

**Comments and Responses on SOCCR/SAP 2.2 Draft 1 (May 2006)  
CHAPTER 6**

COMMENT FROM PEER REVIEWERS						AUTHOR'S RESPONSE						
Comment Number	Reviewer ID	Chapter	Page	Line	Comment Text	Acknowledged, but no further response or revisions are required	Revisions have been incorporated as suggested in the comment	Agree, but see "Notes on Response"	Agree, but elaboration is precluded by length limitations	Disagree; see "Notes on Response"	Beyond scope of report/chapter	Notes on Response
06-001	9	6	6-1	32-35	The Key Findings section's last bullet is far too narrow in scope, for example, ignoring major topics and options, especially efficiency and fuel switching.						X	This chapter does not deal with end uses: see other chapters in Part II
06-002	9	6	6-1	General	The Energy Information Administration (EIA) Annual Energy Outlook for 2005 has been superseded by the same document for the year 2006.		X					
06-003	9	6	6-1	27-31	The Key Findings section's 5th bullet should have the "if concerns about carbon cycle imbalances grow" removed to avoid political controversy.		X					
06-004	9	6	6-2	30-32	Are there truly zero energy exports from the U.S. to Mexico and Canada?	X						Statement is true as written, per EIA
06-005	9	6	6-3	21-23	Why make a suggestion? Instead, why not implement the suggestion?			X				Sentence deleted
06-006	9	6	6-4	14	Define "environmental impacts"				X			
06-007	9	6	6-5	1	The first sentence is incorrect unless the authors are using a data base of two North American countries, in which case the statement is silly as stated.		X					
06-008	9	6	6-5	22-26	Use EIA AEO 2006		X					
06-009	9	6	6-5	25	Is the 7% reference meaning 1) from 45 to 38% or 2) 7% of 45% which is about 4%?		X					
06-010	9	6	6-6	28-30	Carrying on the "wedges" analogy is confusing		X					
06-011	9	6	6-6	31 et seq	Even if options are known to be technologically feasible, they still require a tremendous level of RD&D to get the processes ironed out and the costs down – i.e., large-scale capture of carbon requires substantial advances in science.	X						Minor change made in text
06-012	9	6	6-8 thru 6-9		The cost discussion is a cornucopia of different studies and meanings and thus is confusing.			X				Agree. Section shortened. But it accurately represents the state of the existing knowledge, which is not very close to coherent.
06-013	9	6	6-8	32	A cost of 5 cents per kilowatt hour is roughly equivalent to the average price paid by a residential consumer of electricity in numerous states in the U.S. today.		X					
06-014	9	6	6-10	14 et seq	Just like the Key Findings section, the Research and Development Needs section ignores key needs like efficiency.						X	See 06-001 above
06-015	10	6	6-1	19	Should 'comfort , convenience' be listed first (implies most important) as drivers for increase in energy use? Is there data to support this? Is it more likely that productivity and population growth will be the primary drivers for increases in energy consumption?					X		Abundant literatures on consumption behavior.
06-016	10	6	6-1	30-31	This sentence is unclear and strongly implies that it would be preferable to wait to implement carbon emission controls. Is there data to support this? Other studies have indicated different results, and several studies indicate that near-term investments in electricity generation will have very long-term emissions impacts. What 'prospects' improve?					X		Statement revised; but it is descriptive, not normative
06-017	10	6	6-1	34	Should climate science be listed somewhere in the R&D priorities?						X	

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06-018	10	6	6-2	19	Listing oil refining with electricity generation implies that emissions from refineries are comparable to those of power generation plants, which is not the case. In fact, refinery emissions account for about 20% of life cycle emissions for crude oil derived fuels (e.g., gasoline, jet fuel, diesel fuel), with the majority of emissions released by fuel consumers. Conversely, nearly all emissions from electricity generation occur at the power plant, and electricity consumers do not directly release carbon dioxide to the atmosphere.		X					
06-019	10	6	6-2	22	It should be noted that refinery emissions (on the order of 2-3 million metric tonnes CO2 per year per refinery, approximately 1000 refineries in the US) are much smaller than those from electricity generation (on the order of 10-20 million metric tonnes CO2 per year per plant, with ~10,000 fossil fuel power plants).		X					
06-020	10	6	6-2	23	Emissions from oil production are probably on the same order as the other 'smaller' sources listed, and should be mentioned here. A rough estimate of these emissions can be made using IPCC Inventory Guidelines Chapter 4 Section 2 Tier 1 factors.		X					
06-021	10	6	6-3	9	Please consider adding the word 'upgrading' so that the phrase reads '...petroleum refining and upgrading and...'. Emissions from Canadian refining and upgrading processes are much larger than for other North American countries because of the significant oil sand production in Alberta.		X					
06-022	10	6	6-3	19	If available, a definition for 'energy industries' should be provided.			X				No definition found
06-023	10	6	6-3	30	No data is given to indicate oil refineries to be a significant source of methane. Please refer to the API Compendium of Greenhouse Gas Emissions Estimating Factors for the Oil and Gas Industry for a rough estimate of refinery methane emissions. Compared to other sources, these emissions are likely to be small.		X					
06-024	10	6	6-3	33	Not clear what 'that scale' is referring to.		X					
06-025	10	6	6-4	2-5	The reference to bioenergy is unclear and implies that biofuels tend to have negative or neutral carbon emissions. Lifecycle studies have shown that depending on life cycle boundaries, fertilizer, transportation and tilling practices, biofuels can have carbon emissions, and in some cases, utilize more energy to produce than is released during combustion of the biofuel. In such cases, greenhouse gas emissions from the biofuel lifecycle would be greater than those of fossil fuels.		X					

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06-026	10	6	6-4	17-23	As written, this paragraph gives no other reason than policy conditions for the dominance of fossil fuels as energy supply. Suggest rewrite as follows: "Production costs of electricity from coal, oil or natural gas at relatively large scales are currently lower than other sources of electricity, besides large-scale hydropower, and production costs of liquid and gas fuels are currently far lower than other fuel sources, though rising. This is mainly due to the fact that the energy density and portability of fossil fuels is as yet unmatched by other energy sources, and in some cases, policy conditions reinforce fossil fuel use. These conditions..."		X					
06-027	10	6	6-5	26	Emissions from crude oil refining could be expected to rise at a rate just below rate of growth/decline in refined product use. US DOE may have projections of refined product use rate. Refinery emissions are about 20% of lifecycle emissions for fuels, and improvements in refinery efficiency over time will drive emissions per barrel of refined product lower over time.		X					
06-028	10	6	6-5	33	Consider adding the following...'because there is no single solution that is clearly more cost-effective than others; solutions will be specific to project circumstances.'				X			
06-029	10	6	6-6	26-27	Suggest rewriting without the term 'wedge' as this is not adequately defined, and is only one of several approaches to considering future technology strategies. Either delete the word 'wedges' or substitute 'technology solutions'. For example, line 26 could be rewritten '...adding together smaller contributions...', and line 28 'If many technology solutions can be combined...'	X					Use of the term "wedges" deleted in following paragraphs	
06-030	10	6	6-6	34	This implies that carbon capture and sequestration will necessarily involve hydrogen as an energy carrier. Other CCS options, such as firing with oxygen or post-combustion capture are also likely to be used.				X			
06-031	10	6	6-7	5	Delete the phrase '...although prospects remain speculative at this time...'. As evidenced by the Sleipner, Weyburn and In Saleh projects, carbon capture and storage technology can be demonstrated, but cost reductions and policy certainty are needed for broader implementation.		X					
06-032	10	6	6-8	28	The word 'global' appears twice. It would be clearer if one instance were deleted.		X					
06-033	10	6	6-9	1-2	The cost basis is not entirely clear. Is this the total cost or the cost increase with capture and storage? Also, it is not clear why the cost of nuclear energy would rise.		X					
06-034	10	6	6-10	1-2	Good point. It is important to include economic drivers/barriers in policy and technology assessments.	X						
06-035	10	6	6-11	1	What other incentives are contemplated? The energy industry is not 'limited to fossil fuels'. It should be noted that nuclear, hydro and geothermal are pursued when economic. In general, economics and market forces shape energy supply.		X					
06-036	10	6	6-11	6-7	Remove reference to 'wedge'; for example: '...advances might be combined with multiple technologies to transform...'		X					

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06-037	10	6	6-13	3-10	Since there are innumerable economic and technology studies are underway in the area of greenhouse gas emissions and mitigation, it is not clear why a single study is prominently highlighted in this report. For example, the CO2 Capture Project is doing a lot of work in the area of next generation technology development for CO2 capture and storage. The MIT Joint Program on the Science and Policy of Global Change is another one. I would suggest deleting this text box.		<b>X</b>					