company and project level. ISO standards might be acquired from national standardisation bodies. (Regina Annette Betz, University of New South Wales (UNSW))	1 Accept and update as late as possible
13-828	A	65	43			13.4.2 should be incorporated into 13.4.1.2 in view of the similarity of the topics. (Koji Kadono, Global Industrial and Social Progress Research Institute)	2. Current structure is appropriate
13-829	A	65	43	66	19	This sub-section unfortunatelly gives a false impression of global approach in	3. Add WSSD, Type 2

						addressing the climate change problem as the authors suggest that emission trading is the key approach. There are indeed many LDCs and small island states that are unable to particpate in CDM or emission trading and they will be left out. Many NGOs are currently doing good work among developing countries, particularly at community levels, so are the citizens pressuring their respective gpvornments in addressing the climate change issues. The challenge is to link the international agreement with national development priorities and sustainable development.How developed countries and their private sectors play a more proactive roles in transfer technology to developing countries is a major driver. (Kok Kee Chow, Malaysian Meteorological Deparment)	
13-830	A	65	46			Non-governmental partnerships with NGOs also changes the multilateral process of climate change. See for example, Kanie (2005) NGO Participation in Global Climate Policy Decision-making: A Key for Tackling with Stumbling Blocks, http://web.fu-berlin.de/ffu/akumwelt/bc2005/papers/kanie_bc2005.pdf (Norichika Kanie, Tokyo Institute of Technology)	3. North-South issues to be discussed by entire writing team
13-831	A	66	15	66	17	Linking of EU ETS and NSW scheme as well as the state based Australian scheme is discussed in Betz and MacGill 2005: Emissions trading for Australia: Design, transition and linking options, CEEM discussion paper, Sydeny. Available from www.ceem.unsw.edu.au (Regina Annette Betz, University of New South Wales (UNSW))	3. Discuss in section 13.4.1.2
13-832	A	66	20	66	20	worth including here is the Carbon Disclosure Project -see Dlugolecki, Tyndall Centre Briefing Note 7, also the project website has various literature at "cdproject" (Andrew Dlugolecki, university of east anglia)	3.
13-833	A	67	5	67	5	Remove Keidanren Voluntary Action Plans from the box (refer to my comment on page 62 lines5-7). (Mitsutsune Yamaguchi, Teikyo University)	1
13-834	A	67	5			The Pew Center's Business Environmental Leadership Council (BELC) is now the largest U.S. based association of corporations focused on addressing the challenges of climate change, with forty-one members representing $2 trillion in market capitalization and over 3 million employees (see http://pewclimate.org/companies_leading_the_way_belc/). (Joanna Lewis, Pew Center on Global Climate Change)	1. Include in the box
13-835	A	68	5	68	9	Text should be part of Box 13.9 (Jos Sijm, ECN)	1
13-836	A	68	10			Section 13.5: I would like to see this section address the new literature on policy-based commitments. See for example the Climate Dialogue at Pocantico's (2005) discussion of policy-based approaches (2005). (http://pewclimate.org/docUploads/PEW%5FPocantico%5FReport05%2Epdf). The discussion of policy-based approaches, although could apply to either developed or	3. To be considered in drafting this section

						developing countries, is particularly attractive as a first step towards discussing types of commitments that might be taken on by developing (Non-Annex I) countries. Such policies (discussed throughout this report) could include both climate mitigation policies, as well as policies with other goals that have climate benefits. (Joanna Lewis, Pew Center on Global Climate Change)	
13-837	A	68	10			It is not clear why a separate section 13.5 should be inclused, while the key literaure on possible elements of international agreements are discussed earlier. If new literature becomes available it is better to integrate it and not create a separate section for it. (Bert Metz, IPCC)	3. This section was assigned. Will consider need for the section as part of restructuring the chapter.
13-838	A	68	16			Many references are not peer-reviewed. (Richard Tol, Hamburg University)	3 Will check
13-839	A	68	16			Please, check list of references as some references are mentioned twice, while others are missing. (Jos Sijm, ECN)	1
13-840	A	68	16			many references are still missing in the list of references, making checking statements about these sources impossible (Marcel Berk, Netherlands Environmental Assessment Agency)	1
13-841	A	74	37	74	39	den Elzen, M.G.J and Meinshausen, M., 2006. Multi-gas emission pathways for meeting the EU 2 C climate target. In: H.J. Schellnhuber, W. Cramer, N. Nakicenovic, T. Wigley and G. Yohe (Editors), Avoiding Dangerous Climate Change. Cambridge University Press, Cambridge, UK. (Michel den Elzen, The Netherlands Environmental Agency)	1 If relevant
13-842	A	74	47	74	49	den Elzen, M.G.J. and Lucas, P., 2005. The FAIR model: a tool to analyse environmental and costs implications of climate regimes. Environmental Modeling and Assessment, 10(2): 115-134 (Michel den Elzen, The Netherlands Environmental Agency)	1 If relevant
13-843	A	82	10	82	10	Justus and Philibert, 2005 (not "Justice") (Cédric Philibert, International Energy Agency)	1
13-844	A	82	20	82		References: SUGGESTION: Insert Jotzo, F. and Pezzey, J. C. V. (2005), "Optimal intensity targets for emissions trading under uncertainty", Economics and Environment Network Working Paper EEN0504, Australian National University, Canberra; also published as PESD working paper no.41, Stanford University. [Note: This was submitted for publication in June 2005. Paper attached.] (Frank Jotzo, Australian National University)	1 If relevant
13-845	A	86	37	86	37	Meinshausen, M., 2006. What Does a 2 C Target Mean for Greenhouse Gas Concentrations? A Brief Analysis Based on Multi-Gas Emission Pathways and Several Climate Sensitivity Uncertainty Estimates. In: H.J. Schellnhuber, W.	1 If relevant

						Cramer, N. Nakicenovic, T. Wigley and G. Yohe (Editors), Avoiding Dangerous Climate Change, Cambridge, UK. (Michel den Elzen, The Netherlands Environmental Agency)	
13-846	A	95	39	95	48	Torvanger et al. (2005) and Torvanger et al. (2004) missing. (Asbjørn Torvanger, CICERO)	1
13-847	A	98	43	98	45	"Yamaguchi Mitsutsune 2003" should be replaced with the following: "Yamaguchi, Mitsutsune 2004. Implementing the Kyoto Protocol commitment and Free Trade – Focusing on Japanese Automobile Fuel Efficiency Standards -. Keio Economic Studies Vol.XL1. No. 1, Keio Economic Society pp.37-57". (Mitsutsune Yamaguchi, Teikyo University)	1
13-848	A	105	0			p. 105 Table 13.3 contains many non-climate policy related agreements. While an interesting intellectual exercise and demonstration, due to the very limited space available in the AR4, would it not be more efficient to concentrate on climate-change related agreements only? This may require that the table deviates from international agreements only and covers also national and sub-national agreements (such as the national and municipal targets? ??), but may give a better illustration of the menu of options available for climate-related agreements. (Diana Urge-Vorsatz, Central European University)	
13-849	A	109	0			Page 109, Table 13.5., concerning Carbon Funds of the Government of Japan: The timing for launching the Japanese funds (in fact, it's not the funds, but the up-front payment scheme to cover a part of the costs necessary in implementing CDM project activities and to obtain the credits in exchange for the payment) should be April 2003; and the amount of investment shoud read JPY 22-57 billion per annum. (MASAHIRO NISHIO, Ministry of Economy, Trade and Industry)	Table will be updated.