

**Report of the  
Expert Group Meeting on Sustainable  
Development Scenarios for Rio+20**

Vienna/Laxenburg, 27-29 June 2011

Hosted by

International Institute for Applied Systems Analysis

Organized by

Secretariat for UNCSD (“Rio+20”), Division for  
Sustainable Development, United Nations  
Department of Economic and Social Affairs

The present document is the formal report of the “Expert group meeting on sustainable development scenarios for Rio+20”, organized by R. Alexander Roehrl and David le Blanc of United Nations DESA, and hosted by Keywan Riahi of IIASA. The meeting was held at IIASA headquarters in Vienna/Laxenburg, Austria, from 27 to 29 June 2011.

Additional meeting and background documents/materials are available at: [http://www.un.org/esa/dsd/dsd\\_sd21st/meetings.shtml](http://www.un.org/esa/dsd/dsd_sd21st/meetings.shtml).

The opinions expressed in this report are those of the authors of the report and do not necessarily reflect the views of the United Nations or its senior management.

## Contents

Objective of the meeting .....	1
Main conclusions of the meeting .....	2
Opening remarks .....	3
SD21 sustainable development scenarios: introduction to the initiative and the meeting..	3
Stock taking of scenario initiatives for Rio+20 .....	3
Review of models, sustainable development scenarios, and their impacts on decision-making since the Earth Summit. ....	4
SD21 scenario development .....	5
Treatment of risks and extreme scenarios.....	6
Exploring transition paths .....	7
Defining the SD21 scenario study .....	8
Conclusion and next steps.....	8
Annex 1: Meeting participants.....	10
Annex 2: Overall draft outline/subgroups.....	11
Annex 3: Annotated agenda.....	11

## Objective of the meeting

The meeting was organized in the context of a project entitled “Sustainable Development in the 21<sup>st</sup> century (SD21)”. The overall goal of the project is to build a coherent vision of sustainable development in the 21<sup>st</sup> century. The project will inform the United Nations Conference on Sustainable Development (UNCSD, informally referred to as “Rio+20”). The project is managed by the Division for Sustainable Development, United Nations Department of Economic and Social Affairs (DESA) which also serves as the Secretariat for “Rio+20”. One of the components of the SD21 project is a study on sustainable development scenarios, to which the present meeting contributed.

Given the importance of the conference for the sustainable development community, many research institutions have either developed or are developing their own scenario exercises for the Conference, or have been contributing to relevant assessments and analytical exercises, such as the Global Energy Assessment and those of the Intergovernmental Panel on Climate Change. These exercises, as is traditionally the case, focus on different sectors, use different assumptions, and are not always directly comparable to each other. Sometimes they highlight trade-offs and synergies among few, selected sectors. While very detailed work exists for a few sectors and themes (e.g., energy, agriculture, climate change, etc.), others have received comparatively less attention (e.g., poverty, nitrogen and phosphorus cycle, etc.).

One important objective of the project is to achieve coherent, integrated picture/scenarios represented by a range of models and covering as much of the full range of sustainable development as possible. Therefore, DESA’s approach for the scenario component of the SD21 project is to involve all interested modelers and scenario analysts through an open and transparent process.

Well before the meeting, a concept note (prepared in January 2011 and finalized in April

2011) was circulated among interested experts identified by the project team. The note outlines a suggested methodology and potential approaches and ‘work tracks’. The goal of the meeting was to receive initial feedback and to assess the potential for collaboration of individuals and institutions across a wide range of disciplines and approaches.

The specific objectives of the meeting were:

- (1) To take stock of ongoing scenario initiatives for Rio+20;
- (2) To present and discuss a methodology based on endpoints for the future that could provide a unifying framework for looking at fully sustainable scenarios across models and scenario exercises;
- (3) To discuss practical ways by which the scenario community could compare and assess results from different models through “soft linking” of existing or ongoing exercises;
- (4) To assess the willingness of the modeling community to contribute to the Rio+20 preparations by running variants of existing scenarios, based on additional, collectively agreed endpoints;
- (5) To collectively build an outline for a chapter on scenarios for the upcoming “Sustainable Development in the 21<sup>st</sup> century (SD21)” report, and invite participants to contribute to the writing of chapter sections.

29 experts attended the meeting (Annex 1). An additional 19 experts indicated their or their institution’s interest in participating in the SD21 scenario exercise, but could not join the meeting and thus provided their inputs in writing or per phone.

The meeting followed an open approach without formal presentations and allowed ample room for free brainstorming, moderated by the DESA team (Annex 3).

The following describes the main issues raised in chronological order suggested by the agenda (see Annex). Key conclusions, guiding

principles, and work packages with deadlines will be described in a separate, detailed work plan.

## **Main conclusions of the meeting**

1) Many modellers and institutions are interested in contributing to and in being featured in the Rio+20 process, either through their “own” exercises or through joint initiatives (GEA, GEO-5, SEI/FBDS, etc.). Many are also eager to influence the political process.

2) The scenario exercises undertaken by different institutions focus on different sectors. They typically highlight trade-offs and synergies among a handful of sectors. There are a number of gaps in the way some dimensions of critical importance to sustainable development are included in models, as well as asymmetries in the way different sectors are being modeled. Energy, landuse, and climate change issues have been covered at great detail, whereas biodiversity, income disparities, health and certain social issues have not received similar level of attention. On the other hand, some clusters of scenario exercises are already harmonized with each other, as a result of subcontracting and evolutionary model development.

3) Generally speaking, the approach of sustainable development scenarios in terms of endpoints covering all relevant areas of sustainable development (as opposed to a handful of endpoints relating to one or two sectors), which had been proposed by the UN-DESA team in the concept note of the meeting circulated in early 2011, seemed to be acknowledged as a useful way forward. Some modelling institutions are planning to develop scenarios based on this approach specifically for Rio+20. The meeting highlighted the usefulness of distinguishing between goals, means, and policies when discussing endpoints.

4) Regarding outreach to decision-makers, it was agreed that highlighting synergies and trade-offs in key clusters of sectors (for example, water-food security-energy) was both a

dimension in which modelling could support the debate and a powerful way to draw attention from the political community. As such, this approach should be reflected in the SD21 scenario chapter. As the relative importance of these clusters and the related synergies and trade-offs will depend on country-specific characteristics (geo-physical, economic, social), insights from in-depth examples at the national level are critical to complement global scenario modelling in this respect.

5) During the meeting, several individuals and institutions committed to contributing analytical inputs to the SD21 project, in various forms including additional variants of their own scenarios based on additional endpoints suggested by the project team, country-level integrated scenarios, and written contributions to the SD21 scenario chapter.

6) An outline of the SD21 scenario chapter was discussed during the last day of the meeting, based on the previous discussions (Annex 2). It was agreed that participants would indicate to the UN-DESA team the sections of the outline for which they plan to provide inputs for the chapter.

7) It was also agreed that a short paper (3 pages) would be produced collectively for submission as an input of the scenario modelling community to the political process for Rio+20 by the deadline of 1 November 2011.

8) The project team committed to circulating a revised list of endpoints, taking into account the distinction between goals, means and policies that was discussed at length during the meeting; and to circulate a consolidated list of assignments based on the voluntary submissions of meeting participants and other institutions working in the field.

9) The UN-DESA team was encouraged to continue exploring the potential for a more permanent Forum as interface between the scientific and political communities for the time after Rio+20.

Monday, June 27

## **Opening remarks**

Nebojsa Nakicenovic of IIASA welcomed participants. He expressed his views on what a stocktaking exercise on long-term scenario analysis could bring to the Rio+20 process and what dimensions it could consider. He described some of the conclusions of the recently concluded Global Energy Assessment and emphasized the importance of the development perspective for the scenario work under the SD21 project, in contrast to the large body of work with a single focus on climate change.

David Le Blanc (UN-DESA) welcomed participants and thanked Keywan Riahi and his organizing team at IIASA for hosting the meeting. He also expressed his gratitude to the many modellers that had chosen to join the meeting despite a number of competing events. He briefly recalled the context and objectives of the meeting, and the overall approach followed by the UN-DESA team.

## **Session 2 SD21 sustainable development scenarios: introduction to the initiative and the meeting**

David Le Blanc (UN-DESA) provided an overview of the SD21 project in preparation for Rio+20, including the project's components, outputs and timeline. The interrelationships between the SD21 scenario exercise and other studies under the project were discussed, in particular those relating to policies and institutions in the long-term. He outlined some of the milestones of the political process leading to the Rio+20 conference, including the compilation of submissions by UN Member States at the end of 2011.

Alex Roehrl (UN-DESA) provided an overview of the team's approach for the scenario component of the SD21 project and recalled the main elements of the "Note on SD21 scenarios" circulated before the meeting by the project team.

He also provided ideas on how to bring together the various model scenario initiatives across sectors and scope. In particular, he highlighted the central role of the Global Energy Assessment scenarios; the value of an open-source, open-assumptions process (e.g., with OSEMOSYS), and the relevance of national case studies on the wide range of trade-offs and synergies (e.g., with CLEWS). In this context, he also mentioned DESA's in-house initiative to build a set of integrated scenarios as input for the project.

Initial questions raised during the discussion related primarily to the envisaged usage of the SD21 scenarios, their scope in terms of adaptation and mitigation, and elements of the final product of the project.

It was agreed that integrated scenarios need to be presented that adequately cover economic, social and environmental dimensions. In view of the limited time left before Rio+20, it was suggested to focus the exercise on contrasting a baseline with a sustainable development scenario, primarily the one referred to as "rainbow scenario family" in the note on SD21 scenarios. Variants of it could reflect the range of different world views (or paradigms), in essence rearranging the scenario families suggested in the SD21 scenario note into only two groups.

A general discussion ensued on the interaction between the scenario community and the political process for the conference. The preparation of a very short (3 pages) paper as an input to the political process by the deadline of 1 November 2011 was agreed by participants. In addition, DESA was encouraged to continue exploring a more permanent interface between the scientific and political communities at the level of the UN for the time after Rio+20.

## **Session 3 Stock taking of scenario initiatives for Rio+20**

In this session, modellers and scenario analysts exchanged the latest information on their respective ongoing or recently completed scenario exercises for Rio+20 and other fora. Prior review

by the project team illustrated the large number of such exercises, including in sectorally organized communities with only limited information exchange.

In particular, brief updates were presented by Wolfgang Lutz (IIASA) on population, health and education; by Keywan Riahi (IIASA) on the Global Energy Assessment (with PBL); by Mark Howells (KTH) on the CLEWS and OSEMOSYS models; by Detlef van Vuuren (PBL) on their own contribution for Rio+20, whose final report was announced for December 2011, as well as PBL's lead in scenario analysis for GEO-5 and the future IPCC scenarios; by John Latham and Noemi Nemes (FAO) on the latest "state of natural resources" report and a series on national case studies in the area of agriculture and food security that would be made available to the SD21 project soon; by Måns Nilsson (SEI) on a joint scenario exercise with FBDS building on the Global Energy Assessment scenarios; by Molly Hellmuth (WWAP) on the new UN-water scenarios under development; by Rob Dellink (OECD) on OECD's Green Growth Strategy and the Environmental Outlook scenarios for 2050, expected for Sept./Oct. 2011; by Keigo Akimoto (RITE) on their multi-year exercise to develop ALPS scenarios; and by Enrica Decian (FEEM) on their scenarios on climate change, technology and education.

In addition, shorter updates were provided by all participants in a full tour de table, from which the following patterns emerged:

There are a large number of ongoing scenario initiatives, many of which will be completed in time and some of which are being undertaken specifically for Rio+20. These scenario exercises focus on different sectors, policy instruments, and their model methodologies represent different worldviews. Integrated approaches typically highlight trade-offs and synergies among a handful of sectors. There is a wide range of depth and coverage of the three pillars of sustainable development, ranging from stylized to very detailed large-scale assessments. While very detailed work exists for a few sectors and themes (e.g., energy,

agriculture, climate change, etc.), others have received comparatively less attention (e.g., poverty, population, nitrogen and phosphorus cycle, etc.).

Energy and climate change are at the core of many scenario exercises, associated with other dimensions that vary across models, such as water, education, proxies for biodiversity, and land use. Population is often included as an exogenous variable, using either IIASA projections or some variants of the UN projections. Social issues are typically covered in less depth than others. While scenario exercises have increasingly focused on deprivation indicators (what happens at the left tail of distributions), some models do not explicitly consider income distribution. In most of the models discussed during the meeting, the relationships between economic growth and income distribution is being modelled in very simple ways, for example, based on exogenous empirical relationships.

Some inter-sectoral models with high resolution in terms of technology and geography (e.g., by RITE, PBL and IIASA) can serve as "glue" between global and national-level, as well as between sectoral models.

It was agreed that highlighting synergies and trade-offs in key clusters of sectors (for example, water-food security-energy) was both a dimension in which modelling could support the debate and a powerful way to draw attention from the political community. As such, this approach should be reflected in the SD21 scenario chapter. As the relative importance of these clusters and the related synergies and trade-offs will depend on country-specific characteristics (geo-physical, economic, social), in-depth national examples need to complement global scenario modelling in this respect.

## **Session 4**

### **Review of models, sustainable development scenarios, and their impacts on decision-making since the Earth Summit.**

In this session, participants were invited to reflect on their own contributions to policy-making, including what they considered successes and failures, as well as on the interaction between scenario models and policy-making itself. In particular, a number of lessons-learned were suggested to be reflected in the SD21 report.

Participants welcomed the fact that the SD21 team had planned to base a review of the interaction between scenario models and decision-making on feedback from both modellers and decision-makers, in order to contrast various perspectives and ensure credibility of the conclusions.

It was apparent that anecdotal evidence existed for many examples, but that only few had been documented in a systematic way to-date. This applied to both the “good” and the “bad” examples. In addition, there was no agreement on what constituted a “good” or “bad” example, in line with prevailing differences in worldviews. To name just two examples: The role of IIASA’s RAINS model in the in political learning process on burden sharing to reduce acid rain in Europe was primarily considered a “good” example. Also, the routine use of models in support of decision-making in specific sectors, such as fishing quotas, was emphasized.

The capacity-building role of models was underlined by a number of participants: as a tool for raising awareness and common understanding of issues for negotiation (e.g., as a basis for engagement in discussions on water rights allocation); as support to decision-making in the face of conflicting objectives (e.g., some conflicts may not be apparent until illustrated by numbers or maps); and as a tool for framing problems in different ways.

Some examples were discussed that were considered “not so good”. The discussion highlighted the political nature of the relationship between science and decision-making. Models are often mobilized to “rubber-stamp” already taken decisions, or to justify the existence of bureaucratic institutions.

In many countries, ministries have their own models on which they rely for better or worse, the more so as the issues at stake are politically sensitive. Thus, international and global models are not necessarily the preferred option for national politicians, and the link to global or regional developments can be disregarded.

In many cases, modelling follows policy-making: many policies are decided and implemented without recourse to modelling. In those cases, modelling becomes important in the implementation and evaluation phases. Sometimes however, modelling has led to a reassessment and refinement of policies or measures, one example of which is the European biofuels policy.

In other cases, the political implications of model results cause modellers to refine the models in order to check the validity of those results, for example, in the case of the feasibility of the 2°C stabilization target. In particular the peculiarities and inertia of the two decades history of the 2°C target since the Villach conference was discussed. In this context, it was suggested to follow-up with interviews of the key people involved.

Therefore, the interaction between model-based scenarios and policy-making is most often a two-way, cyclic interaction process.

Some participants highlighted the inherent limitations of prevailing models in terms of representing the practical intricacies of actual policies. Most often, policies are represented indirectly or in a highly stylized way. Typically tools available for models are prices, quantities, and various constraints. In this sense, “models should provide insights, not numbers”, a guiding principle that was also suggested for the SD21 scenario study.

## Tuesday, June 28

### **Session 5** **SD21 scenario development**

In this session, participants provided feedback on the methodology suggested by DESA in its “note on SD21 scenarios” which had been

prepared in early 2011 and circulated to all participants before the meeting. Much of the discussion focussed on the most suitable endpoints to be considered to characterize “sustainable development scenarios”.

The approach of sustainable development scenarios in terms of normative endpoints covering all relevant areas of sustainable development (as opposed to a handful of endpoints relating to one or two sectors) was agreed upon as a useful way forward. Some participants are now planning to develop scenarios based on this approach specifically for Rio+20. A number of participants suggested that the whole issue of sustainable development was one of how to reach desirable social endpoints while staying within environmental limits.

The “right” number of sustainable development goals, targets and indicators was discussed that models should consider, but no agreement was reached on the issue. The UN set of sustainable development indicators, and various related sets used in modelling exercises were mentioned. One participant suggested to focus on 3 indicators for each of the “pillars” of sustainable development. In contrast, others recalled the difficulties encountered in previous projects (especially inter-sectoral ones) that aimed to limit their exercises to a handful of normative targets and indicators. Indeed, it appeared to be difficult to come up with a short list a priori. For example, in the environmental dimension, biodiversity, pollution from chemicals, and CO<sub>2</sub> emissions are just three of the many potential interesting indicators to consider which could not be simply aggregated.

General principles to guide the selection of normative endpoints were mentioned, including:

- Focusing on measurable and practical indicators, rather than abstract ones. For example, the global rate of disappearance of species is currently not measurable with a high degree of confidence. Hence, endpoints in terms of biodiversity changes at the global level may be better apprehended through a proxy such as land use, or other indicators.

- Focusing on indicators that can be scaled up from one geographical level to the next, e.g., the number of people suffering from hunger.
- Focusing on indicators reflecting both “supply” and “demand” side, e.g. water stress instead of water consumption; and
- The importance of the shape of tails in distributions, reflecting a general idea of long-term goals formulated in terms of “reducing scarcity”, e.g., reducing poverty, ensuring universal access to education, energy, etc.

It was agreed to make a distinction between “goals” (e.g. limiting temperature increase to 2 Celsius degrees), “means” (e.g. reducing CO<sub>2</sub> emissions), and “policies” (e.g., CO<sub>2</sub> tax), even though it was clear that such distinction was not always straightforward.

It was agreed that DESA would circulate a revised list of normative endpoints, taking into account the written contributions and the discussion at the present meeting.

## **Session 6**

### **Treatment of risks and extreme scenarios**

In this session, participants explored how to integrate extreme events and risk management into scenario models and the related discourse. Much of the discussion focused on climate-related risks, following a presentation by Reinhard Mechler (IIASA) on the IPCC’s SREX and related work.

The demand for spatially explicit models was emphasized, especially in the context of extreme climate scenarios, and scenarios focussed on adaptation (e.g., through exposure maps, drivers, land use). While joint mitigation and adaptation approaches are rare, it was emphasized that risk management had to be based on such joint treatment, in order to be useful. Some expressed their view that global models were not necessarily reliable or trusted in this area. In view of their global nature they might blur or average out much clearer relationships or conclusions at the local or

national level. Hence the need for risk models at lower geographical levels.

Regarding the incorporation of risk in scenario exercises, many participants seemed of the opinion that it was very partial at best, with only specific uncertainty dimension explored as robustness tests of models (for example, distribution in future carbon prices). Important dimensions such as the impacts of food supply disruptions, have been considered in qualitative scenarios run by individual countries from a security perspective, but not included in quantitative models.

A real consideration of risk in scenario modelling (including tipping points) involves the question of “acceptable risk”, which is by definition linked to different world views.

Importantly, the notion that the combination of multiple risks that may not be critical individually can combine to create major shocks, which has been highlighted in recent assessments of the state of oceans and is thought to have contributed to massive ecological crises in the Earth’s past, is not reflected in typical sensitivity analyses.

It was agreed to follow-up with more in-depth discussions by a subgroup on extreme events, and possibly a separate meeting later in 2011.

## **Session 7**

### **Exploring transition paths**

In this session, the scope for adopting common reporting templates for SD21 exercise was explored, in order to enable easier comparison of scenarios and underlying assumptions. The discussion also explored the extent to which models can inform decision on the choice of specific policy instruments.

Volker Krey presented IIASA’s flexible online database that had been used in various scenario and model comparisons in the past, and also included a wealth of scenarios in a consistent fashion. Naturally, it was suggested to

use this database as a repository for the group was floated and to build a reporting format based on the existing reporting formats. Such approach would help the process of identifying “broadly consistent” scenarios developed with a range of models covering different sectors and themes.

The discussion showed that modelling groups used different softwares and catalogues for their own scenario building and comparison needs. Although the importance for model comparison of making explicit the data sources and assumptions used was recognized by many, there did not seem to be a shared sense that the effort of “feeding” meta-data in a common database was worth undertaking. Yet, it was clear that most of the participants had been part of the comparison exercises with their scenarios already being part of the IIASA database and other groups’ databases.

Regarding how scenarios can inform policy regarding the choice of policy instruments, diverse opinions were heard, which pointed to the difference between feasibility and implementation in practice.

Some suggested that policy instruments should not be discussed at all, and that other type of evidence (for example empirical literature reviews) was needed to support choice in that regard. The difference between means (e.g. decreasing CO<sub>2</sub> emissions) and policies (how to do it) was emphasized. For example, models can say something about reducing CO<sub>2</sub> emissions by modelling a carbon tax, which is relatively easy to do; after which, implementation of a tax or other instruments can be done in different ways. Models can discuss the technical possibility and economic implications of universal energy access, but this needs to be complemented by more qualitative discussions to integrate other dimensions (for example, access to finance).

Others were optimistic as to the potential of models to provide insights to policy makers on the efficacy of some instruments relative to others, and said the role of modellers should be to find ways to model even stylized policies as far as possible.

A related topic of debate was on the use of trying to produce estimates of “costs” or

“investment needs”. Even though a number of recent scenario exercises or related publications have taken up this challenge, it faces methodological and practical problems (sub-additivity and consistency). It was perceived by some that a more qualitative approach illustrating orders of magnitude on the one hand, synergies and trade-offs on the other hand, was preferable. Regarding orders of magnitude, it was mentioned that those could be crucial to identify the “right” policy entry points. Qualitative insights from models could then be complemented with in-depth analysis.

## **Session 8**

### **Defining the SD21 scenario study**

In this session, the key questions of the first two days of the meeting were revisited, in order to move to a more detailed “definition” of the SD21 scenario study.

One aspect that received great attention was the question of feasibility to attain certain “normative endpoints” and the importance to be given to synergies and trade-offs.

There was no agreement as to the meaning of the “feasibility” of sustainability transitions. One has to distinguish physical, technical, economic, and socio-political feasibility. In fact, non-technical barriers appear the most important in practice (for example, for energy efficiency). What models can do in this context is to highlight the pros and cons of available choices, in order to support the actual choices by decision-makers at the political level.

Even the seemingly simple question of technical feasibility has to be treated with caution. The fact that current models cannot “find” a solution to certain objectives does not necessarily indicate infeasibility but can be linked to intrinsic limitations of models. An example that was discussed was the feasibility of the “2°C stabilization target”. Whereas the possibility of respecting this limit was initially put in doubt based on results from available models, further enrichment of the technological

side of models resulted in making the objective technically “feasible”. In this example, political dimensions related to the participation of countries in a joint emission reduction effort are as important to the achievability of the target as technical factors.

Current modelling exercises are based (at least for BAU scenarios) on implicit assumptions about institutions, political constraints, and preferences. However, the assumptions change over time and may define completely new spaces for action, making “feasibility” a relative concept. Almost by definition, scenarios are blind to this dimension.

Regarding the best way to present the main results from the series of scenario exercises that are currently underway to decision-makers, there was a sense that highlighting synergies and trade-offs in key clusters of sectors was both a dimension in which modelling could support the debate and a powerful way to draw attention from the political community. Four or five key clusters would need to be identified. Examples of clusters relevant to sustainable development are: water, land use, food security, and energy; and population, education, health, and growth.

As the relative importance of these clusters and the related synergies and trade-offs will depend on country-specific characteristics (geophysical, economic, social), insights from in-depth examples at the national level are critical to complement global scenario modelling in this respect.

### **Wednesday, June 29**

## **Session 9**

### **Conclusion and next steps**

The concluding session discussed next steps in the preparation of the SD21 scenario study.

Building on the “Note on SD21 scenarios” and the previous days of discussion, DESA staff prepared an outline for consideration. A long list

of scenario contributions that had been suggested by participants was also presented for feedback.

It was agreed that DESA would circulate a revised and more detailed outline to the group after the meeting, together with suggested work assignments for subgroups and relevant deadlines.

Participants agreed to submit in writing to DESA the specific contributions and priority areas to which they would like to contribute, including:

- The sections or sub-sections of the chapter where they could provide inputs;
- Commitments to analytical contributions in the form of scenario variants adding

additional endpoints from the agreed list as constraints;

- Indications of upcoming contributions in kind such as sharing of upcoming reports or existing studies.

The project team committed to circulating a revised list of normative endpoints, making a distinction between goals, means and policies; and to circulate a work plan containing a consolidated list of contributions/assignments by participants and others who had indicated their interest.

It was agreed that a short paper (3 pages) would be produced jointly for submission as an input of the modellers and scenario analysts to the political process for Rio+20 by the deadline of 1 November 2011.

## Annex 1: Meeting participants

No	First Name	Surname	Affiliation
1	Richard Alexander	Roehrl	United Nations DESA
2	David	Le Blanc	United Nations DESA
3	Keywan	Riahi	IIASA, Graz University
4	Detlef	Van Vuuren	PBL
5	Marcel	Kok	PBL
6	Molly	Hellmuth	WWAP, Columbia University
7	Robertus	Dellink	OECD, Wageningen University
8	Mark	Howells	Rotal Institute of Technology (KTH)
9	Siwa	Msangi	IFPRI, USA
10	Enrica	De Cian	FEEM, Italy
11	Morgan	Bazilian	UNIDO
12	Keigo	Akimoto	RITE
13	Holger	Rogner	IAEA
14	Mans	Nilsson	SEI
15	Noémi	Nemes	FAO
16	John	Latham	FAO
17	Lars	Schnelzer	IAEA
18	Nebojsa	Nakicenovic	University of Vienna, IIASA
19	Reinhard	Mechler	IIASA, WU Vienna
20	Shonali	Pachauri	IIASA
21	Wolfgang	Lutz	IIASA, VID, Wittgenstein Centre, Oxford Martin School
22	Michael	Obersteiner	IIASA
23	Volker	Krey	IIASA
24	David	McCollum	IIASA
25	Guenther	Fischer	IIASA
26	Arnulf	Gruebler	Yale University, IIASA
27	Armon	Rezai	WU Vienna
28	Zbigniew	Klimont	IIASA
29	Ferenc	Toth	PIK, IIASA, IAEA

## **Annex 2: Overall draft outline/subgroups**

- (1) Identification of normative goals/objectives for 2050 and list of potential means;
  - a. Discussion of relationships among each other and to worldviews
  - b. Hierarchy of goals, means, and policy packages
- (2) Identification of existing scenarios that achieve normative sustainability endpoints
- (3) Development of joint storylines for relevant scenarios
  - a. Transitions paths
  - b. Main synergies and trade-offs
  - c. Sectoral highlights, coherent policy packages
  - d. Open assumptions variants
- (4) National case studies and integrated analysis
  - a. Selected climate-land-energy-water scenarios (CLEW) and possibly other clusters
  - b. Discussion of ranges of trade-offs/synergies and identification of most important inter-linkages
- (5) Implications of extreme events for robustness of choices
- (6) Policy conclusions and recommendations.

Annex 1: Review of models, sustainable development scenarios, and their interaction with decision-making since Rio 1992

Annex 2: Brief summaries of recent scenario studies and types of models

## **Annex 3: Annotated agenda**



**Expert Group Meeting on SD21 Sustainable Development Scenarios for the Rio+20 Summit**

Organized by United Nations DESA and hosted at the International institute for Applied Systems Analysis,  
Schlossplatz 1, 2361 Vienna/Laxenburg, Austria, 27-29 June 2011

*Annotated Provisional Agenda*

**27 June:**

**1. Opening**

- (a) Registration
- (b) Welcome statements
- (c) Self-introduction of participants

*[Welcome statements by UN-DESA and IIASA. This may include a video-link with the director of DESA-DSD.]*

**2. SD21 Sustainable Development Scenarios: introduction to the initiative and the meeting**

*[Objective: brief introduction by DESA]*

- (a) Rio+20 Summit
- (b) SD21 project and publication
- (c) Expected outcomes of the expert group meeting
- (d) Study on Sustainable Development Scenarios for Rio+20 (SOSD)
- (e) Process, timeline
- (f) Agenda for the remainder of the meeting

*[More in-depth material on the scenario initiative will be shared with participants before the meeting.]*

**3. Stock-taking of past and present SD21 scenario initiatives for Rio+20**

*[Objective: to share the latest information on relevant global scenario initiatives, to explore synergies, and set the stage for more in-depth discussions in the remainder of the meeting]*

- (a) IIASA/GEA scenarios
- (b) OSEMOSYS open source, open-assumptions scenario process
- (c) SEI/FBDS scenario study on energy access
- (d) PBL's study ("Growing within limits") for the Club of Rome
- (e) IPCC SRES and the new emission scenarios process
- (f) Extreme events and scenarios: "Game Changers" and IPCC-SREX
- (g) Results of various model and scenario comparisons: EMF, IEW, IPCC-RCP, AMPERE, ADAM, MATISSE, AME, RECIPE, IAMC, etc.
- (h) UNEP GEO-5 scenarios
- (i) Other thematic scenarios: UN-Water scenarios, Biodiversity scenarios, Land-use and forestry scenarios, MDG scenarios, etc.

- (j) Other efforts by UN and intergovernmental organizations: IAEA, IRENA, OECD, IEA

*[We will try to keep this session as brief as possible. Presenters will be requested to share more in-depth material/papers with participants well before the meeting.]*

#### **4. Review of models, SD scenarios, and their impact on decision-making since Rio 1992**

*[Objective: to exchange perspectives on and define scope and contents of the first part of the scenario study (the “review”)]*

- (a) Overall trends and impacts

*[What have models been used for? What lessons were learnt from the development of the main families of models? How have models influenced policy-making? What are the main policy areas that are not well covered? What lessons can be learned for the future? DESA and others will report on their review work, for initial feedback by experts.]*

- (b) Collection of sustainable development scenarios and meta-analysis

*[What kind of meta-analyses have been undertaken? Which gaps should the SD21 study address? Which scenario reporting standards and databases exist? ILASA, PBL, and others will report on related work]*

### **28 June:**

#### **5. SD21 scenario development**

*[Objective: to discuss the overall conceptual framework for the SD21 scenarios, including scenario storylines types of scenarios and the sustainable development “vision”.]*

- (a) Types of scenarios, competing approaches
- (b) Scenario clustering and “storylines”, including various sustainable development “visions”
- (c) Realistic endpoints for common scenario specification
- (d) Harmonizing variables and “soft-linking”
- (e) Meta-model
- (f) Sustainable development issues: variables that need to be tracked (minimal set of indicators), variables that can be simulated by a subset of models.
- (g) Policy instruments and interventions

*[A major part of the meeting will be spent on this session with in-depth discussions of the overall scenario framework. The “Note on SD21 scenarios” by David le Blanc and R..Alex Roehrl might be a useful starting point. Participants are also encouraged to submit their ideas and comments to the Secretariat before the meeting.]*

#### **6. Treatment of risk and extreme scenarios**

*[Objective: to discuss potential ways of capturing risk and extreme events in the study.]*

- (a) Extreme events: climate system, health, geo-engineering, military and social conflicts, etc.
- (b) Approaches: scenarios or meta-analysis

*[What type of risks and extreme events or shocks should be considered? How should they be captured? Quantitatively with models, or qualitatively as “stories”? Integrated (e.g., as sensitivity*

cases) or in a separate section? Can we have a consistent picture across models? Depending on the interest, session 6 may be held in parallel with parts of session 5 and 7.]

#### 7. Exploring transition paths

*[Objective: to make the link with the other parts of SD21 on short-medium term]*

- (a) Can we agree on a common thread / reporting grid for all models to describe transition?
- (b) How important is policy sequencing?
- (c) How far can one go in saying something meaningful about the combination of policies that would be needed based on a meta-analysis, or does it have to remain exploratory?
- (d) Evaluating “green economy” policies or “green growth” policies within a long-term framework: can it be done?

*[DESA will provide proposals for consideration by the meeting.]*

#### 8. Defining the SD21 scenario study

*[Objective: to define the scenario study, including a set of normative endpoints for key common variables identified earlier, and a minimum set of questions to be explore (models can examine other questions as well)]*

- (a) End date for the exercise
- (b) Endpoint variables and “sustainable” ranges for those variables
- (c) Set of questions to be addressed

*[Which indicators would be suitable to define “sustainable” endpoints and could be used by as many models as possible? What are the most important 5-10 questions that all models might try to answer? A proposal by DESA will be considered.]*

#### 29 June (morning):

#### 9. Next steps

*[Objective: to discuss technical and financial support, cooperation, and outreach, and to agree on next steps for the team.]*

- (a) Proposal of “work tracks” by DESA
- (b) Constitution of the writing teams for the work tracks
- (c) Relevant events for outreach and peer-review until Rio+20
- (d) Timeline for next steps
- (e) The scenario process after Rio+20
- (f) Open Discussion

*[Next steps include, e.g., the work programme; finalization of the study; upcoming modellers’ meetings; and the life of the SD21 scenario process beyond Rio+20.]*

#### 10. Conclusion and farewell