

Comments on Chapter 11

1 **Written Public Comments on the**
2 ***Strategic Plan for the U.S. Climate Change Science Program***
3 **Chapter 11: Human Contributions and Responses**
4 **to Environmental Change (p 121-130)**
5 **Comments Submitted 11 November 2002 through 18 January 2003**
6 **Collation dated 21 January 2003**

7
8 Page 121, Chapter 11: There are many questions remaining for the possible development of
9 this section that are critical to the overarching goals of the CCSP. For example, there are
10 many evaluation and/or assessment goals without associated time frames indicated, or
11 mechanisms for the integration of the research from this area into other areas. The
12 elements remain somewhat distinct and abstract from the other components.

13
14 Many of the human dimension challenges would benefit by consideration of decision
15 systems utilizing SI information. This is especially the case for building trust with
16 decision makers. Trust is built up over time and over several orders of decision
17 capability. SI offers opportunities to test ideas and build trust, and to evaluate the aspects
18 of human-environment systems that represent ‘low hanging fruit’ for such efforts. There
19 need to be some early successes to motivate further consideration of more challenging
20 problems.

21
22 The time frame for results (2-4 yrs for CCRI; 5-15 years for USGCRP) also requires
23 integration of SI learning opportunities. This is not much time and it will be important to
24 not reinvent the wheel for human dimensions of decision capacity. SI can also inform
25 ideas and the development of metrics to assess utility of information. With the short fuse
26 for results, there needs to be serious consideration of the role of research on variable
27 climate, predictions of variable climate, and uses of uncertain climate information to
28 inform decisions and planning.

29
30 What are the institutional roles in improving decision capacity under uncertainty, and
31 how can they be strengthened? Where are the best opportunities for affecting change in
32 decision systems? Especially when assessing human adaptive capacity, the
33 understanding that can be derived from current decision processes built in trust, and
34 conducted under uncertainty at timescales of variability are quite relevant. There is good
35 opportunity for building on trust, building capability within institutions, validating
36 aspects of model results, and conducting experiments in the integration of quantitative
37 and qualitative information at timescales of interest to decision makers today, to help in
38 understanding how decisions for the longer term may be better informed.

39 **IRI, ZEBIAK AND STAFF**

40
41 Page 121, Chapter 11: **First Overview Comment.** There is a glaring omission from this
42 chapter of any mention of the recently completed National Assessment of the Potential
43 Consequences of Climate Variability and Change. This Assessment was primarily
44 focused on “Impacts of global change on societies ... and adaptive capacity in responding
45 to the impacts.” The Assessment looked in detail on potential impacts to and adaptation
46 strategies for agriculture, water supply, infrastructure, ecosystems, etc as well as human

Comments on Chapter 11

1 health. The Assessments were published as regional and sectoral reports, are accessible
2 on government sponsored web sites and much of the literature has been presented at
3 scientific conferences and published subsequently in peer-reviewed journals. Yet this
4 chapter makes no reference to this literature and does not show how new research will
5 build upon existing research. An effectively designed research program must be based on
6 previous work, otherwise it is a waste of time and money at best and an obstruction of
7 good decision making at worst.

8
9 **Second Overview Comment.** Another omission from this chapter (and the science plan
10 in general) is an acknowledgement and incorporation of the large body of research
11 summarized on this topic by the Intergovernmental Panel on Climate Change's Third
12 Assessment Report, Working Group II – Impacts, Adaptation and Vulnerability. The
13 research questions in this section are directly addressed in that report. Does this omission
14 imply that the IPCC WGII work will be ignored when developing scenarios? Will we be
15 starting from scratch here as well? If the IPCC work will be used as a basis, there should
16 be an explicit discussion of how and where it will be applied. Will the SRES scenarios
17 be employed or new scenarios developed? If the SRES are not used, a defensible
18 argument must be made to justify this decision. If they are used, why will 2 years be
19 needed to develop them. In general, this work should be closely integrated to existing
20 and on-going international integrated assessment work to leverage resources and save
21 time and money.

22
23 **Third Overview Comment.** A key decision facing decision makers is how aggressive
24 the measures to reduce greenhouse gas emissions should be, based on existing scientific
25 information. To effectively make these decisions, information on impacts to human
26 health and society discussed in this chapter has to be linked to decisions about mitigation
27 efforts, not just adaptation efforts. Decision makers need to know if large public health
28 risks are likely if greenhouse gas emissions continue at current or slightly diminished
29 rates. In order to facilitate this, I suggest closely linking research on public health to
30 decision support related to mitigation.

31 **JANINE BLOOMFIELD, ENVIRONMENTAL DEFENSE**

32
33 Page 121, Chapter 11: First Overview Comment: The term uncertainty is utilized without
34 any clear definition of the term. As this is the main theme of much of the report, it
35 portrays an incorrect image of climate science that everything is uncertain and that no one
36 can or should act until the uncertainty levels are diminished. It then goes on to lay out a
37 high risk strategy of waiting until an unknown day for uncertainties to be reduced before
38 any action can be taken. The risks are high as the lifetime of greenhouse gases in the
39 atmosphere is long and mitigation efforts will not take immediate effect, unlike some
40 other pollutants. This also ignores decades of research by US institutions and others that
41 have reduced uncertainty levels on a wide range of climate issues. A guide to the
42 uncertainty levels is clearly included in the IPCC's Third Assessment Report.
43 We would therefore strongly recommend that the report and the research efforts around it
44 not revolve around reducing uncertainties per se, but rather provide new and useful
45 information for policymakers. Finally, to infer that policymakers must have 100%
46 certainty before taking any decisions is not consistent with the current situation. As the

Comments on Chapter 11

1 report notes, there are many uncertainties surrounding terrorism, but the government is
2 not waiting for 100% certainty before taking preventative measures such as increasing
3 security in airports.

4 **JENNIFER MORGAN, WORLD WILDLIFE FUND**

5
6 Page 121, Chapter 11: This chapter appropriately recognizes that human actions can be
7 significant factors contributing to climate change, and that human responses to global
8 environmental change may further or retard policies intended to reduce GHGs and
9 mitigate climate change (for example, consumers may adopt new energy-saving
10 technologies at higher or lower rates than expected, or insist on maintaining homes in
11 areas where high flooding is increasingly likely during storms). However, the research
12 agenda in this section is extremely vague and not clearly linked to the decision making
13 process or to other, more technical scientific research priorities.

14
15 Many of the illustrative research questions allude to sweeping issues that have already
16 been covered by large bodies of academic literature (for example, page 123, line 26:
17 “What induces technical innovations and adoption of new technologies?,” and line
18 27,”What affects the transfer of technology from country to country?”). Some of the
19 identified research needs are equally sweeping (e.g., page 124, lines 25-26,”Assessment
20 of how social, cultural, and economic factors affect the discounting of future health and
21 environmental costs and benefits”). It is not clear whether the research plan will draw on
22 existing knowledge in these areas or seek to reinvent the wheel, which would come at a
23 high cost in time and resources. The vitally needed product of this work (“ . . .
24 improve[d] analytical methods and models of how climate variability and change, land
25 use change, population change, sea level rise, and other global environmental changes
26 affect decision making in public health, water management, agriculture, transportation
27 infrastructure, urban areas, coastal areas, and other climate-sensitive sectors”) is vague
28 and does not prioritize or set any time frame for achieving its goals.

29 **KENNETH A. COLBURN, NORTHEAST STATES FOR COORDINATED** 30 **AIR USE MANAGEMENT (NESCAUM).**

31
32 Page 121, Chapter 11: **Impact and Mitigation Research for Environmental Justice**
33 **Communities**

34
35 **The Strategic Plan should include research on mitigation strategies for the**
36 **disproportionate impacts on communities of color and low income communities.**

37
38 Chapter 11 of the Strategic Plan addresses human contributions and responses to
39 environmental change, but does not specifically mention studying climate change impacts
40 on people in different economic brackets. Research is needed on the effect of climate
41 change on low income communities in the U.S., and strategies to mitigate these impacts.

42
43 According to the IPCC’s Third Annual Assessment, climate change is already, and will
44 continue to disproportionately harm communities of color and low-income people. Yet,
45 very little research is being conducted to determine how to better protect communities of
46 color and low income people from the impacts of climate change.

Comments on Chapter 11

1
2 In California, the U.S., and abroad, urban dwellers, farm workers, and residents of low-
3 lying areas will be affected by sea level rise, worsening urban air quality, the impact of
4 job losses, and by higher prices for food, water, and other goods and services. In low-
5 lying areas such as Bangladesh, the Maldives, and the South Pacific islands, climate
6 change impacts have already caused displacement and loss of fresh drinking water and
7 croplands. Impacts could eventually force tens of millions of already economically
8 marginalized people to flee their homes and countries, causing unbridled financial and
9 cultural losses and physical hardship.

10 **CHRISTINE CORWIN, BLUEWATER NETWORK**

11
12 Page 121, Chapter 11: Treating resilience to climate change on ecosystems separately from
13 human contributions creates an artificial distinction that is not helpful for policy making.

14 **JENNIFER BIRINGER, WORLD WILDLIFE FUND**

15
16 Page 121, Chapter 11: First Overview Comment: The set of questions is missing a key
17 question: “What can we do about climate change?” The answers to this question involve,
18 by definition, technology. Consequently this chapter would benefit from a much more
19 explicit linkage to the Climate Technology Program.

20
21 Second Overview Comment: The set of questions, even when augmented to include a
22 rigorous examination of mitigation as well as, or as part of, adaptation, mixes two
23 fundamentally different enterprises: 1) The study of human ecology (i.e., questions 1, the
24 first part of 2, and 4), in which cognition is irrelevant and 2) The study of human agency
25 (the latter part of 2, and 3), in which it is central. While agency can certainly be thought
26 of within the context of human ecology (as just another aspect of our species life history
27 strategy) it takes a surprising lack of self-consciousness to not see that the entire CCSP is
28 exactly what questions 2 and 3 seek to examine. The research program is its own
29 research subject! This approach borders on solipsism. In order to avoiding endless
30 fascination with knowing without acting, the program ought to split this Chapter into two
31 parts. That part which deals with ecology and its codification in models should remain as
32 Human Contributions (or fused with Chapter 12) while those aspects that deal with the
33 relationship between knowing and acting ought to be combined with Reporting and
34 Outreach to create a much more rigorous chapter entitled Permanent and Experimental
35 Dialogue on Global Change Science and Policy, or something similar.

36 **CALIFORNIA RESOURCES AGENCY**

37
38 Page 121, Chapter 11: **First Overview Comment:** Where is the NAS report? Where is
39 the national assessment? Where is the IPCC TAR? There is a wealth of information out
40 there yet we seem bound and determined to ignore it. In some cases reinventing the wheel
41 or rehashing debates that are already quite mature. Let’s take advantage of the wealth of
42 knowledge that does exist and save our effort and funds for the questions that get us to
43 solutions, not those that help us put off solutions.

44
45 **Second Overview Comment:** Can we really resolve the uncertainties that the questions
46 this chapter aims to resolve in 2-4 years? Many of these issues have been on-going for

Comments on Chapter 11

1 decades. To believe that we are now going to really focus and tie it all up is optimistic to
2 put it kindly.

3 **REVIEWER'S NAME, AFFILIATION: LARA HANSEN, WORLD**
4 **WILDLIFE FUND**

5
6 Page 121, Chapter 11: This chapter does a good job of recognizing the challenges facing
7 our transportation system.

8 **DEPARTMENT OF TRANSPORTATION, LAWSON**

9
10 Page 121, Chapter 11: First Overview Comment: This chapter should be split into two
11 separate chapters because the two areas it covers are so different. One part is devoted to
12 questions that generally appear in IPCC Work Group 1 and related special reports on
13 emissions of greenhouse gases and other causes of climate change. Another part deals
14 with impacts and adaptation, a Work Group 2 activity. And another part deals with
15 decisionmaking, which probably belongs in Work Group 3. Moreover, the chapter seems
16 to be dealing with several aspects of “global change” even though the title of the report is
17 “...Climate Change.” At the very least, the chapter needs an explanation for why the
18 chapter examines “global change” when the report is about climate change—but it would
19 probably be better to focus the chapter on climate change.

20 Because this chapter covers so many different issues, human health is the only
21 impact discussed in any depth. But decisionmakers also need to understand the impacts
22 of climate change on coastal zone communities, agriculture, energy consumption,
23 infrastructure, and other human activities. Space constraints evidently prevented the
24 authors from addressing those other human activities, leaving an incomplete chapter.

25
26 Second Overview Comment: The Federal Document Needs a Strategic Plan for Sea Level
27 Rise (and Other Effects of Climate Change but this Report Does not Move us closer to
28 such a Plan.

29 The United States has neither a coherent policy nor a coherent research program
30 to address the impacts of rising sea level. EPA, NOAA, the Corps of Engineers, USGS,
31 FEMA, and US Fish and Wildlife Service are each responsible for managing
32 consequences of sea level rise, researching the effects, or both. These agencies are each
33 spending considerable resources conducting research to increase our understanding of the
34 vulnerability of human settlements to rising sea level, but little or no effort is being made
35 to ensure that the research is coordinated so as to deliver the maximum usefulness. As a
36 result, much of it is duplicative, or designed to only answer the question that one agency
37 immediately needs answered without regard to the many opportunities to accomplish
38 more for the same level of resources. For the most part, our knowledge regarding
39 vulnerability of human systems to sea level rise depends on data created by programs that
40 have little or nothing to do with climate change or sea level rise.

41 For example, FEMA has a \$300 million/year program to improve
42 floodplain maps. Accurate maps need good topographic information. Understanding the
43 vulnerability to sea level rise (or precipitation changes due to climate change) also
44 requires better topographic information than the 5- 10- and 20-foot contour intervals
45 available for most regions. LIDAR offers the federal government an opportunity to get
46 elevations to the nearest 20 cm—an order of magnitude improvement and sufficiently

Comments on Chapter 11

1 precise to understand the impacts of the 1 foot rise in sea level expected in the next
2 several decades (including subsidence). Therefore, it would seem reasonable to assume
3 that a coordinated strategic research plan would ensure that a great deal of the floodplain
4 mapping resources went to LIDAR, which would make for both better flood maps and
5 climate vulnerability analysis.

6 But this chapter does not get into such “details” (although this “detail” is
7 100 times larger than the “climate science” budget devoted to impacts of sea level rise).
8 If an agency chooses to not call a program “climate science”, then this chapter does not
9 recognize it—even if such a program does more for climate science than the programs it
10 does include. Nor does the chapter deal with all of the other questions of coordinating
11 research designed for various purposes but which could allow us to advance our
12 understanding. The chapter simply lists some questions—as if it’s sole purpose was
13 simply to provide a general guidance to scientists apply for grants, perhaps as a yardstick
14 for the “relevancy reviews” for the grant programs.

15 And so, the federal government is on it’s way to missing the best opportunity in
16 decades to actually reach a meaningful coordination on optimizing America’s
17 understanding of how to deal with sea level rise. FEMA employees have told me that in
18 many cases, they will not collect LIDAR but will instead produce better maps using the
19 same inadequate data that the existing maps use. Why? Because their management
20 objectives tell them to produce a specific number of maps; ‘tis better to produce 20
21 improved maps that still use inaccurate data, than to produce 10 maps that use
22 dramatically improved data. From the perspective of the Flood Insurance Program, more
23 maps with poor data may make sense. But from the perspective of the United States of
24 America, a smaller number of maps with good elevation data would be better, because
25 the federal climate program and other non-FEMA programs (e.g. Corps of Engineers,
26 state emergency management, EPA hazardous waste spill response) would also be able to
27 make use of that better elevation data.

28 We have an opportunity to at least develop a strategic plan that identifies a more
29 rational use of federal research funds. The authors of this chapter, however, have
30 indicated that they do not believe that they are supposed to develop a strategic plan that
31 looks at this larger picture of federal resources. One has to draw the line somewhere, and
32 for most of the scientific issues it may make sense to only consider resources labeled as
33 “climate science” by the sponsoring agencies. But in the case of sea level rise—and
34 probably some of the other effects as well—this approach excludes most of the important
35 research. At the very least, the chapter needs a disclaimer explaining that the strategic
36 plan is not really a plan for how the federal government can answer the key questions
37 regarding impacts of sea level rise, because CCSPO decided not to consider most of the
38 federal research related to those effects or analyze strategic choices. A better approach,
39 however, would be to revise the chapter—and perhaps re-organize all of the chapters
40 related to effects of climate change—to include a discussion of the objectives, the
41 research taking place and needed to achieve those objectives, and a plan for meeting the
42 objectives.

43 **JIM TITUS, U.S. ENVIRONMENTAL PROTECTION AGENCY (SEE**
44 **DISCLAIMER)**

45

Comments on Chapter 11

1 Page 121, Chapter 11: Thank you for the opportunity to comment on Chapter 11 of this
2 Strategic Research Plan. Since the Human Dimensions are – as emphasized in several
3 presentations at the December 1-3 Workshop in DC (hereafter (DC workshop) – cross-
4 cutting and integral to all the components of the plan, I will focus my general comments
5 on several overarching issues and on the integration and fit of this chapter within the
6 context and larger intent of the plan.

7
8 This review is much akin to the process of developing a photograph: one holds a negative
9 up against the light and imagines the final picture that one will get from the inverse of the
10 light and dark contours – i.e., from what is there and from what is missing. In other
11 words: we will get the answers to the questions we ask, and accidental discoveries at best
12 about all we do not ask. It is thus my intent to point out how the research agenda set in
13 Chapter 11 will and will not provide necessary answers to urgent policy questions.

14 15 **First Overview Comment: The Positive Aspects of the Draft Plan**

16 I begin with the positives: First, much work went into preparing this draft and I want to
17 acknowledge its authors, as well as all those who provided input and reviews into the
18 earlier version of the USGCRP strategic research plan, a document that was ready for
19 primetime just about when President Bush took office but which never was released.
20 Second, I want to praise in particular the emphasis and intention apparent in this plan of
21 pursuing the linkages among program elements, and the attempts to improve the
22 management of these interactions between the research and assessment functions across
23 the research branches of different federal agencies. In extension, I would like to
24 encourage these agencies to be good role models for other decision-makers and
25 information users by involving the resource management branches of these agencies early
26 and often in the implementation of this plan. Third, I would like to praise the emphasis –
27 throughout the plan – on tangible products and payoffs from the research pursuits. In
28 particular, I would encourage that this be done in Chapter 11 as much as in other
29 chapters. (I will come back to this issue later).

30 31 **Second Overview Comment: The Slanted Cast of the Core and Breadth of the 32 Human Dimensions Research Agenda**

32 In this chapter and throughout the plan, there is a
33 strong recognition of the central role of human contributions and impacts of climate and
34 global change, as the following quote suggests:

35
36 “The need for research on the ... “human dimensions” of global change ...
37 motivates research questions throughout this plan.” (p.121)

38
39 Each chapter recognizes human causation of global changes; each chapter points to the
40 links among the program elements. This creates the impression of a well-integrated plan
41 – even if the linkages are not particularly well specified (which may be forgiven for a
42 strategic plan at this level of specificity). I expect and suggest that they be spelled out in
43 much greater detail in each of the detailed research implementation plans, which will be
44 developed later. Of course, on each of the plan’s goals – cross-agency interaction,
45 linkages among program elements, and delivery of products – the proof will be in the
46 pudding, and I look forward to seeing the implementation unfold accordingly.

Comments on Chapter 11

1
2 The first signs of doubt appear, however, in how broad (or not) the Human Dimensions
3 research agenda is cast in this chapter as suggested by the following quote:

4
5 “... includes studies of potential technological, social, economic, and cultural
6 drivers of global change, and how these and other aspects of human systems may
7 affect adaptation and the consequences of change for society.” (p.121)

8
9 This suggests that the foci of Chapter 11’s research agenda include the drivers of change,
10 the impacts, adaptation to these impacts and (apparent from the structure of the chapter)
11 the decision-making to support adaptation. What is strangely absent as a core focus is
12 mitigation. While some aspects of mitigation are touched upon in a few illustrative
13 research questions in this chapter and elsewhere in the plan, mitigation must rise to the
14 level of a core question in this chapter if this plan truly intends to provide useful
15 information for the full range of policy- and decision-making options as it claims.

16
17 **Third Overview Comment: A Far Too Narrow Basis of the Research Agenda**It’s
18 illustrative to look at the basis on which this HD research agenda rests because it might
19 explain what is and is not included in this plan. The ones listed in the draft plan are
20 obviously very important sources to draw upon – *Global Environmental Change:*
21 *Research Pathways for the Next Decade* (NRC, 1999); *Under the Weather: Climate,*
22 *Ecosystems and Infectious Disease* (NRC, 2001); and *Climate Change Science: An*
23 *Analysis of Some Key Questions* (NRC, 2001). These references should be among the
24 core documents. But the ones that are missing are just as informative.

25
26 First, it is entirely unexplained and inexcusable why this particular chapter misses any
27 and all reference to the IPCC, especially Working Group II’s contributions which focuses
28 explicitly on impacts, vulnerability, adaptation and questions of resilience – the themes of
29 this program element (IPCC (2001) – WG II). That Working Group III (IPCC (2001) –
30 WG III) is not included is a logical cause or consequence of the neglect or denigration of
31 mitigation questions to a below-core status. Of course, this has some serious
32 consequences:

- 33 a. this chapter does not draw on the best available science to inform the research
34 agenda for the next 10 years, raising the question how the research undertaken
35 under this program element can usefully and adequately contribute to the many
36 other research elements in this plan, e.g., on scenario development or land
37 use/land cover change; and
- 38 b. it is impossible to assess then, what the U.S. will really have to contribute to the
39 advancing state of the science internationally.

40
41 Secondly, what raises just as serious questions as the neglect of the most authoritative
42 references on the subject matter of this chapter (IPCC), is the total and complete
43 disregard of the U.S.’s own National Assessment (including the sectoral, regional and
44 synthesis reports from the *First U.S. National Assessment of the Potential Consequences*
45 *of Climate Variability and Change* (1999-2001)) (hereafter NA). That comprehensive,
46 and time-consuming effort is not mentioned once in the entire document (one may – with

Comments on Chapter 11

1 some generosity – read one implicit mention out of a passage on p.128). What’s more is
2 that much of the experience, insight, learning and valuable scientific progress made in it –
3 not to speak of the immeasurable relationship-building between scientists and
4 stakeholders – is dismissed, undermined and disregarded. Specific examples of this
5 dismissive language are on p.39 (call for a “new class of relationships”, p.41 (lines 27-
6 30), p. 42, 44, 46, p.65 (lines 27-28 asking the same questions already asked in the NA),
7 p.77 (asking questions for which we already have answers from the NA experience),
8 p.85, pp. 125-6, p.146 (data and information needs which we already have answered
9 through the NA), and so on.

10
11 Of course, the NA did not provide the pan-ultimate answers to many questions. Most
12 things in science, and certainly such complex ones as global change, are not answered
13 once and for all. But in science and assessments, findings and process experiences are
14 being built upon, they are recognized, discussed, debated, and improved upon. An
15 unknowing reader of this document would not even know that the National Assessment
16 ever took place. But as one of the initiated ones, I find it:

- 17 a. regrettable – to put it mildly – that the self-less, voluntary effort of so many of
18 this country’s best scientists and of thousands of stakeholders is not recognized in
19 any way whatsoever. It is well known how the Bush Administration has come
20 under legal and political pressure by various interest groups to suppress
21 information generated by the National Assessment effort. It appears these interest
22 groups have more sway over the Administration than the commitment to sound
23 science (see, Reichhardt, Tony. 2002. “Calls for more data forms basis of Bush
24 climate strategy.” *Nature*, vol.420, 14 November, 2002, p.110);
- 25 b. it is bad science to not build on what we know; and as a result a waste of taxpayer
26 money to reinvent the wheel and repeat inquiries as this strategic plan suggests it
27 will do; and what’s more,
- 28 c. because these authoritative and valuable documents have not been solicited, is
29 that the resulting research questions do not capture the cutting edge of HD
30 research and thus what the most pressing research should be.

31
32 **Fourth Overview Comment: Inconsistency with Plan’s Guiding Principles** Moving
33 beyond the serious limitations mentioned above, it seems fair to assess whether the plan
34 as currently drafted holds up against its own goals (p.11). To do so, I am referring to the
35 research plan’s three guiding principles. The first of these principles calls for a policy-
36 relevant but not policy-driven research agenda. Several quotes from the text underline
37 that goal:

38 “... *process of making policy and resource management decisions should remain*
39 *entirely*
40 *separate from the research function*” (p.39)

41
42 “... *research must be independent of particular policy agendas in order to remain*
43 *free of*
44 *bias*” (p.44)

45 There are several ways in which this plan can be read as asking science to provide post-
46 hoc justification for policy choices already made. Examples include:

Comments on Chapter 11

- 1 a. In the CCRI, there is a specific focus on aerosols. While legitimate questions
2 remain about the role and function of aerosols, the way the research question is
3 framed and the special focus on aerosols in and of itself suggests that the question
4 preempts a preferred policy choice, namely that we should exclusively focus on
5 the quick fixes while the emission of longer-lived greenhouse gases such as CO₂
6 or CH₄ is allowed to continue (p.19, and explicitly on p.40).
- 7 b. The research focus on marine carbon sequestration – while there is no similar
8 focus on renewable energy or other options to reduce emissions before they are
9 produced -- again biases the findings in favor of specific policy options (pp.56,
10 103-104). If only certain options are included in this research plan rather than in
11 that of the National Technology Initiative, then this ought to be stated somewhere.
- 12 c. Emission goal assessments are supposed to be conducted mostly against economic
13 and security criteria, whereas ecological criteria are put last and social criteria are
14 omitted altogether (p.45, see also p.150).
- 15 d. The specific focus on regional air pollution in the Pacific region (the only
16 research undertaken outside of the boundaries of the US, by the way!) combined
17 with an assessment of the impacts of that pollution on North America, while not
18 also investigating the impacts of air pollution originating in North America on
19 others sounds like an attempt to build the scientific basis for finger-pointing while
20 not taking responsibility for our own contribution to regional air pollution. That's
21 just distasteful! (p.63).
- 22 e. A terrible euphemism (at best), and a heavily politically biased misrepresentation
23 of constraints on policy choices (at worst) is expressed on p.39: "The main
24 constraint on any such [fossil fuel emissions] reductions has been the desire to
25 maintain modern living standards preserving the ability to serve the energy needs
26 of a growing economy with diverse economic sectors in the context of evolving
27 societal values."

28
29 In addition, there is one glaring way, in which this research agenda seems to be policy-
30 driven and which is particularly apparent in Chapter 11. The overall much stronger
31 emphasis on adaptation than on mitigation given the scope of the chapter and throughout
32 the plan was already mentioned. What is striking, however, is how – when mitigation
33 issues are considered at all – those options are always examined against their impacts on
34 the economy, in particular, the costs of different mitigation options, and on national
35 security, while there is not once a question in this entire plan about the cost of adaptation.
36 So, of course, the answer we must expect from this research agenda is that mitigation will
37 cost something while adaptation is free. Specific page references where this bias is
38 apparent include:

- 39 a. adaptation is linguistically always prioritized over mitigation, for example on pp.
40 78, 81, 122, 125, and 161;
- 41 b. the report treats equally risks and benefits involved in climate change without
42 acknowledging the scientific consensus that risks and constraints on adaptation
43 will outweigh benefits for most people in the world and especially over the long
44 term, and especially for the most vulnerable, including those in this country, see
45 pp.8, 10, 121

Comments on Chapter 11

- 1 c. there is no interest in investigating the costs and feasibility of adaptation under
2 threshold conditions, see pp.39, 43, 75, 77, 117, 121, 124-5

3
4 Given what we already know about the policy inclinations of the Bush Administration, it
5 is not a far reach to conclude that the information resulting from this research agenda will
6 be policy-relevant but also policy-driven. Besides simply not producing a balanced
7 picture of the full range of possible response options, we must conclude that this chapter
8 and the plan more generally will fail to deliver on the first of its guiding principles unless
9 a fairer balance is struck here.

10 The second guiding principle is the laudable focus on both reducing and improving the
11 assessment and communication of uncertainty. I am pleased to read in this plan that,

12
13 *“Uncertainty need not be a basis for inaction... but should be carefully*
14 *described.”* (p.11)

15
16 This is obviously a welcome divergence from the practice and explicit statement of the
17 Bush Administration. I agree that we need to improve our understanding, account for
18 uncertainty, and as responsible stewards and managers of our life support systems still act
19 decisively to avert the worst of the potential consequences of climate change.

20
21 Of course, if one truly wanted to convey an inclination toward action rather than inaction,
22 it would be advisable to use the term “confidence levels” more so than “uncertainty” and
23 some indication when the confidence level will be high enough for action. I am hard
24 pressed to believe that this subtlety escaped the authors of the plan.

25
26 Moreover, the way the uncertainty is expressed in this plan is telling: every bit of
27 evidence for global warming is downplayed (examples include pp.4, 5, 6, 7, 16, 17, 33,
28 58, 83, 112, 117); every bit of uncertain knowledge is highlighted (examples include
29 statements in chapter 3 on pp.31, 40, 44, 47, 48; in chapter 6 on pp. 72, 73, 76; and on pp.
30 109, 123); and the vulnerabilities and benefits are always weighed equally throughout the
31 plan (e.g., on pp.8, 34, 40, 44, 76, 113, 121, 126).

32
33 Particularly disturbing – expressed in the following statement early on in the draft plan –
34 the plan asserts that we will never get even close to knowing enough to act. I highlight it
35 here, because it pins this pan-ultimate “unknowability” on “the human factor,” which of
36 course is the central theme of Chapter 11.

37
38 *“Even if the scientific community were to develop a ‘perfect’ model of the global*
39 *climate, it would not be possible to predict the level and rate of future changes in*
40 *climate resulting from human activities. This is because these activities are not*
41 *pre-determined, but rather depend on human choices, which will, in turn, affect*
42 *future climate conditions”* (p.7)

43
44 In and of itself, this statement is, of course, a gross overstatement, exaggerating the
45 degrees of freedom underlying individual human choices, and dismissing elements of the
46 human context, which are fairly stable and typically changing slowly, predictable, and

Comments on Chapter 11

1 acting as constraints on individual choices. Moreover, if it were indeed true, we would
2 not only have to question why the human contribution component is worth studying at
3 all. Moreover, we would actually have give up trying to understand and project all
4 climate change in the future – that is, give up much of the research questions, for which
5 the CCRI and USGCRP are trying to find answers. For example, on p.107 the research
6 plan asks for “accurate predictions of future CO₂ and CH₄ emissions.” Given that
7 enormous amounts of these emissions are of human origin, we can already conclude that
8 either the statement on p.7 has to be deleted or be modified. Alternatively, subsequent
9 research questions have to be weeded out, so that only those remain that do not involve
10 humans. That latter options is, of course, entirely ridiculous.

11
12 Meanwhile, research questions regarding adaptation not once ask about uncertainties
13 regarding the feasibility, acceptability, or effectiveness. Questions regarding thresholds,
14 the limits of resilience or adaptive capacity, and any consideration of impacts and coping
15 capacity in the face of surprises or major shifts in environmental and climatic conditions
16 are omitted, yet all of these are closely tied to these supposedly unpredictable human
17 choices and actions. In short, if this chapter wants to obey the plan’s second guiding
18 principle, it must apply the uncertainty focus more consistently across all research
19 questions.

20
21 Finally, the third principle calls for the balanced and simultaneous achievement of
22 scientific credibility and public usefulness – by which the authors of this plan mean that
23 the generated information be relevant to specific decisions or policy choices, timely, and
24 accessible and understandable to potential information users.

25
26 Again, I am pleased to find such a high level of awareness that both is needed, while I
27 hope the plan authors are aware of social scientific research on the science-policy
28 interface done over the past few years, which has shown that there is a subtle trade-off
29 and delicate balance that needs to be struck in every situation to achieve highest
30 effectiveness (for example, multiple publications developed under the Global
31 Environmental Assessment Project at Harvard University, Kennedy School of
32 Government; see <http://environment.harvard.edu/gea/pubsbytype.html>).

33
34 The place where the rubber meets the road here of course, i.e., where the simultaneous
35 achievement of scientific credibility and usefulness can be assessed, is in the deliverables.
36 The plan suggests that the CCRI aims to deliver over the short term –

37
38 *“CCRI programs will produce deliverables useful to policy-makers in a short*
39 *time”*
40 *(2-4 years) (p.15),*

41
42 while the USGCRP will bring out its results over a longer time horizon –

43
44 *“The [USGCRP] plan describes important questions and goals for research over*
45 *the next*
46 *decade” (5-10-15 years) (p.165).*

Comments on Chapter 11

1
2 At first pass, these timelines are welcome and in some but not in all instances realistic
3 and reasonable. The very fact, of course, that expectations for tangible results in the near-
4 term are raised calls into question President Bush's decision to not revisit climate policy
5 at all until 2012. The question begs whether all these research results – especially those
6 delivering useful information for national policy-making – will simply sit on the shelf
7 until then. A gesture from the White House to the contrary would give credence to the
8 intent of this plan, and, of course, Congress will need to play a more forceful role in
9 demanding and acting on the research results. Short of that, this plan should address how
10 dust-gathering will be avoided given the political context in which it will deliver its
11 findings.

12 13 **Fifth Overview Comment: Lack of Specificity on Research Products and Pay-Offs**

14 Unfortunately, Chapter 11 is more vague than any of the other chapters with regard to
15 deliverables. First, nowhere does the chapter provide any indication over what time frame
16 results in this research area can be expected. It is not only unsatisfying in its own right,
17 but this omission makes it impossible to evaluate whether the activities in this central
18 research element will feed in a timely fashion into other elements dependent on its input.
19 For example, the CCRI aims to produce policy-relevant scenarios within 2-4 years, but,
20 of course, that requires solid social scientific input. It is unclear what specifically will be
21 asked of the social sciences to feed into the scenario development, and whether that can
22 be delivered in time. Such time-dependencies need to be addressed to improve on the
23 integration between the different research elements in the plan.

24
25 The second issue with the outputs here is that there is nowhere – not in this chapter nor
26 anywhere else in the plan – a recognition of the challenge

- 27 a. to integrate information generated by different disciplines; and
- 28 b. to integrate qualitative and quantitative data and research results.

29
30 The social sciences, obviously, will be big contributors to the research done under this
31 program element; much, but clearly not all, of their work is qualitative. While there is
32 only one small, even implicit recognition of qualitative research altogether in this entire
33 plan – a problem in its own right – the plan does not make any attempt to explain how
34 qualitative research will either inform or be integrated into the quantitative modeling that
35 seems to be the big ticket for the next ten years. This short-coming must be resolved if
36 this chapter wants to have any chance to pass muster with the social scientific
37 community.

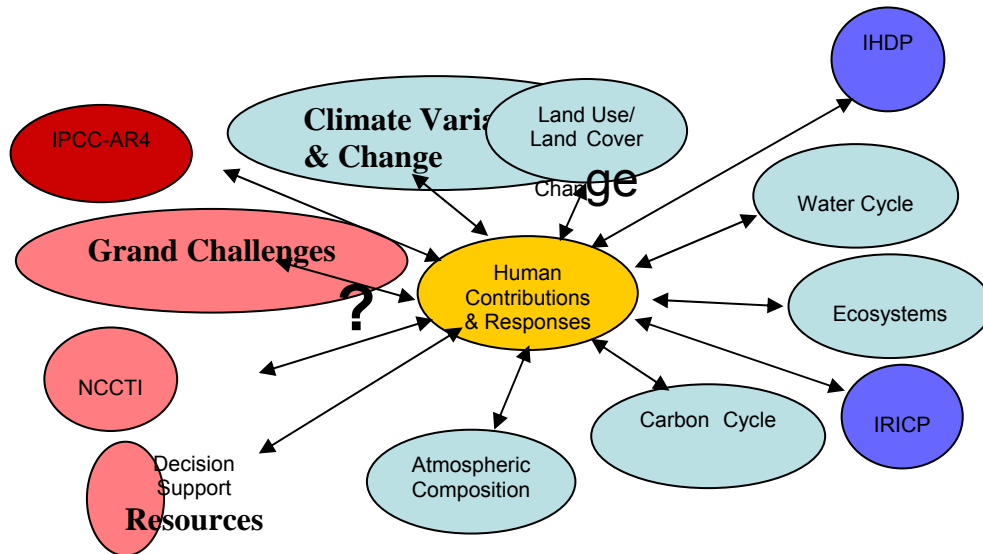
38
39 Third, the chapter is particularly vague on the type of deliverables it aims to produce,
40 other than integrated assessment models and a long list of information needs of decision-
41 makers. Again, it should be reiterated that there is no need to reinvent the wheel. Instead,
42 plan writers can and should build on what we have learned and already know from the
43 experience with the first National Assessment. It is time to deliver on the already-
44 identified information needs, not make another list of them and thereby waste valuable
45 time and resources.

46

Comments on Chapter 11

1 Finally, what the emphasis on deliverables leaves out entirely, of course, is a “human
 2 dimension” that cannot be found on paper or on the web or in any GIS database: and that
 3 is the trust slowly grown and engendered in the relationships built between information
 4 providers and users. It is the gel that makes information delivery work; it is the glue
 5 between institutions and individuals; it is the ingredient without which the best
 6 information will not be used. We know this from social scientific research and experience
 7 (again see the relevant research literature, much of which was reviewed and cited in the
 8 Global Environmental Assessment project cited above). But the plan remains utterly
 9 vague about the “new working relationships,” “the new institutional arrangements”
 10 between scientists and decision-makers, which the CCSP wants to build. Thus, it remains
 11 unclear whether anything useful will actually come out of this research component.
 12

13 **Sixth Overview Comment: Missing and Underdeveloped Key Linkages** Finally,
 14 several comments are in order on the linkages to other research components and
 15 institutions (see Figure below). The chapter concludes with reiterating the multiple
 16 linkages to other program elements, but most chapters, including the Human Dimensions
 17 chapter, actually give very little detail on what of these linkages will be examined. This
 18 chapter would thus greatly benefit – i.e., reduce some of its policy-driven bias – if it
 19 better addressed these key linkages in more detail and filled in the omissions.
 20



21
 22
 23
 24
 25
 26
 27
 28
 29
 30
 31
 32
 33
 34
 35
 36
 37
 38 In particular, I suggest the following improvements (referring to the linkages to boxes in
 39 red tones above):

- 40 • On Decision Support Resources: a serious reconsideration of doing open,
 41 independent regional and sectoral assessments and building on that previous
 42 experience. In addition, plan authors need to spell out improvements on the
 43 timelines and more specifics on deliverables and decision support resources which
 44 will allow others to assess the usefulness of this program element;
- 45 • On the Grand Challenges: some sort of counterweight to the quantitative
 46 modeling bias in this plan and some acknowledgment of the data integration

Comments on Chapter 11

- 1 challenges particularly pertinent to a research area where the social sciences will
2 play a significant role;
- 3 • On the NCCTI: a more explicit discussion of how this plan and research element
4 interfaces with the National Climate Change Technology Initiative so that it
5 becomes apparent whether the full or at least fuller range of policy options is truly
6 being considered would give this research plan greater credibility and help keep
7 the politics outside the research process; and finally,
 - 8 • On the Contributions to the IPCC's Fourth Assessment: A discussion of how the
9 findings not only build on the state of the art of the human dimensions science as
10 captured in the last IPCC assessment, but how the research sponsored in the US
11 will feed into the Fourth Assessment Report. As Dr. Pachauri highlighted in his
12 presentation at the DC Workshop, the Fourth Assessment Report will have a
13 strong focus on vulnerability and on regional assessments. Meanwhile, the
14 Administration's research plan lacks a comparably useful framework and indeed
15 suggests that the US is not planning to have any further independent assessments
16 other than agency reports. If the US is serious about remaining a leading scientific
17 force on global change issues, this plan needs to spell out how it will contribute to
18 the larger global quest for understanding this complex challenge.

19 **SUSANNE MOSER, UCS**

20
21 Page 121, Chapter 11: This research arena is key to science in the service of society
22 because of the need to understand humans' crucial role in contributing to global change,
23 and especially how their well-being is affected by global change and how their actions to
24 adapt to global change in turn create more (although perhaps different kinds of) global
25 change. This—along with lines 14-20 on page 121—suggests that human dimensions
26 should appear more prominently throughout the *Strategic Plan for the Climate Change*
27 *Science Program (CCSP)*.

28
29 This is a good starting point, e.g., with respect to the “illustrative research questions,” but
30 could benefit from strengthening on the corresponding “research needs” and “products
31 and payoffs.” As is the case for the rest of the *Strategic Plan*, the human dimensions
32 chapter needs more specifics on products and time lines, guidance about what the highest
33 priority research needs are, and how the research managers will know when enough has
34 been learned about a particular sub-topic. It would be helpful to clarify what research
35 will consider global environmental changes and what research will focus more narrowly
36 on global climate (variability and) change.

37
38 For this chapter, as well as for the *Strategic Plan's* sections on decision support,
39 sufficient resources will need to be made available to measure outcomes and demonstrate
40 products. For instance, it is easy to identify the hardware and data related to the typical
41 USGCRP observing systems; it can be difficult for natural scientists to get a feel for the
42 sometimes intangible products that come from both quantitative and qualitative social
43 science research. For instance, Question 3 asks how the methods and capabilities for
44 societal decision making under complexity and uncertainty can be enhanced. It is a
45 research topic in its own right to determine how decisions actually are influenced by
46 information. The often conflicting objectives and many constraints that decision makers

Comments on Chapter 11

1 face suggest that information about global climate change will be only a small component
2 among the many factors they must juggle when making a decision. Thus it may be more
3 productive to couch some initial efforts in the context of vulnerability and adaptation
4 actions that could be implemented in years to decades, rather than focusing on
5 (potentially much larger) changes that might not (barring surprises) be manifest for
6 longer time periods. This would have two advantages: First, information resulting from
7 the CCSP research activities would have a higher likelihood of actually being used.
8 Second, its role is more likely to be large enough that its influence actually can be
9 identified and measured.

10
11 My own inclination would be to re-order the questions as Q2, Q3, Q1, and Q4. The
12 reasoning is that Q2 is the most important of the four questions, exploring why global
13 environmental and climate change matter (to society). Q3 examines how decisions might
14 be made about the issue and its impacts, regardless of whether the causes are natural or
15 anthropogenic. Then Q1 examines the human share of the cause, which can shed insights
16 on how to control that component. Finally, Q4 could be a chapter on its own, but is
17 included here for conciseness and because the human health effects under consideration
18 clearly are human responses.

19
20 Chapter 11 Bottom line: The CCPS is unlikely to get an appropriate allocation of
21 resources, and whatever research results it is able to produce are unlikely to be *used* if it
22 is not clear that the program addresses societal problems and provides results that can be
23 used to protect or enhance societal well-being (where, of course, well-being depends on
24 ecosystems as well as human activities). Much of the research on human factors related
25 to global environmental change, impacts, and adaptation has the potential to be applicable
26 to a wide range of regional and local problems even when those problems do not have a
27 sizeable global linkage. This potential for additional benefits from the research results
28 calls for a stronger presence of human dimensions in the *Strategic Plan*.

29 **ANN FISHER, PENN STATE UNIVERSITY**

30
31 Page 121, Chapter 11: This chapter represents an essential part of the strategic plan. The
32 proposed research must be done, and done well, if all the other atmospheric research in
33 the plan is to be useful. Most of the research questions and needs listed are excellent.

34 Specific Comments on Chapter 11

35 **S.A. CHANGNON, ILLINOIS STATE WATER SURVEY**

36
37 Page 121, Chapter 11: Question 4 in “This chapter’s contents...” More than just
38 information is needed. Also needed is the development of strategies, policies and
39 measures to address potential health risks. It is unclear why only cumulative risks are
40 being addressed. It should be made clear that impacts will be site specific and path
41 dependent.

42 **KRISTIE L. EBI, EPRI**

43
44 Page 121, Chapter 11: The Plan has an obvious focus on the development and
45 implementation of strategies to adapt to increasing concentrations of greenhouse gases,
46 increasing climate variability, and climate change. It rarely places the same emphasis on

Comments on Chapter 11

1 strategies to mitigate climate change through policies that aim to reduce the primary
2 threat to our climate, namely, anthropogenic sources of greenhouse gases. I believe that
3 these two chapters, as well as the Plan overall, should reflect a more balanced approach
4 to climate change, that offers not only the potential costs and benefits of adaptation
5 strategies but, also outlines the costs of and potential costs and impacts avoided by
6 mitigation strategies.

7
8 Second Overview Comment: Educational institutions, corporations, and local
9 governments across the country have already developed and implemented programs to
10 reduce their greenhouse gas emissions. Most are realizing substantial cost savings from
11 new energy efficiency measures. Few, if any, report any negative impacts of new
12 measures to reduce greenhouse gas production. The substantial actions that have already
13 been taken by institutions and local governments, with little or no federal vision or
14 financial support, demonstrate the level of concern in many communities around the
15 country and their will to develop these initiatives on their own. Their efforts and their
16 successes deserve recognition in the introductory paragraphs of these 2 chapters to foster
17 hope and encourage further local action. Furthermore, the evaluation of their efforts
18 should be a research priority in both chapters, enabling communities, institutions, and
19 corporations to learn from past experience and more effectively determine actions that
20 they can take now to reduce ghg emissions, increase their energy efficiency, improve air
21 quality, and save money.

22 **KRISTIN MARCELL, NYSDEC HUDSON RIVER ESTUARY PROGRAM**

23
24 Page 121, Chapter 11: This section proposes valuable work to look at how climate
25 change will affect health status globally, including in the developing world. However
26 health is not the only sector likely to be affected in developing countries. It is not clear
27 whether these important effects will be examined in the GCRP.

28 **WARRILOW, WILKINS – UK DEPARTMENT FOR ENVIRONMENT,**
29 **FOOD AND RURAL AFFAIRS**

30
31 Page 121, Chapter 11:

32 Chapter 11 needs more linkage with the discussion of international collaboration.

33
34 Chapter 11 needs to stress the importance of using multiple scenarios to indicate a range
35 of possible outcomes.

36
37 Chapter 11 needs to better articulate the linkages between research and decision-making
38 frameworks.

39
40 Chapter 11 needs more linkage with the discussion of reporting and outreach because of
41 the diversity of decision-makers (e.g., individuals and non-governmental organizations).

42 **JOAN L. ARON, SCIENCE COMMUNICATION STUDIES**

43
44 Page 121, Chapter 11: Technology obviously plays an important role in human
45 contributions to environmental change. The IPCC emissions scenarios incorporated
46 assumptions about rates of technological change, but perhaps an equally important

Comments on Chapter 11

1 consideration is what factors affect the rates of technological change. What are the
2 current barriers that need to be removed and the potential incentives that could be
3 implemented to facilitate technological change? This is an important issue that needs to
4 be effectively communicated to policy-makers, because it is a critical factor in weighing
5 the costs and benefits of different policy options to address climate change.

6
7 Comment 2

8 Please also see comment for Chapter 10 regarding the time-scales of impact assessments.

9 **VICKI ARROYO AND BENJAMIN PRESTON, PEW CENTER ON**
10 **GLOBAL CLIMATE CHANGE**

11
12 Page 121, Chapter 11: This chapter is a relatively balanced and mature discussion of the
13 topic, reflecting several years of discussion within the Global Change Research Program
14 scientific community. Its first three questions are the right ones to ask; and the fourth
15 question is also a good one, although why health effects alone have been privileged for
16 specific attention is not entirely easy to understand.

17
18 The most important questions about this chapter have to do not with what is here but with
19 what the discussion of “key linkages” implies about attention to human contributions and
20 responses in *other* chapters of the strategic plan. As just one obvious example, note the
21 omission of people in discussing impact monitoring in Chapter 3. As another, note the
22 central importance of human dimensions (research as well as practice) in implementing
23 the commitments of Chapter 4. More generally, there is a tendency for chapters on such
24 topics as the water cycle and the carbon cycle to mention human contributions and
25 responses in introductory material but then to ignore them in lists of research needs and
26 products.

27
28 Within the chapter, the most obvious comment is that in many cases the presentations of
29 research needs and products are more general than in preceding chapters. More detailed
30 statements on many of these research agenda issues are readily available in recent
31 National Research Council reports, widely peer-reviewed and authoritative, and should
32 be integrated into this chapter.

33
34 One significant omission that I see in the list of topics presented in the draft chapter is
35 research on prospects and avenues for *institutional change*, which is as important an issue
36 -- and an issue as based in good research -- as technological change. For instance,
37 potentials for U.S. institutions to become more adaptive could be a key in responding to
38 climate change impacts in ways that reduce disruptions to regional economies, and this
39 can be studied. Another omission, related to Chapter 4 and other parts of the plan, is the
40 need for improvements in our national capacities to construct economic and demographic
41 scenarios for the mid-term and longer-term future. It is difficult to assess the possible
42 meaning of climate change forecasts without this kind of context (e.g., likely economic
43 and social opportunities and costs), and it is also difficult to construct useful land-use
44 forecasts (Chapter 8) without them.

45

Comments on Chapter 11

1 This chapter should increase its emphasis on the importance (for research on human
2 contributions and responses) of attention to issues and processes at regional and sectoral
3 scales. In particular, I would argue, it should make the strategic point that a great deal of
4 the human dimensions research that is needed to support CCRI and GCRP is necessarily
5 going to be place-based, regional analysis, in order to have a reasonable chance of
6 capturing the range of complexities of nature-society relationships. Where research
7 capacities for this kind of regional analysis exist, they should be reviewed for
8 complementarities and possible redundancies and then used (EPA, DOE, NOAA, NSF,
9 and NASA have all invested in capacity building in this regard). Where the current
10 infrastructure, including models and data bases, is inadequate, it should be strengthened.

11 **THOMAS J. WILBANKS, OAK RIDGE NATIONAL LABORATORY**

12
13 Page 121, Chapter 11: This chapter does a good job in taking a cross-sector approach, but
14 there are 3 major oversights missing from this chapter:

- 15 1) Lack of International Scope: We live in a globalized world, including
16 international travel, trade and food importation, and population migration, to
17 name a few aspects. Moreover, we are taking a very myopic view of the world if
18 we ignore health impacts in more vulnerable developing countries. Continued
19 neglect of the poorest and most vulnerable regions of the world will not serve our
20 country well; persistent inequities in health and environment may lead to a larger
21 global burden of disease, that can likely threaten public health and national
22 security of the US, especially following climate/environmental disruption.
- 23 2) Lack of cost-benefit analysis of Adaptation: While this chapter does discuss
24 economic “drivers” of environmental change, lacking is any focus on the cost of
25 adaptation. According to assessments on climate change and health, even in
26 places where the number of disease cases may not change, the risk and subsequent
27 costs of disease prevention could change considerably. Such important economic
28 analysis is highly relevant to a comprehensive evaluation of the health responses
29 to climate and environmental change.
- 30 3) Incomplete review of the literature: This is a very serious oversight and a missed
31 opportunity to advance the field. Why is the Health Sector Report of the US
32 National Assessment not cited? This assessment was published as a series of
33 peer-reviewed scientific papers in the highest ranking environmental health
34 journal of the National Institutes of Health (NIH). To exclude this document
35 shows a disregard for the scientific peer review process.

36
37 Additionally, the US National Assessment (health expert panel) included division chiefs
38 of the Centers for Disease Control and Prevention (CDC) and other agencies, professors
39 and department chairs in academia, and scientists from the private sector. If an
40 assessment from such an expert panel goes ignored, I have little faith in whatever
41 foundation the Climate Science Program is building upon.

42 **J. PATZ, MD, MPH, JOHNS HOPKINS BLOOMBERG SCHOOL OF**
43 **PUBLIC HEALTH**

44
45 Page 121 – Chapter 11: I see glaring omissions in the chapter, namely questions
46 surrounding increasing consumption, especially energy and the infrastructures, both in

Comments on Chapter 11

1 and outside the home which deliver energy services. It is now fifteen years since the
2 publication of *Our Common Future* (WCED 1987), which concluded that if serious
3 environmental problems were to be avoided, the rich countries of the world would have
4 to reduce their energy consumption by 80% in 2020 compared to 1980 levels. Recent
5 surveys show that the OECD countries have increased their energy consumption by 33%,
6 from 400 to 600 MTOE, over those 15 years (BP 2002). Energy use in Asia has grown
7 from about 20 to 120 MTOE, faster than anticipated in the WCED analysis, and studies
8 in China and India leave little doubt that energy will continue to grow at a rapid rate.
9 Household energy use (stationary and mobile) continues to be the fastest growing sector
10 in both developed and developing countries.

11
12 Technology optimists have time and again put forward efficiency scenarios (best
13 technology, best practice, and so on) which postulate the potential for significant
14 reductions in household energy use, but while both production, transmission and end-use
15 technologies have improved in efficiency, total energy consumption has continued to
16 grow. Of course efficiency ought to be continue to be encouraged, but if we are serious
17 about reducing climate gas emissions, the research and policy agendas need to be
18 broadened to examine the things which are offsetting efficiency, such as the increasing
19 consumption of: per capita living space; artificial cooling (for interior spaces); mobility
20 (especially in numbers, sizes and fuel consumption of cars); cleanliness (washing and
21 drying) and other (Energy services,.

22
23 In light of this, I propose that these as examples of questions that need to be added:

24
25 How do we move the policy paradigm and research agendas in the United States and
26 other OECD countries from a narrow focus on encouraging new technologies and energy
27 efficiency to one which addresses growth in energy services?
28

29 A related question, put in different terms: What are the real constituents of energy
30 demand and how do we reduce demand? For example, a central driver of demand not
31 addressed in current theoretical approaches is the increasing demand for per capita living
32 space.
33

34 Finally, how do we expect to achieve reductions in energy consumption and climate gas
35 emissions in a society which is saturated in a discourse which positively associates more
36 consumption with a better life (and at the level of national economic policy encourages
37 growth in GDP)?

38 **WILHITE, RESEARCH FELLOW AT THE UNIVERSITY OF OSLO, S**
39 **CENTRE FOR DEVELOPMENT AND THE ENVIRONMENT, AND**
40 **FORMER GENERAL MANAGER OF THE EUROPEAN COUNCIL FOR**
41 **AN ENERGY EFFICIENT ECONOMY (ECEEE)**

42
43 Page 121, Chapter 11: For the solution of the climate change problem, the US is focusing
44 on technology (incl. sequestration technologies) and technology transfer to developing
45 countries. I think the scope has to be broadened, especially in the context of the problem
46 how to get the developing countries on board. I think the US needs to redefine its position

Comments on Chapter 11

1 in the international climate policy arena and therefor new approaches (alliances,
2 institutional arrangements, regime formation) are necessary. I think that a lot of
3 supporting scientific research (social sciences!) is possible and needed, to get this job
4 done. For example: instead of focusing on climate change as such you might try to focus
5 on regional development problems and priorities like water scarcity, food security,
6 energy, and to explore where and how the climate change issue could be connected to
7 these priorities (climate friendly solutions!). So, use regional problems as a vehicle to
8 achieve the objective of involving the developing countries in the abatement of climate
9 change. As an illustration I refer to the Development and Climate project that the RIVM
10 (the Netherlands) started about a year ago. In that project we cooperate with 6 developing
11 countries. The approach is bottom-up: the 6 countries produce reports on their problems
12 and status and the next step is to find possible linkages with the climate change issue.
13 This approach offers long term perspectives to the solution of the problem, embedded in
14 the regional context.

15
16 So, my challenge to you there is: do you really want to make a difference? are you
17 prepared to identify and include additional research priorities in support of new
18 approaches (institutional arrangements, regime formation, alliances)? and is there a
19 willingness to act then, based on the outcomes of such a programme? (of course this is
20 reserved to policymakers).

21 **HEIJ, IPCC FOCAL POINT FOR THE NETHERLANDS**

22
23 Page 121, line 4: Focusing question 4 only on “human health” is too specific—really
24 should be health and well-being, and should perhaps be not only the physical and
25 individual aspects of these, but also the effects on societal institutions and societal life
26 and options.

27 **MICHAEL MACCRACKEN, LLNL (RETIRED)**

28
29 Page 121, Line 4: Question 1- What about combustion emissions? Why can't this be
30 overtly stated in any chapter in this document? Especially here?

31 **LARA HANSEN, WORLD WILDLIFE FUND**

32
33 Page 121, Line 4: Question 3: Why not consider all of the other things we make decisions
34 about without certainty? We use bet hedging strategies all the time. Insurance is
35 predicated on this idea. We are not certain that we will have an automobile accident, but
36 we get insurance. In fact some states mandate this insurance, so that we can pay for the
37 damage we might cause. We are not certain that we will get sick, but we have health
38 insurance. Why, because it is a good idea. We make decisions based on probabilities all
39 the time. Why not discuss this side of the issue as well. Ignoring it is unbalanced.

40 **LARA HANSEN, WORLD WILDLIFE FUND**

41
42 Page 121, Line 4: Question 4 -Does this include health impacts due to the changed
43 environment as well? Does this include health impacts of air pollution from combustion,
44 refining and transport of fossil fuels? Water pollution from extraction and refining of
45 fossil fuels?

Comments on Chapter 11

1 **LARA HANSEN, WORLD WILDLIFE FUND**

2
3 Page 121: Lines 6-20 provide a good introduction.

4 **ANN FISHER, PENN STATE UNIVERSITY**

5
6 Page 121, lines 14-18: Need to be indicating that these types of contributions and
7 responses can also be affected by global change (so the temperature going up can have an
8 effect on emissions and the economy, etc.). This all needs to be treated in an interactive,
9 two-way manner.

10 **MICHAEL MACCRACKEN, LLNL (RETIRED)**

11
12 Page 122, lines 1-5: Research on human contributions and responses should include
13 decision-making frameworks and their linkages to the results of interdisciplinary research
14 on global change systems.

15 **JOAN L. ARON, SCIENCE COMMUNICATION STUDIES**

16
17 Page 122, lines 1-5: Those “in the know” will understand this, but outsiders probably will
18 not.

19 **ANN FISHER, PENN STATE UNIVERSITY**

20
21 Page 122, line 2: The quest for “common forcing scenarios” should include multiple
22 scenarios. At the CCSP workshop, Robert O’Connor (NSF) stressed the need for
23 multiple scenarios in his summary report of the breakout session on scenario
24 development to support decisions.

25 **JOAN L. ARON, SCIENCE COMMUNICATION STUDIES**

26
27 Page 122, line 7: This section refers to “a series of national and international reports”, but
28 highlights only reports by the U.S. National Research Council. There needs to be more
29 on international efforts (e.g., the Interagency Network on Climate and Human Health
30 formed by the World Health Organization, the World Meteorological Organization, and
31 the United Nations Environment Programme).

32 **JOAN L. ARON, SCIENCE COMMUNICATION STUDIES**

33
34 Page 122, lines 8-13: The US National Assessment process with its many reports also
35 contributed and needs to be mentioned.

36 **MICHAEL MACCRACKEN, LLNL (RETIRED)**

37
38 Page 122, line 14: missing National Assessment peer-reviewed papers.

39 **J. PATZ, MD, MPH, JOHNS HOPKINS BLOOMBERG SCHOOL OF**
40 **PUBLIC HEALTH**

41
42 Page 122, lines 16-19: this is all pretty vague.

43 **MICHAEL MACCRACKEN, LLNL (RETIRED)**

44
45 Page 122, lines 17-18: I understand that this is a quote from the NRC study; yet the
46 strategy’s list of enterprise disciplines should also include mathematics. Advances in

Comments on Chapter 11

1 mathematics often preclude advances in other sciences. And the reliance of climate
2 science on modeling reacting systems and sharing vast amounts of information makes
3 focusing on mathematics, as well as computer science breakthroughs particularly critical.

4 **DEPARTMENT OF TRANSPORTATION, LAWSON**

5
6 Page 122, line 25: This should be rephrased to “How are humans and society affected by
7 global environmental change and how can the respond and prepare?” or something
8 similar.

9 **MICHAEL MACCRACKEN, LLNL (RETIRED)**

10
11 Page 122, line 25: Should add “how to prepare for and” in front of “to respond to global
12 environmental change”.

13 **KRISTIE L. EBI, EPRI**

14
15 Page 122, line 28. Throughout the *Strategic Plan*, an effort has been made to minimize
16 or define jargon. I suggest that “human forcing” be explained as: how human activities
17 affect the climate system, land use and land cover, and other aspects of the global
18 environment. Then for many of the research activities envisioned in t *Strategic Plan*, the
19 focus for human forcing is how human actions (inadvertent or deliberate) affect climate.

20 **ANN FISHER, PENN STATE UNIVERSITY**

21
22 Page 122, Line 29: Should include impacts of global change on ecosystems.

23 **JENNIFER BIRINGER, WORLD WILDLIFE FUND**

24
25 Page 122, line 32: This should also be referring to how decisions are made under
26 conditions of limited knowledge, which is done all the time.

27 **MICHAEL MACCRACKEN, LLNL (RETIRED)**

28
29 Page 122, lines 34-37. Mathematics and computer science should be covered here, per
30 comment above.

31 **DEPARTMENT OF TRANSPORTATION, LAWSON**

32
33 Page 122, lines 35-38: good.

34 **ANN FISHER, PENN STATE UNIVERSITY**

35
36 Pages. 123-124: The Question 1 discussion seems weak on the land use/land cover topic
37 (aside from food production and health). More explicit attention is warranted even
38 though Chapter 8 is about this topic. Changes in land use and land cover depend on the
39 relative profitability of differing land uses and on people’s preferences (e.g., that support
40 refuges and other protected “natural” areas), including lifestyle choices such as living in
41 scattered development rather than in more compact areas that would reduce
42 transportation and other infrastructure needs. Societal choices to have lots of
43 development in coastal areas typically have not have accounted for either historic nor
44 projected sea-level rise; poorly planned coastal development could exacerbate erosion
45 and its costs to ecosystems and infrastructure, as noted in the p. 125 reference to the NRC
46 *Pathways* report. Although Chapter 8 is devoted to land use and land cover, it is more

Comments on Chapter 11

1 oriented toward data collection and mapping than toward the behavioral modeling that
2 could explain why the observed land use/cover patterns have changed the way they have—
3 with theoretical bases for projecting future changes. Careful management will be
4 required to ensure the collaboration with social scientists that is mentioned frequently in
5 Chapter 8 and in the “key linkages” section of Chapter 11, especially page 129, lines 7-8
6 and 10-11. Perhaps Chapter 8 could have more focus on how changes in land use/land
7 cover affect global climate change, with the Chapter 11 focus more on how decisions
8 about land use/land cover influence vulnerability to global environmental and climate
9 changes.

10 **ANN FISHER, PENN STATE UNIVERSITY**

11
12 Page 123, Question 1: The first core research questions addresses the drivers of climate
13 change, land use/cover change, other global environmental changes. I already highlighted
14 the shortcomings in the focus on impacts. The one not mentioned yet is a questionable
15 omission of questions regarding thresholds, the limits of resilience or adaptive capacity,
16 and any consideration of impacts and coping capacity in the face of surprises or major
17 shifts in environmental and climatic conditions, but also in the face of other socio-
18 economic challenges. Communities and individuals are likely to be less resilient when
19 already stressed to the maximum, for example, as a result of economic hardship etc.

20
21 Specifically, the chapter omits dealing with several important aspects of the human
22 dimensions – again creating the impression of political bias. I suggest these omissions are
23 remedied to counter this obvious bias:

- 24 1. The research plan not once asks questions about energy and resource consumption
25 as drivers of climatic and environmental change. There is much not fully
26 understood about it. But without such understanding, the institutional and
27 political-economic drivers of change – which also influence the responses to
28 change – cannot be addressed successfully in policy-making.
- 29 2. The plan is woefully ignorant of and silent on several aspects of the human
30 dimensions that the human-dimensions research community and others concerned
31 with human behavior are increasingly interested in. These include culture,
32 institutions, values, and behavior. Some of these change slowly, others faster, yet
33 they all impose significant constraints on changing policy, and because of their
34 slowness in changing, they can be assessed and integrated and at least considered
35 in predicting human drivers of change. In each of the issues listed (population,
36 trade and economic activity and technological change) these broader social and
37 small-scale individual aspects are far from fully understood, yet not even
38 mentioned here. How exactly that can be done ought to be addressed over the next
39 ten years, but this plan says nothing about these matters. A significant omission!
- 40 3. The plan must be more explicit about what will be asked of the social sciences in
41 support of the scenario development described elsewhere in the plan. Especially,
42 it must provide timelines so that it can be assessed whether the human dimensions
43 community can deliver on the timeframe that these scenarios will be developed.

44 Overall, this research focus would benefit greatly if it actually built on the existing
45 understanding and findings of both the IPCC and the NA to avoid asking repeat
46 questions, and in fact, to pose more sophisticated, more nuanced ones.

Comments on Chapter 11

1 **SUSANNE MOSER, UCS**

2

3 Pages 123 - 124: In contrast to Chap 9, here are some specifics, reassuring the reader that
4 the authors are "on the same page" as some common understandings of the issues. This
5 is fine.

6 **WIENER, INDIVIDUAL COMMENTATOR**

7

8 Page 123, lines 3ff: This is NOT a statement of what we know. It is important that the
9 chapter indicate by reference where the information is best summarized (e.g., an IPCC
10 report).

11 **MICHAEL MACCRACKEN, LLNL (RETIRED)**

12

13 Page 123, line 7. Make clear that the global deforestation here results from human
14 decisions to harvest trees or clear land.

15 **ANN FISHER, PENN STATE UNIVERSITY**

16

17 Page 123, lines 10-11. Rewrite as "Despite wide ranging research, the level of
18 understanding achieved to date is quite uneven."

19 **ANN FISHER, PENN STATE UNIVERSITY**

20

21 Page 123, lines 12-13: The need to "model human actions in order to project future
22 conditions and consequences" requires a perspective of multiple scenarios.

23 **JOAN L. ARON, SCIENCE COMMUNICATION STUDIES**

24

25 Page 123, lines 15-18: Additional issues include how to develop scenarios, the need for
26 development of health models, and the importance of stakeholder involvement in
27 determining the research agenda.

28 **KRISTIE L. EBI, EPRI**

29

30 Page 123, 15ff: In posing these various questions, this will only be meaningful if there is
31 some indication of how well these must be estimated and how much improvement is
32 needed over current knowledge. It would also be helpful to have some mechanism for
33 determining the relative importance of pinning down these various quantities—some of
34 these will matter a lot, others not much.

35 **MICHAEL MACCRACKEN, LLNL (RETIRED)**

36

37 Page 123, lines 16-18: Studies of processes, trends, scenarios and projections need to be
38 linked to decision-making frameworks.

39 **JOAN L. ARON, SCIENCE COMMUNICATION STUDIES**

40

41 Page 123, line 20: Add transportation to list of variables related to population growth and
42 demographic change.

43 **DEPARTMENT OF TRANSPORTATION, LAWSON**

44

45 Page 123, line 28: **(44-S)** Here is a use of "predicted" that may need changing to
46 "projected", but I'm not sure. Consistency would suggest a change, I believe.

Comments on Chapter 11

1 **HP HANSON, LANL**

2
3 Page 123, lines 28-29: An additional question is what are the potential health impacts of
4 new technologies and of carbon sequestration.

5 **KRISTIE L. EBI, EPRI**

6
7
8 Page 123, line 28: Change “predicted” to “projected” as many factors influence these and
9 the estimates are conditional.

10 **MICHAEL MACCRACKEN, LLNL (RETIRED)**

11
12 Pages 124-126: Thank you! the recognition of social creation of vulnerability is indeed a
13 big step forward in understand the source and solution of many problems, and the
14 treatment here is good. It seems clear to me that this also helps strengthen the good job
15 immediately following, on the value of specific studies of the role and relevance of
16 uncertainty in decision-making in any given situation. Bravo!

17 **WIENER, INDIVIDUAL COMMENTATOR**

18
19 Page 124-125: We recognize the advantages of broadening the consideration of
20 consequences of climate change to include vulnerability and adaptation. Vulnerability
21 assessment can identify mechanisms by which natural and societal systems can be
22 interrupted by a broad range of drivers, and is not as dependent upon assumptions about
23 future changes in climate as direct estimates of impacts. However, we are concerned that
24 the language of the *Draft Strategic Plan* reflects a shift in focus rather than a broadening.
25 For example, the quotation from the NRC (1999) report *Global Environmental Change:
26 Research Pathways for the Next Decade* comments on the importance of other drivers for
27 affecting systems than climate change. Although some systems are likely to be more
28 heavily affected in the future by non-climate related changes, for other systems, climate
29 is the major driver. The projects outlined would appear to enhance methods for
30 conducting impact assessments and the acquisition of information necessary to do so, but
31 there does not appear to be much in the way of performance of the next generation of
32 impact assessments. How are policy-makers and resource managers to make effective
33 decisions that reflect the costs and benefits of climate change and potential responses
34 without up-to-date information on consequences? The *Draft Strategic Plan* proposes
35 assessments of ecosystem impacts and health impacts, yet societal systems are not
36 addressed, even though these are critical areas if one is to understand the economic
37 costs/benefits associated with climate change. Furthermore, vulnerability assessment
38 alone constrains policy choices for addressing climate change impacts to resource
39 management (i.e., adaptation to reduce vulnerability). Without quantitative assessment of
40 potential impacts, the effects of other policy alternatives such as mitigation cannot be
41 comprehensively assessed.

42 **VICKI ARROYO AND BENJAMIN PRESTON, PEW CENTER ON**
43 **GLOBAL CLIMATE CHANGE**

44

Comments on Chapter 11

1 Page 124, Lines 7-26—There needs to be a emphasis on research to predict various future
2 “societal changes”, or scenarios. Research of the societal changes over the past 50 to 100
3 years, say in large urban areas where the climate has changed, would be highly useful.

4 **S.A. CHANGNON, ILLINOIS STATE WATER SURVEY**

5
6 Page 124, lines 9-26. Reorganizing could make it seem less like the “everything but the
7 kitchen sink.” Lines 25-26 would have relevance far beyond the CCSP.

8 **ANN FISHER, PENN STATE UNIVERSITY**

9
10 Page 124, lines 9-10: An additional issue is the development of non-market models
11 (including health) for inclusion in integrated assessment models.

12 **KRISTIE L. EBI, EPRI**

13
14 Page 124, Lines 9-12: The scope of modeling needed to address the diversity of issues
15 raised in this and other chapters suggests that we will need less of a single model and
16 more of a comprehensive modeling framework, within which models of different aspects
17 of economy and ecology, often with different time steps and spatial grains, can be hooked
18 together to examine particular scenarios and outcomes. This modeling framework is an
19 issue large enough to merit its own focus, if not as a chapter, then at least as a major
20 research question. Also the modeling framework must facilitate examination of new
21 energy futures based on mitigation, including ones in which fossil fuel is considerably
22 more expensive or entirely absent.

23 **CALIFORNIA RESOURCES AGENCY**

24
25 Page 124, lines 9 and 11: Again, these tools exist. What needs to be done is not to
26 develop them but to improve them—and by how much should be indicated (e.g.,
27 sufficiently to provide estimates to within some percentage for some type of important
28 question).

29 **MICHAEL MACCRACKEN, LLNL (RETIRED)**

30
31 Page 124, Lines 13–16: “*Comprehensive studies of greenhouse-relevant emissions and*
32 *potential climate change that include carbon aerosols in an integrated assessment model*
33 *and the appropriate specification of emissions, costs of control, and chemical and*
34 *radiative characteristics of those aerosols.”*

35
36 In this (third) key need why single out “carbon aerosols” for inclusion in an integrated
37 assessment? Why not include sulfur-based aerosols, and others as well? (see page 51,
38 line 35). These aerosols are “greenhouse-relevant emissions”, and thus already included
39 generally.

40 **DAVID L. WAGGER, PH.D., SELF**

41
42 Page 124, Lines 22-24: Economic analysis of costs and benefits should not be restricted
43 to those alternatives that influence human health, but should be an aspect of all analyses.
44 Economic analysis should be broad enough to deal with non-market goods and services
45 and should estimate the costs of adaptation as well as mitigation.

Comments on Chapter 11

1 CALIFORNIA RESOURCES AGENCY

2
3 Page 124, lines 22-24: The wording here seems to imply that there will be an estimate
4 globally for each and every household, which is surely dreaming.

5 MICHAEL MACCRACKEN, LLNL (RETIRED)

6
7 Page 124, Lines 25–26: “*Analysis of how social, cultural, and economic factors affect*
8 *the discounting of future health and environmental costs and benefits;*”

9
10 The last key need omits an analysis of how social, cultural, and economic factors affect
11 placing (market) values on health and environmental costs and benefits (see “Overview
12 Comments on Chapter 10”). A new key need addressing this question should be added.

13 DAVID L. WAGGER, PH.D., SELF

14
15 Page 124, lines 29-34. Need a timeline for products and payoffs (same throughout
16 chapter).

17 DEPARTMENT OF TRANSPORTATION, LAWSON

18
19 Page 124, line 35: It would help to have some specific examples indicated.

20 MICHAEL MACCRACKEN, LLNL (RETIRED)

21
22 Page 124, Line36: Should include impacts of global environmental variability and change
23 on ecosystems as well.

24 JENNIFER BIRINGER, WORLD WILDLIFE FUND

25
26 Page 125, Lines 1-12. This paragraph does not really deliver a summary of our state of
27 knowledge on the effects of climate change on people. It skips the basic scientific
28 understanding and offers a few anecdotal observations. It would probably be better to
29 write a paragraph on each of the three topics enumerated in question 2, indicating in each
30 case what we know and what we don’t yet know.

31 JIM TITUS, U.S. ENVIRONMENTAL PROTECTION AGENCY (SEE 32 DISCLAIMER)

33
34 Page 125, Question 2: The second core research questions addresses impacts,
35 vulnerability, resilience, adaptive capacity. I already highlighted the shortcomings in the
36 focus on impacts.

- 37
38 1. Overall, this chapter displays an over-emphasis on adaptation (given the lack of
39 attention given to serious questions about mitigation and prevention), while not
40 asking a comprehensive set of questions about adaptation.
41 2. This core question offers a good opportunity to be more explicit about the
42 challenging task of integrating qualitative and quantitative research results and
43 data, but it is absolutely silent on it. It makes me wonder whether anyone has
44 thought these through very much...
45 3. As mentioned previously, the plan never asks questions about the cost, feasibility,
46 and effectiveness of potential adaptation options. I explicitly restate this omission

Comments on Chapter 11

1 as it should be a core complementary question to the costs and feasibility of
2 mitigation options. Again, this is a good example of the not-so-subtle political
3 bias: assuming that adaptation will go smoothly without major interruptions or
4 hurdles while focusing on all the obstacles to dealing with the problem on the
5 front end (i.e., in mitigation), is just unrealistic and imposing wishful thinking
6 rather than conducting reality-based research on important policy-relevant
7 questions. This must be remedied.

8 **SUSANNE MOSER, UCS**

9

10 Page 125, lines 4-5: Giving as an example that society has adapted to climate variations is
11 not really applicable when considering climate change, which will be more monotonic
12 and much larger—and occurring everywhere at once instead of in isolated areas. The
13 limits of this example need to be stated.

14 **MICHAEL MACCRACKEN, LLNL (RETIRED)**

15

16 Page 125, line 6: This “major conceptual advance” needs to be explained. In addition, it
17 is really more conceptual than practical as there is basically an infinite set of potential
18 vulnerabilities (and so partial derivatives) and it is not really practical to do all of this.
19 How this alternative approach will be put into practice needs a lot more thought.

20 **MICHAEL MACCRACKEN, LLNL (RETIRED)**

21

22 Page 125, line 11: Add “prepare for and “ in front of” respond to”.

23 **KRISTIE L. EBI, EPRI**

24

25 Page 125, line 15. It should be acknowledged that in addition to climate model analysis,
26 the National Assessment extensively employed vulnerability analyses. The work
27 described in this section should build upon previous work in this area.

28 **JANINE BLOOMFIELD, ENVIRONMENTAL DEFENSE**

29

30 Page 125, Lines 15-33: While these questions may merit some degree of additional
31 empirical research, it would be preferable if they were pursued within the context of the
32 activities in Chapter 13, "Reporting and Outreach", since in fact Reporting and Outreach
33 is the real laboratory for examining “how society uses improved information about the
34 climate system...to adapt more effectively.”

35 **CALIFORNIA RESOURCES AGENCY**

36

37 Page 125, line 22: Society could use current information more productively.

38 **KRISTIE L. EBI, EPRI**

39

40 Page 125, section beginning line 25: In addition, longitudinal data sets need to be
41 developed.

42 **KRISTIE L. EBI, EPRI**

43

44 Page 125, lines 26-33. Difficult to follow the research needs – suggest a bulleted list.

45 **DEPARTMENT OF TRANSPORTATION, LAWSON**

46

Comments on Chapter 11

1 Page 125, line 26: what is the difference between “empirical studies” and “field
2 campaigns?”

3 **J. PATZ, MD, MPH, JOHNS HOPKINS BLOOMBERG SCHOOL OF**
4 **PUBLIC HEALTH**

5
6 Page 125, line 41: **(45-E)** Another verb: “Improved communication and
7 dissemination...are being developed...”

8 **HP HANSON, LANL**

9
10 Page 125, lines 41-42: The products and payoffs to meet the needs of decision-makers
11 should include international issues.

12 **JOAN L. ARON, SCIENCE COMMUNICATION STUDIES**

13
14 Page 126-128: Will health effects be incorporated into scenarios? As policy-makers
15 weigh different potential futures and policy options, it may be useful if they are allowed
16 to examine the health implications, if any, of various alternatives, because health is a
17 particularly salient issue for the public. For example, mitigation policies that address
18 both air quality and greenhouse gases simultaneously should be considered, such as those
19 that target tropospheric ozone and black carbon as well as traditional greenhouse gases.

20
21 Also, please see comment for Chapter 10 regarding the time-scales of impact
22 assessments.

23 **VICKI ARROYO AND BENJAMIN PRESTON, PEW CENTER ON**
24 **GLOBAL CLIMATE CHANGE**

25
26 Page 126, line 1 and following. A comment made to chapter 4 above applies equally well
27 to this section, I copy it here: “A critical omission from this section is the need for tools
28 to support decision making about mitigation under uncertainty (see first overview
29 comment above – Chapter 4 comments). This is at the heart of the debate between the
30 administration’s ‘wait for more research (i.e., less uncertainty)’ decision and those who
31 feel that there is enough certainty to support more aggressive control of greenhouse gas
32 emissions. Decision makers at the federal level could greatly benefit from an analysis of
33 how previous decisions under uncertainty were made and how to bound uncertainty that
34 exists. For example, given specific issues, how will uncertainty change in a quantitative
35 sense given an additional 5 years of research. Will we be 5%, 10% 50% more confident?
36 Will the finding change in sign? This should be a very high priority activity.”

37 **JANINE BLOOMFIELD, ENVIRONMENTAL DEFENSE**

38
39 Page 126, Question 3: The third core research questions addresses issues of complexity,
40 uncertainty, and the long time horizons in global change decision-making. Again, the
41 areas of bias and omission have been discussed in general already – particularly the
42 complete omission of the findings and experiences gained in the First National
43 Assessment, and the need to be more specific on the products, stakeholder processes and
44 pay-offs.

45

Comments on Chapter 11

1 Let me add one specific suggestion, which is to include a comparative research element
2 here, namely an experimental design where the cost-effectiveness of different decision-
3 making approaches will be assessed (e.g., precautionary vs. cost-benefit vs. reactive
4 approaches).

5 **SUSANNE MOSER, UCS**

6
7 Page 126, Lines 1-33: What is the relationship between these decision support efforts and
8 those outlined in the CCRI? Isn't this a repetition of effort, or at least an unnecessary
9 division of activities that should be carried out in concert?

10 **VICKI ARROYO AND BENJAMIN PRESTON, PEW CENTER ON**
11 **GLOBAL CLIMATE CHANGE**

12
13 Page 126, line 3: Change "social and economic" to "social, economic and non-
14 economic"

15 **KRISTIE L. EBI, EPRI**

16
17 Page 126, lines 3-6: It is an insult to suggest that this is a summary of the state of
18 knowledge. There is not even a reference given. This needs to be improved.

19 **MICHAEL MACCRACKEN, LLNL (RETIRED)**

20
21 Page 126, Line 10: Why would we want to propagate uncertainty?

22 **JENNIFER BIRINGER, WORLD WILDLIFE FUND**

23
24 Page 126, lines 11-12: Add non-economic costs and opportunities.

25 **KRISTIE L. EBI, EPRI**

26
27 Page 126, lines 13-14: Add that choices can be made proactively to address possible
28 impacts.

29 **KRISTIE L. EBI, EPRI**

30
31 Page 126, section beginning line 20: An additional research question is to determine how
32 much information is enough to take action.

33 **KRISTIE L. EBI, EPRI**

34
35 Page 126, Lines 21-26: The proposed research program reduces the relationship of
36 science and policy to market research for selling info widgets and completely misses the
37 societal need for power to base its actions on provisional but nonetheless valid assertions
38 of truth. It is less important for researchers to understand what decision-makers need or
39 want to know than for researchers to engage in a dialogue with decision-makers that
40 yields important information for decision-makers. Put another way, it is far more
41 important for the program to experiment with the institutional arrangements that facilitate
42 information exchange than to conduct an assay of decision-maker needs and wants.

43 **CALIFORNIA RESOURCES AGENCY**

44
45 Page 126, lines 21-22: The "research to determine what information is required by
46 individual, organizations, and governments to make better decisions regarding global

Comments on Chapter 11

1 environmental variability and change” should be linked to the discussion of reporting and
2 outreach.

3 **JOAN L. ARON, SCIENCE COMMUNICATION STUDIES**

4
5 Page 126, section beginning line 28: Assessment is a process. How will the process be
6 sustained?

7 **KRISTIE L. EBI, EPRI**

8
9 Page 126, line 33: There are no specifics—this is really not much use.

10 **MICHAEL MACCRACKEN, LLNL (RETIRED)**

11
12 Page 127, Question 4: The specific focus on human health can be justified for a number
13 of reasons (importance to society, integrator of many types of changes in society, etc.).
14 Under this focus area, however, I want to suggest a much greater emphasis on the
15 differential impacts of health risks from climate change, i.e., a more explicit
16 environmental justice focus which under previous administrations, the EPA – for
17 example among other federal agencies – already committed to. This plan should not
18 retreat on that, but in fact encourage every agency involved in health research to
19 understand the differential vulnerability and coping capacity better.

20
21 Secondly, if it is in fact true that the capacity of our health care system to deal with the
22 growing health risks from climate change will determine the actual incidence of illness –
23 as many health impacts scientists argue, then this capacity of the response system itself
24 needs to be under much greater scrutiny. How well prepared is the system to respond to
25 the growing demand and deliver timely and effective health care? Is the access to this
26 system equally good for different sub-populations, and if not, how can that be remedied?
27 Are their scenarios under which the system could no longer function effectively?
28 Such questions, again, are highly policy relevant, but not asked so far in this plan.

29 **SUSANNE MOSER, UCS**

30
31 Page 127: Here, on the health issues, the abstraction detracts from credibility; there is
32 simply too long a history of such problems as failures of the basic needs approach in
33 development, the catastrophe of the HIV/AIDS pandemic, and the coming disaster of
34 anti-biotic resistance in a growing range of pathogens, due to ubiquitous environmental
35 dispersal through livestock application... The public engagement we need will be
36 diminished by looking uninformed or biased against some problems.

37 **WIENER, INDIVIDUAL COMMENTATOR**

38
39 Page 127, lines 2-5: References are needed for statements that say “well-established” and
40 to things like “agenda-setting exercises.” This is really just vague talk without references
41 and substantiation.

42 **MICHAEL MACCRACKEN, LLNL (RETIRED)**

43
44 Page 127, Line 11: Not clear why this should focus on global and developing country
45 impacts and not focus on the US.

Comments on Chapter 11

1 **HOWARD FELDMAN, AMERICAN PETROLEUM INSTITUTE**

2
3 Page 127, line 14: Change “particulate” to “particles” to be proper grammar.

4 **MICHAEL MACCRACKEN, LLNL (RETIRED)**

5
6 Page 127, Line 15: Should also consider any beneficial impacts of ozone, ie reductions
7 in UV radiation and consider effects on cold-related illnesses.

8 **HOWARD FELDMAN, AMERICAN PETROLEUM INSTITUTE**

9
10 Page 127, line 15. Add to the list “vector-borne diseases”. There is a large body of
11 research on mosquito-borne disease and climate change, for example.

12 **JANINE BLOOMFIELD, ENVIRONMENTAL DEFENSE**

13
14 Page 127, line 18: "... capitalize on the enormous protections afforded by wealth and the
15 public health infrastructure." I strongly agree that no analysis of the costs and effects of
16 climate change is complete without taking into account current and future levels of
17 wealth and the investments they make possible in public health infrastructure. I suggest
18 adding the following sentence: "Some research shows that a dollar spent reducing
19 greenhouse gas emissions today reduces wealth in the year 2100 by at least three dollars,
20 meaning too great a concentration on prevention today will undermine the world's ability
21 to adapt tomorrow." –

22 **JOSEPH L. BAST, THE HEARTLAND INSTITUTE**

23
24 Page 127, Line 24: Also, what is the ability of public and private health services to
25 mitigate the impact of the infectious diseases?

26 **HOWARD FELDMAN, AMERICAN PETROLEUM INSTITUTE**

27
28 Page 127, lines 27-28: Add proactive measures in addition to response strategies.

29 **KRISTIE L. EBI, EPRI**

30
31 Page 127, lines 29-30: Evaluating tools and information products is important. One
32 improvement to the wording is: "... best methods for assessing climate-related health
33 impacts and for developing and evaluating useful tools and information products to
34 enhance public health”.

35 **JOAN L. ARON, SCIENCE COMMUNICATION STUDIES**

36
37 Page 127, lines 36-37: "Work on improved understanding of the health effects of UV
38 radiation, including exposure across regions and populations ..." I strongly agree that this
39 is a key area where reliable data are missing, making it impossible to determine if public
40 concern over the "hole in the ozone layer" and subsequent government actions were
41 justified. While ozone depletion has been documented, the predicted increase in ground-
42 level UV radiation has not, and preliminary data suggested no upward trend prior to the
43 ban on CFCs. Since the decision to ban CFCs is often cited as a model for "precautionary
44 action" to protect the Earth's atmosphere, it is important to the climate change debate that
45 this historic episode be better documented. –

Comments on Chapter 11

1 **JOSEPH L. BAST, THE HEARTLAND INSTITUTE**

2
3 Page 127, line 36. Add to Research Needs list: “The benefits to public health of
4 mitigation strategies to control greenhouse gas emissions. For example, the
5 improvements in air quality and concomitant reduction in respiratory illness incidence
6 from reducing use of fossil fuels in urban areas.”

7 **JANINE BLOOMFIELD, ENVIRONMENTAL DEFENSE**

8
9 Page 127, lines 38-40. Biologists and ecologists have a clear notion of what constitutes a
10 field study in their disciplines. It is less clear what the field study here might include, or
11 how it might be conducted.

12 **ANN FISHER, PENN STATE UNIVERSITY**

13
14 Page 127, line 40: Presumably this should refer to “climate variability and change” and
15 not simply to “climate”—we are interested in changes more than the base state.

16 **MICHAEL MACCRACKEN, LLNL (RETIRED)**

17
18 Page 127, Line 42: Related question on the impact of global climate change vs. the
19 impact of urban heat islands on public health.

20 **HOWARD FELDMAN, AMERICAN PETROLEUM INSTITUTE**

21
22 Page 128, lines 1-9: [Listing research needs, including:] "Research on the climate,
23 environment, and atmospheric interactions related to asthma, allergic disorders, and other
24 acute and chronic respiratory disorders and deaths . . ." This list is misleading and
25 incomplete. Many experts would view all five bullet items listed here to be speculative
26 threats based on highly unlikely worst-case scenarios for climate change. In particular,
27 they seem to assume higher day-time summer temperatures in large cities, which the
28 temperature record shows have yet to occur, and which likely occur only as the result of
29 urban heat island effects, not global climate changes. Conspicuously absent from this list
30 are the likely positive effects on public health of climate change due to milder winters
31 (meaning fewer deaths due to extreme cold weather and lower heating bills) and more
32 food production (meaning lower prices and higher consumption of fruits and vegetables,
33 known to reduce cancer and other health risks). I suggest all five bullets on this page be
34 rewritten to reflect the more cautious use of language elsewhere in the Strategic Plan, and
35 that the USCCSP fund research into the possible health benefits of climate change as well
36 as possible hazards. –

37 **JOSEPH L. BAST, THE HEARTLAND INSTITUTE**

38
39 Page 128, Line 2: explicitly include influenza given increasing death toll.

40 **HOWARD FELDMAN, AMERICAN PETROLEUM INSTITUTE**

41
42 Page 128, Line 4: include both hot and cold season effects.

43 **HOWARD FELDMAN, AMERICAN PETROLEUM INSTITUTE**

44
45 Page 128, Line 6: include diseases that might decrease also

Comments on Chapter 11

1 **HOWARD FELDMAN, AMERICAN PETROLEUM INSTITUTE**

2
3 Page 128, line 7: Add foodborne diseases.

4 **KRISTIE L. EBI, EPRI**

5
6 Page 128, line 7: what about COSTS of “control and treatment”

7 **J. PATZ, MD, MPH, JOHNS HOPKINS BLOOMBERG SCHOOL OF**
8 **PUBLIC HEALTH**

9
10 Page 128, Lines 8–9: “*Research on the health effects of production and use of alternative*
11 *fuels and new energy technologies.*”

12
13 This (last) research need is completely disingenuous. For years (if not decades), as
14 evidenced by the Department of Labor’s “Energy Employees Occupational Illness
15 Compensation Fund” (~\$863 million in FY2003), “Special Benefits for Disabled Coal
16 Miners” (\$300–400 million annually over the next few years), and “Black Lung
17 Disability Trust Fund” (~\$2.66 billion in FY2003), we have been quite willing to tolerate
18 and to pay for the consequences of the job-related health hazards and risks that coal
19 miners and other energy workers face.

20
21 Only NOW, when we are considering “alternative” and “new”, we need to be suddenly
22 concerned about the health effects of production and use of fuels and energy
23 technologies?!?!
24

25 This is not a research need, but rather a generous gift to the energy (fossil fuel) industry
26 of marginalizing, if not impeding, the development of alternative fuels and new energy
27 technologies, and it should be stricken.

28 **DAVID L. WAGGER, PH.D., SELF**

29
30 Page 128, line 10: Should add a bullet, “Research on diseases in the most vulnerable
31 regions of the world (not just within US borders)”

32 **J. PATZ, MD, MPH, JOHNS HOPKINS BLOOMBERG SCHOOL OF**
33 **PUBLIC HEALTH**

34
35 Page 128, Line 10: ▪ Research on the public health effects of changes in food supply
36 cost and availability due to climate change.

37 **HOWARD FELDMAN, AMERICAN PETROLEUM INSTITUTE**

38
39 Page 128, line 19: So what does the phrase “fundamental research results” mean—in
40 what way might decisionmakers use such information. Provide examples, and note that
41 all the following items are applied and not fundamental.

42 **MICHAEL MACCRACKEN, LLNL (RETIRED)**

43
44 Page 128, line 22: what about waterborne diseases?

Comments on Chapter 11

1 **J. PATZ, MD, MPH, JOHNS HOPKINS BLOOMBERG SCHOOL OF**
2 **PUBLIC HEALTH**

3
4 Page 128, line 24: Should add another bullet, “Integrated studies that include responses,
5 e.g., A/C, vector control, and subsequent benefits AND side-effects (or costs) of such
6 measures.”

7 **J. PATZ, MD, MPH, JOHNS HOPKINS BLOOMBERG SCHOOL OF**
8 **PUBLIC HEALTH**

9
10 Page 128, lines 25-26. This is a mechanism, not a product nor a payoff

11 **ANN FISHER, PENN STATE UNIVERSITY**

12
13 Page 128, lines 25-26: This is a method of doing something—not a payoff or product.

14 **MICHAEL MACCRACKEN, LLNL (RETIRED)**

15
16 Page 128, lines 27-29, and lines 37-38 are important, but do not follow from the
17 discussion.

18 **ANN FISHER, PENN STATE UNIVERSITY**

19
20 Page 128, line 29: again, what about vulnerable international hotspots as well.

21 **J. PATZ, MD, MPH, JOHNS HOPKINS BLOOMBERG SCHOOL OF**
22 **PUBLIC HEALTH**

23
24 Page 128, lines 32-34: The ties to all elements of the CCSP require an explicit statement
25 of linkage to Chapter 12 (Grand Challenges in Modeling, Observations, and Information
26 Systems), Chapter 13 (Reporting and Outreach), and Chapter 15 (Program Management
27 and Review).

28 **JOAN L. ARON, SCIENCE COMMUNICATION STUDIES**

29
30 Page 128, line 40. Add, “Research on human health is linked closely to decision support
31 (Chapter 4), in terms of both adaptation and mitigation options.”

32 **JANINE BLOOMFIELD, ENVIRONMENTAL DEFENSE**

33
34 Page 129. It is important to show linkages and integration; the writing could be clearer
35 on this.

36 **ANN FISHER, PENN STATE UNIVERSITY**

37
38 Page 129: Again, I would note my position above on the low utility of inapplicable
39 abstraction.

40 **WIENER, INDIVIDUAL COMMENTATOR**

41
42 Page 129, Lines 32-33: The most important linkage, that to Chapter 13:Reporting and
43 Outreach, is entirely absent.

44 **CALIFORNIA RESOURCES AGENCY**

45

Comments on Chapter 11

1 Page 129, lines 32-33: Giving only one example seems really minimal. More should be
2 given.

3 **MICHAEL MACCRACKEN, LLNL (RETIRED)**

4

5 Page 130, references: Recommend reference be correlated to text (via numbers). Also –
6 were there other references used to prepare this Chapter? Some of the subjects seem
7 outside the scope of the NRC reports quoted.

8 **DEPARTMENT OF TRANSPORTATION, LAWSON**

9