

Global-Change Scenarios: their Development and Use US CCSP Synthesis and Assessment Product 2.1b

Comments by Dr. Nebojsa Nakicenovic, IIASA

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Author team responses in italics:

1. Generally the report is very informative, balanced and well written. The main overall shortcoming that it is not clear what the purpose of the assessment is and who are the potential audiences (clients). This should be stated more clearly at the outset. In particular, the front matter on what the scenarios are, how they are used and for what purposes is based on many such similar introductions in IPCC 1995 Evaluation, SRES, TAR WG3 Ch2, MA, etc.

This report, and in particular the opening sections, goes substantially beyond these prior sources in the specificity with which it seeks to distinguish scenarios from related modes of analysis and decision support, and from other types of statements about future conditions. The revisions have sought both to clarify the specific intended users, and make the level of exposition throughout the report more consistent with addressing these user groups.

2. The history of the role of scenarios in climate assessments in general and IPCC in particular is very useful and well presented. The same is true for the general introduction to the process and history of IS92 and SRES.

No response required.

3. However, there are some strong biases and unbalanced presentations of issues in the report particularly concerning SRES. Most concerning is the often anecdotal style of presentation of issues and arguments. For example, on page 43, lines 30 to 35, text is really more in a journalistic style being quite accusative rather than factual. It should be clearly stated which specified values generated implausible model specifications and which participants hold these views. Saying in this context "some participants" and in other places in the report actually attributing unpublished, internal IPCC documents without permission of those concerned is not a good practice (e.g. footnote 78 "Beijing MM notes, Oct 98, pg 2, or footnote 65 "appears that PPP was post processing" which in fact it was not as stated in SRES report.). As only one SRES LA is listed as author, it could be assumed by a reader that all such statements should be attributed to that person, so more precise references and statements are clearly called for. Given that SRES included 80 members of the writing team, it would be good to present both the criticisms and views of others who might not share the same views.

The first passage identified concerns the report's criticism of fixing output target values for harmonized model runs. This section does not claim that any particular model result within SRES was implausible. In fact, the text argues that attempts to discredit a scenario exercise by claiming a particular scenario value is implausible are highly suspect, and any such externally advanced claims of implausibility must pass a high hurdle. Rather, the section is making the more general argument that attempting to replicate specified results using multiple models with different structures requires ad hoc adjustment of internal parameters, or in some cases model structure, and that such adjustments make interpretation of the results difficult and preclude the examination of inter-model variation as an indication of structural uncertainty. This seems an obvious general analytic point, and one of substantial importance for the design of future scenario exercises, which is our main concern. In addition, it is clear from the record of the SRES work that modelers faced substantial challenges in achieving the harmonization targets. The discussion in this section has been revised to stress the general aim of identifying lessons and challenges for future scenario exercises.

The statement that the PPP outputs from the MESSAGE model were achieved by a post-processing of MER-determined outputs has been deleted, as it was tangential to the main thrust of the discussion in the section on the PPP/MER controversy.

The draft has also been carefully edited to eliminate any inappropriate informality of tone.

The concern about source materials used is addressed in point 5 below

4. Another similar example of imprecise and potentially misleading statements is given on page 44, lines 31 to 39. The reader might have the impression that SRES scenarios were reported only at the level of 4 world regions so as to avoid being an "easy target for attack". While it is probably true that the IPCC approval process would be more difficult for country-level scenarios compared with global-regional scenarios, it is not clear at all that higher-level of aggregation avoids being an "easy target for attack" compared to more disaggregated regional resolution. The true reason for such a high level of aggregation was that this was consistent with regional specification of the six SRES models. Actual and higher regional resolutions are available from individual modeling groups, various websites and publications (e.g. RIVM group).

The text retains a general discussion of how the inevitable discrepancies that arise between detailed results produced by global models and more detailed national data can be exploited in a contentious political environment to call the credibility of a scenario exercise into question. The text is revised to note the existence of other persuasive reasons for aggregating reporting, in particular the issue of inconsistent regional boundaries between participating models.

5. As mentioned, a general concern in this context is that much of the material is based on internal documents, private notes and other similar sources (apparently without explicit permission of those concerned).

The aim of this report is to draw on experience to date to identify issues, challenges, and lessons for future scenario exercises. This requires examining current experience with enough specificity to illuminate challenges, difficulties, controversies and their resolution, and areas of weaknesses. Our treatment of sources has sought to balance this need with our aim to avoid gratuitous criticism of worthy past efforts or imposing professional embarrassment. To this end, we have refrained from using materials that could plausibly be construed as private communications – i.e., individual emails – and also from identifying individual parties to particular conflicts or controversies in past scenario exercises. We have, however, made use of internal working communications such as meeting minutes and reports. These cannot reasonably be construed as private communications, since they were circulated to dozens of people. Nor are they confidential government materials – as evidenced by the fact that the complete internal working materials from the IPCC Second Assessment Report have been deposited in the Global Environmental Archives of Harvard University Library for scholarly access. We remain convinced that using these sources is appropriate, and greatly enhances the usefulness and persuasiveness of the report.

6. On a more substantive note, the report is very complementary about many aspects of SRES. For example, it highlights the use of storylines in conjunction with different modeling approaches. However, it also states that SRES fell short of full integration of the qualitative and quantitative scenarios. This can indeed be the case as much more could have been achieved. Nevertheless, from the wording of the report the reader could conclude that this is a serious deficiency and that other scenarios have resolved this challenge much better than SRES. Should this be the case, it should be stated. However, this more likely not to be the case as the scenarios that use both storylines and models are rare. In fact, SRES had a much higher degree of integration than virtually all other studies to date. For example, the MA scenarios were developed a few years after SRES and are characterized by elaborate storylines but rather quite crude link to a single model (that was basically calibrated to SRES scenarios).

Making effective, consistent, and mutually beneficial use of qualitative and quantitative components of scenarios is a major challenge, which no current global-change scenario exercise has adequately resolved and which will be important for achieving progress in the usefulness of global-change scenarios. But the fact that no other current exercise has achieved more success on this challenge than SRES does not mean that there is no basis for identifying this as a significant weakness of SRES. The record from the work of SRES is quite clear that treatment of the storylines and their integration with quantitative models

were persistent sources of difficulty. This is understandable, since the process was attempting something novel and difficult, but it is also important enough for future scenario efforts to merit a discussion. The revised draft retains this discussion, but focuses more strongly on the importance of effective integration of qualitative and quantitative components for future scenario exercises, drawing on current experience of SRES and other exercises to illustrate how hard this is, and providing a few specific suggestions for how to proceed.

7. Another substantive myth propagated in the report is that there has been a canon or some kind of pressure for modeling groups to harmonize scenarios at all costs. This is simply not the case, there are a number of SRES scenarios that have not been harmonized.

The draft does not state or imply that modeling groups were pressured to harmonize “at all costs.” It notes that non-harmonized scenarios were produced and published. The record is clear, however, that modelers were requested to harmonize with the Marker scenarios and much of the analytic effort of the project consisted of people trying to do this – and succeeding in most cases. We remain critical of the prominence given to harmonization in the exercise, and of a seeming lack of clarity about the purposes to be served by harmonizing other model runs with the marker scenarios. Changes in the revised text seek to ensure that three points are clearly made: 1) prominently noting the existence and origin of non-harmonized scenarios; 2) ensuring that the text does not imply that modelers were in any sense compelled to harmonize, and; 3) shifting the main thrust of the discussion forward to identifying and discussing challenges for future rounds of scenario exercises, rather than criticizing past efforts.

8. Last but not least, there is a wide range of conditional convergence across the set from high in A1 to very low in A2. Nevertheless, it is true that SRES does not include a scenario with conditional divergence (but does of course in terms of absolute income). It ought to be stated also in this context that IPCC included such a mandate in the terms of references.

The text has been revised to note this variation between SRES scenarios more prominently, while still noting that all scenarios assume enough income convergence that even the poorest regions pretty much solve their development problem, with real per capita income rising to well above \$5,000 – i.e., scenarios without any income convergence, and other forms of plausible but undesirable future, were not considered. This requirement did not appear explicitly in the final form of the terms of reference, although the SRES process was under clear instructions to do this, in response to the Parikh critique of the IS92 scenarios. The text does note this direction imposed on the process, and the revisions shift the focus to the future problem of the need to consider undesirable futures in some global-change scenario applications.

9. In sum, the draft report a major step forward in assessing the goal-change scenarios and it is precisely because of this valuable contribution that it would be of paramount to improve on at least some of the deficiencies outlined in this review.

No response required.