

16 July 2010

English/Russian only

UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE

**Ad Hoc Working Group on Further Commitments  
for Annex I Parties under the Kyoto Protocol**

**Thirteenth session**

**Bonn, 2–6 August 2010**

Item 3 of the provisional agenda

**Consideration of further commitments for Annex I Parties under the Kyoto Protocol**

**Views on the topics to be covered and the  
organizations/experts to be invited to the in-session workshop  
on the scale of emission reductions to be achieved by Annex I  
Parties in aggregate and the contribution of Annex I Parties,  
individually or jointly, to this scale**

**Submissions from Parties**

1. The Ad Hoc Working Group on Further Commitments for Annex I Parties under the Kyoto Protocol (AWG-KP), at its twelfth session, invited Parties to submit to the secretariat, by 2 July 2010, views on the topics to be covered and the organizations/experts to be invited to the in-session workshop on the scale of emission reductions to be achieved by Annex I Parties in aggregate and the contribution of Annex I Parties, individually or jointly, to this scale (FCCC/KP/AWG/2010/7, paras. 28 (a) and 29 (a)).
2. The secretariat has received 12 such submissions. In accordance with the procedure for miscellaneous documents, these submissions are attached and reproduced\* in the languages in which they were received and without formal editing.
3. The submission from Spain and the European Commission on behalf of the European Union and its member States\*\* also includes views on paragraph 30 of document FCCC/KP/AWG/2010/7 and hence the same submission is also included in document FCCC/KP/AWG/2010/MISC.4. Similarly, the submission from Brazil also includes views on paragraph 29 (b) of document FCCC/KP/AWG/2010/7 and hence the same submission is also included in document FCCC/KP/AWG/2010/MISC.3.

---

\* These submissions have been electronically imported in order to make them available on electronic systems, including the World Wide Web. The secretariat has made every effort to ensure the correct reproduction of the texts as submitted.

\*\* This submission is supported by Croatia, Montenegro, Serbia and the former Yugoslav Republic of Macedonia.

## Contents

	<i>Page</i>
1. Bolivia (Plurinational State of) (Submission received 2 July 2010) .....	3
2. Brazil (Submission received 15 July 2010) .....	5
3. China (Submission received 15 July 2010) .....	6
4. Grenada (Submission received 9 July 2010) .....	7
5. Indonesia (Submission received 2 July 2010) .....	24
6. Japan (Submission received 2 July 2010) .....	26
7. Russian Federation (Submission received 6 July 2010) .....	27
8. Singapore (Submission received 12 July 2010) .....	28
9. Spain and the European Commission on behalf of the European Union and its member States* (Submission received 30 June 2010) .....	29
10. Sri Lanka (Submission received 1 July 2010) .....	32
11. Switzerland (Submission received 8 July 2010) .....	33
12. Ukraine (Submission received 6 July 2010) .....	34

---

\* This submission is supported by Croatia, Montenegro, Serbia and the former Yugoslav Republic of Macedonia.

## **Plurinational State of Bolivia**

### **Submission**

#### **Views on the topics to be covered and the organizations/experts to be invited to the workshop referred to in paragraph 29 (a) of the Report of the AWG-KP on its 12th session**

---

1. The AWG-KP at its twelfth session requested the secretariat under the guidance of the Chair of the AWG-KP to organize an in-session workshop at its thirteenth session on the scale of emission reductions to be achieved by Annex I Parties in aggregate and the contribution of Annex I Parties, individually or jointly, to this scale.
2. Parties agreed the workshop should allow:
  - a. For a focused technical discussion on the quantitative implications of the proposals and issues identified by Parties in their submissions; and
  - b. For further exploring a possible enhanced scale of emission reductions to be achieved by Annex I Parties, emphasizing that consensus on their overall level of ambition is deemed important.
3. The following topics should be covered in the workshop:
  - a. The quantitative implications of the following issues to the scale of emission reductions to be achieved by Annex I Parties in aggregate and the contribution of Annex I Parties, individually or jointly, to this scale:
    - i. The role of emissions trading and the project-based mechanisms;
    - ii. The treatment of LULUCF in the second commitment period, avoiding loopholes;
    - iii. The use of surplus carry-over of units (AAUs) from the first commitment period to the next commitment period; and
    - iv. Other issues that may affect the scale of total and domestic emission reductions by Annex I Parties for the purposes of meeting their commitments under Article 3 of the Kyoto Protocol.
  - b. The enhanced scale of emission reductions to be achieved by Annex I Parties, in light paragraph 3(a) above and the following elements, with a view to achieving consensus on their overall level of ambition:
    - i. Appropriate benchmarks against which to evaluate the scale of emission reductions to be achieved by Annex I Parties in aggregate;
    - ii. The adequacy of proposed pledges for emission reductions by Annex I Parties in light of these benchmarks with a view to limiting temperature increase to 1 degree c°; and

- iii. Means to raise the level of ambition of the scale of emission reductions to be achieved by Annex I Parties in aggregate.

4. Relevant benchmarks against which to evaluate the scale of emission reductions to be achieved by Annex I Parties in order to ensure consistency with the ultimate objective of the Convention and the principles of equity and common but differentiated responsibilities and respective capabilities include:

- i. Responsibility of Annex I Parties, individually and jointly, for current atmospheric concentrations of greenhouse gases;
- ii. The historical and current per-capita emissions originating in Annex I Parties;
- iii. Technological, financial and institutional capacities; and
- iv. The share of global emissions required by developing countries in order to meet their social and economic development needs, to eradicate poverty and to achieve the right to development.

5. The workshop should enable an informed discussion of the scale of emission reductions to be achieved by Annex I Parties in aggregate and the contribution of Annex I Parties, individually or jointly, to this scale in light of relevant factors including the ultimate objective of the Convention and its Kyoto Protocol, the commitment of Annex I Parties to demonstrate they are taking a lead in modifying longer-term anthropogenic emissions consistent with the objective of the Convention, which includes the stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system and the relevant provisions and principles of the Convention and its Kyoto Protocol including the principles of precaution, equity and common but differentiated responsibilities and respective capabilities. It should assist the Parties to move towards consensus on an equitable allocation and use of atmospheric space with a view to agreeing the appropriate level of total and domestic emission reductions to be achieved by developed countries pursuant to Article 3, paragraph 1, of the Kyoto Protocol.

**Views on topics to be covered and organizations/experts to be invited to the in-session workshop on the scale of emission reductions to be achieved by Annex I Parties in aggregate and the contribution of Annex I Parties, individually or jointly, to this scale**

Brazil welcomes the opportunity to provide its views on Paragraph 29 (a) of the document FCCC/KP/AWG/2010/7, where the AWG-KP invited Parties to submit to the secretariat, views on the topics to be covered and the organizations/experts to be invited to the workshop in-session workshop on the scale of emission reductions to be achieved by Annex I Parties in aggregate and the contribution of Annex I Parties, individually or jointly, to this scale.

Brazil would like to suggest that the focus of the in-session workshop referred above should be on the following topics:

- Explore possible ways to enhanced scale of emission reductions to be achieved by Annex I Parties;
- Issues relating to the transformation of pledges for emission reductions into quantified emission limitation and reduction objectives;
- Expected carry-over of units from the first commitment period to the next commitment period;

Brazil would like to refer to paragraph 28 (a) of the document FCCC/KP/AWG/2010/7 in order to call for the attention of all Parties to focus the technical discussion on exploring a possible enhanced scale of emission reductions to be achieved by Annex I Parties, emphasizing that consensus on their overall level of ambition is deemed important. Proposals to address the implications of the issues identified in the work programme of the AWG-KP, as specified in paragraph 49 (c) of document FCCC/KP/AWG/2008/8, should be considered only after the focused discussion under the in-session workshop on exploring a possible enhanced scale of emission reductions to be achieved by Annex I Parties. In order to save time and promote a focused and constructive discussion, Parties should avoid to address issues out of the mandate of the in session workshop.

On organizations/experts to be invited to the workshop, there is a need to ensure a balanced participation of experts and organizations from Annex I and non Annex I Parties.

**China's View on the topics to be covered and the organizations/experts to be invited  
to the workshop referred to in paragraph 29 (a) of the Report of the AWG KP  
on its 12th session**

1. The AWG-KP at its twelfth session requested the secretariat to organize, under the guidance of the Chair of the AWG-KP, an in-session workshop at its thirteenth session on the scale of emission reductions to be achieved by Annex I Parties in aggregate and the contribution of Annex I Parties, individually or jointly, to this scale. The AWG-KP further requested that the workshop should allow,
  - a. For a focused discussion on the quantitative implications of the proposals and issues identified by Parties in their submissions, and
  - b. For further exploring a possible enhanced scale of emission reductions to be achieved by Annex I Parties.
2. China believes that the following topics should be the focus of the discussions at the workshop,
  - a. The quantitative implications of the following issues to the scale of emission reductions to be achieved by Annex I Parties in aggregate and the contribution of Annex I Parties, individually or jointly, to this scale,
    - i. the role of emissions trading and the project-based mechanisms,
    - ii. the treatment of LULUCF in the second commitment period,
    - iii. the use of surplus carry-over of units (AAUs) from the first commitment period to the next commitment period,
    - iv. and other issues that may affect the scale of total and domestic emission reductions by Annex I Parties for the purposes of meeting their commitments under Article 3 of the Kyoto Protocol.
  - b. The enhanced scale of emission reductions to be achieved by Annex I Parties with a view to achieving consensus on their overall level of ambition. When dealing with this issue, the provisions and principles of the Convention and its Kyoto Protocol, including the principles of equity and common but differentiated responsibilities should be fully respected. In this regard, the following factors shall be fully reflected,
    - i. the contribution of Annex I Parties to the increased level of GHG concentration in the atmosphere, namely the historical per-capita cumulative emissions of Annex I Parties and their current high per capita emissions,
    - ii. the advantage Annex I Parties have been acquired by the excessive emission from their industrialization and modernization, namely their advanced technological, financial and institutional capacities; and
    - iii. the need of developing countries to achieve sustainable development.
3. With regard to the organization/experts to be invited to the workshop, China believes that non-Party organizations which have acquired observer status to UNFCCC and have relevant technical experts that could present on the topics in paragraph 2 above could be invited and/or apply to make presentations. The selection of organizations/experts should ensure a balanced geographical representation with equal opportunities to the South Centre, the Third World Network and other organizations from the developing countries.

**Views on topics to be covered and organizations/experts to be invited to the in-session workshop on the scale of emission reductions to be achieved by Annex I Parties in aggregate and the contribution of Annex I Parties, individually or jointly, to this scale (AWG-KP)**

**9 July 2010**

Grenada welcomes the opportunity to present its views in response to the request for views of Parties, if possible by 2 July 2010, on the topics to be covered and the organizations/experts to be invited to the in-session workshop on the scale of emission reductions to be achieved by Annex I Parties in aggregate and the contribution of Annex I Parties, individually or jointly to this scale. See document FCCC/KP/AWG/2010/7, paragraph 28(a). This in-session workshop will be held in conjunction with the upcoming session of the AWG-KP.

**I. In-session workshop topics**

In Grenada's view, essential topics to be addressed at the in-session workshop include:

- **Scientific findings since the IPCC's Fourth Assessment Report** on observed changes in the climate systems and projected impacts and risks of human induced climate change.
- **Scale of global aggregate emission reductions needed by different time frames (2020, 2050) to ensure that limitation of global average surface temperature increases to below 1.5 degrees above pre-industrial levels remains feasible.**
- **Fair and equitable contribution of Annex I Parties by different time frames (2020, 2050) to emission reductions sufficient to limit global average surface temperature increases to below 1.5 degrees above pre-industrial levels.**
- **Gap between the effective emission reductions that can be achieved by 2020 through the pledges for emission reduction targets now put forward by Annex I Parties**, and what the best available science indicates is a fair and equitable contribution of Annex I Parties to global efforts to achieve emission reductions sufficient to limit global average surface temperature increases to below 1.5 degrees above pre-industrial levels consistent with the objective of the Convention and Kyoto Protocol.
- **Quantitative impact of LULUCF accounting rules** on the overall effective environmental outcomes of the current pledges from Annex I Parties. This issue relates to what the environment would actually see, in terms of emission reductions relative to 1990 emission levels, from current pledges.
- **Quantitative impact of surplus assigned amount units** on the overall effective environmental outcomes of the current pledges from Annex I Parties. This issue also relates to what the environment would actually see, in terms of emission reductions relative to 1990 emission levels, from current pledges.
- **Guidelines for the use of the flexible mechanisms by Annex I Parties**, including the quantitative use of the flexible mechanisms in meeting Annex I Party commitments.
- **Ways and means to increase the level of ambition of Annex I Parties**, to address the enormous gap between pledges and what best available science requires.

Grenada believes it is essential to address these issues objectively, as it is plain that the current Annex I Party pledges are inadequate in view of what science requires. Annex I Party ambition can and must be increased through greater domestic efforts and changes in the accounting rules. Furthermore, increased Annex I ambition in line with the targets that have been proposed by the small island states through AOSIS, are technically and economically feasible and require the political will from Annex I countries.

**II. Organizations/experts to be invited to the in-session workshop**

In Grenada's view, organizations and experts to be invited to the in-session workshop on scale should include:

Representatives of IPCC Working Groups I, II and III

Organizations/experts that can address the policies, measures and technologies that can enable the achievement of a limitation of temperature increases to well below 1.5 degrees over the long-term.

Organizations/experts that can speak to the costs of the implementation of such measures  
Representatives of developing country groupings that will be impacted by insufficiently ambitious mitigation effort.

- Organizations/experts that can address the observed changes in the climate systems and projected impacts and risks of human induced climate change.

Professor Terry Barker of the Cambridge Centre for Climate Change Mitigation Research and Dr. Brigitte Knopf, Sustainable Solutions, affiliated with the Potsdam Institute for Climate Impact Research (PIK), are two experts proposed to contribute to bullets two, three and five above.

The Climate Action Tracker (Ecofys, PIK, Climate Analytics) can contribute to bullet four and Grenada would also be pleased to contribute to the substance of the workshop.

### III. Background

#### A. Emission Reduction Goals

With regards to global emission reduction goals, Grenada is of the view that Annex I Parties are to take the lead in reducing greenhouse gas emissions. This requires that:

1. Global atmospheric greenhouse gas concentrations should be kept **at well below 350 ppm CO<sub>2</sub> eq.**
2. Global average surface temperature increase should be limited to **well below 1.5° C** above pre-industrial levels.
3. Global greenhouse gas emissions must **peak by 2015**.
4. Global CO<sub>2</sub> reductions of **greater than 85%** are required by 2050.

To achieve this goal:

1. Annex I Parties collectively, whether or not Parties to the Kyoto Protocol, must reduce their emissions by **more than 45%** of their 1990 levels by 2020.
2. Annex I Parties collectively, whether or not Parties to the Kyoto Protocol, must reduce their emissions by **more than 95%** of their 1990 levels by 2050.

#### B. Scientific Basis for Annex I Party Emission Reduction Goals

Article 3.3 of the Convention, which guides both the Convention and Protocol, provides that the Parties should take precautionary measures to anticipate, prevent or minimize the causes of climate change and minimize its impacts. Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing such measures.

In the view of Grenada, in the context of this precautionary approach, the avoidance of further negative impacts on small island developing States must be one of the key benchmarks for assessing the adequacy of any global long-term emission reduction goal and for assessing the necessary scale of emission reductions to be achieved by Annex I Parties in the second commitment period.

In December 2008, the AWG-KP concluded as follows<sup>1</sup>:

18. The AWG-KP recalled that its work should be guided by a shared vision of the challenge set by the ultimate objective of the Convention based on the principles and other relevant provisions of the Convention and its Kyoto Protocol. It noted the usefulness of the ranges referred to in the contribution of Working Group III to the Fourth Assessment Report (AR4) of the IPCC and that this report indicates that global emissions need to peak in the next 10-15 years and be reduced to very low levels, well below half of levels in 2000 by the middle

---

<sup>1</sup> See FCCC/KP/AWG/2008/8, Report of the Ad Hoc Working Group on Further Commitments for Annex I Parties under the Kyoto Protocol on its resumed sixth session.

of the twenty-first century in order to stabilize their concentrations in the atmosphere at the lowest levels assessed by the IPCC to date in its scenarios. Hence the urgency to address climate change. At the first part of its fourth session, the AWG-KP recognized that the contribution of Working Group III to the AR4 indicates that **achieving the lowest levels assessed by the IPCC to date and its corresponding potential damage limitation** would require Annex I Parties as a group to reduce emission in a range of **25-40 percent below 1990 levels by 2020**, through means that may be available to these Parties to reach their emission reduction targets. The IPCC ranges do not take into account **lifestyle changes** which have the potential of increasing the reduction range. The ranges would be significantly higher for Annex I Parties if they were the result of an analysis which assumes that emission reductions were to be undertaken exclusively by Annex I Parties. The AWG-KP also recognized that achievement of these reduction objectives by Annex I Parties would make an important contribution to overall global efforts required to meet the ultimate objective of the Convention as set out in its Article 2.

**19. The AWG-KP noted the concerns raised by small island developing States and some developing country Parties with regard to the lack of analysis of stabilization scenarios below 450 ppmv of CO<sub>2</sub> equivalent.** In line with the iterative approach to the work programme, **the information referred to in paragraph 18 above will be reviewed in the light of information received by the AWG-KP, including from possible further scientific work on stabilization scenarios.** [footnotes omitted]

The 'lowest levels assessed by the IPCC to date', referenced in the AWG-KP report, associate a stabilization concentration range of 445-490 ppm CO<sub>2</sub>-eq (350-400 ppm CO<sub>2</sub>) with a 2.0 to 2.4° C increase above pre-industrial levels, and estimate that to achieve such a stabilization concentration would require a 85% to 50% reduction in global CO<sub>2</sub> emissions by 2050, and a reduction in Annex I emissions of 25% to 40% by 2020 and 80% to 95% by 2050.<sup>2</sup>

The small island developing states have repeatedly emphasized that a 2°C increase in global average surface temperature would be devastating to SIDS and jeopardize the sovereign existence of many small island State Parties to the Convention and Protocol. For this reason, such a level of ambition is inadequate under the Convention's multi-lateral process. This concern is noted in paragraph 19 quoted above,<sup>3</sup> and must be addressed in the establishment of Annex I Party targets for the second commitment period.

In the view of Grenada, Annex I Party commitments in the Kyoto Protocol's second commitment period must be consistent with global efforts to reduce greenhouse gas concentrations **to well below 350 ppmv CO<sub>2</sub> eq** and with a limitation of global average surface temperature increases to **well below 1.5° C** (Hansen 2009; Rockstrom, Steffen et al. 2009) .

Since the AR4, there have been a number of publications which demonstrate low stabilisation scenarios that would limit warming and CO<sub>2</sub> to far below the levels assessed in the AR4 (Vuuren, Elzen et al. 2007; Knopf, Edenhofer et al. 2008; Rao, Riahi et al. 2008; van Vuuren, den Elzen et al. 2009; Barker and Scrieciu 2010; Edenhofer, Knopf et al. 2010; Kitous, Criqui et al. 2010; Knopf, Edenhofer et al. 2010; Leimbach, Bauer et al. 2010; Magne, Kypreos et al. 2010; van Vuuren, Stehfest et al. 2010; Vuuren, Isaac et al. 2010). These studies all show that more urgent action is needed than earlier estimated. Most energy-economic models are able to achieve low emission levels, but this crucially depends on early and globally concerted mitigation, rapid up-scaling and feasibility of large-scale bio energy, high rates of energy efficiency improvements, and availability of carbon capture and storage technologies (CCS).

<sup>2</sup> See Contribution of Working Group III to the IPCC AR4, Technical Summary, pages 39 and 90.

<sup>3</sup> It is also reflected in FCCC/KP/AWG/2007/4, para. 19 (Report of the AWG-KP on the first part of its fourth session) where the AWG noted the possibility for further work on lower stabilisation scenarios. The AWG-KP recognized the outcomes of the contribution of IPCC WG II on Impacts, Vulnerability and Adaptation and that 'the lower the stabilisation level achieved, the lower the consequent damages'.

In keeping with the **iterative approach** to the AWG-KP's work programme referenced in paragraph 19 cited above, Grenada believes the AWG-KP must now receive and take on board the results of **more recent scientific information and analysis** that has been produced since the IPCC AR4 on:

- Observed changes in the climate system and projected impacts on human and natural systems and likelihood of crossing tipping points in the earth system;
- Emission pathways and climate and energy policies that are consistent with the precautionary approach;
- Projected damages to vulnerable countries and ecosystems implied by different levels of mitigation effort and the timeframes for such damage.

Recent scientific studies (Allen, Frame et al. 2009; Meinshausen, Meinshausen et al. 2009) support Grenada's view that pathways leading to reduction of GHG concentrations to levels lower than the lowest available for the IPCC AR4 are required from the global community to avoid catastrophic climate change impacts on SIDS and to prevent the triggering of critical climate change thresholds leading to widespread, adverse and irreversible changes in the earth system (Archer, Buffett et al. 2008; Greene, Pershing et al. 2008; Latif and Keenlyside 2008; Lenton, Held et al. 2008; Hofmann and Schellnhuber 2009; Kriegler, Hall et al. 2009; Malhi, Aragão et al. 2009; Notza 2009; Notzb 2009; Schellnhuber 2009).

Hence a greater than 45% reduction in emissions relative to 1990 levels by 2020 and a greater than 95% reduction in emissions relative to 1990 levels by 2050 are required of Annex I Parties.

### **C. Recent Scientific Studies Indicate that More Ambitious and More Urgent Action is Necessary**

The IPCC's Fourth Assessment Report reviewed and analysed scientific studies published up until the end of 2006, and in a few cases to early 2007. This report already showed serious impacts for the most vulnerable countries and systems (IPCC 2007; Smith, Schneider et al. 2009). Scientific research and information accumulating since the publication of the AR4 indicates that observed climate change is close to the top of earlier predictions, (Rahmstorf, Cazenave et al. 2007; Richardson, Steffen et al. 2009).

Many impacts have been underestimated, the timeframe for these impacts has been overestimated, and carbon cycle feedbacks have not been well-understood and are likely to have been underestimated in many cases (Boer and Arora 2009; Bonan and Levis 2010; Gerber, Hedin et al. 2010; Goosse 2010; Schneider and Schneider 2010; Smith and Fang 2010; Zaehle, Friedlingstein et al. 2010). Arctic sea ice loss is continuing at record levels (Serreze, Holland et al. 2007; Stroeve, Holland et al. 2007; Stroeve, Serreze et al. 2008; Markus, Stroeve et al. 2009; Simmonds and Keay 2009) and complete loss of summer ices could occur as early as the 2030s (Wang and Overland 2009; Zhang 2010), with substantial climate consequences (Rennermalm, Smith et al. 2009; Serreze, Barrett et al. 2009) much earlier than predicted in the AR4.

**Sea level rise.** Relevant recent studies, among other things, address the observed rate of sea level rise (Cazenave, Dominh et al. 2009), and the accelerating contributions of Greenland ice sheet melt and West Antarctic ice sheet loss (Rignot 2008; Rignot, Bamber et al. 2008; Rignot, Box et al. 2008; Rignot and Steffen 2008; Chen, Wilson et al. 2009; van den Broeke, Bamber et al. 2009; Velicogna 2009; Rignot, Koppes et al. 2010). Recent projections indicate that sea level rise of well over a metre by 2100 can be expected unless emissions are reduced rapidly (Vermeer and Rahmstorf 2009; Jevrejeva, Moore et al. 2010).

In the AR4 it was found that global warming of 1.9 to 4.6°C above pre-industrial levels would produce a risk of substantial loss of ice from Greenland, which would in turn raise sea levels by some 2 to 7 metres over centuries to millennia, and in this context, the AR4 found that rapid sea-level rise "cannot be excluded" (IPCC AR4 Synthesis Report, 2007). Since the AR4, more research has been done which points towards this long-identified risk (Mercer 1978; Oppenheimer 1998). Evidence from a previous climatic warm period (119,000 to 124,000 years ago, when the climate warmed to around present levels and a bit higher) shows that rapid sea-level rise caused by melting or disintegration of the ice sheets has

occurred before. During that period, sea levels stood at 4 to 6 metres higher than at present, and the rates of sea-level rise averaged 1.6m/century (Rohling, Grant et al. 2008; Kopp, Simons et al. 2009).

Recent research on the relationship between Antarctic temperatures and global sea level over the last 520,000 years indicates that multi-metre increases in sea level over the next centuries are very likely even from warming levels of 2°C, due to the loss of ice from the ice sheets (Rohling, Grant et al. 2009). Acceleration of ice loss from one of the key glaciers draining the West Antarctic Ice sheet in response to ocean warming continues and points towards an escalating level of risk (Joughlin, Tulaczyk et al. 2009; Scott, Gudmundsson et al. 2009; Wingham, Wallis et al. 2009; Jenkins, Dutrieux et al. 2010; Katz and Worster 2010; Kerr 2010; Schoof 2010). Recent examination of plausible melting and/or disintegration rates for the ice sheets suggest strongly that a metre or more is possible if not likely by 2100, and that two metres cannot be ruled out (Rahmstorf 2007; Pfeffer, Harper et al. 2008).

**Ocean acidification.** Ocean acidification has emerged as major issue since the IPCC AR4 (Denman, Brasseur et al. 2007 in IPCC AR4). As CO<sub>2</sub> concentration in the atmosphere rises, more CO<sub>2</sub> is absorbed by the oceans, increasing the acidity of the oceans. An increase in ocean acidity has been observed. Higher ocean acidity reduces the ability of coral species to sequester calcium, which is vitally required for growth and maintenance of coral reefs. Reduced reef calcification due to acidification has been observed in the last decade and significant, reduced reef calcification due to acidification has been observed since 1990 in some regions (Cooper, De'Ath et al. 2008; De'ath, Lough et al. 2009; Tanzil, Brown et al. 2009). Corals around the world are likely to stop growing once atmospheric CO<sub>2</sub> concentration goes above about 450 ppmv and will start dissolving above 550 ppmv (Cao and Caldeira 2008; Silverman, Lazar et al. 2009). Stabilizing CO<sub>2</sub> concentration well below 450 ppmv which could be critical for the long term survival of coral reef ecosystems, yet current global pledges by both Annex I and non-Annex I countries, associated with the Copenhagen Accord, imply 450 ppmv CO<sub>2</sub> concentrations being reached by the late 2030s in about 30 years (Rogelj, Nabel et al. 2010). CO<sub>2</sub> concentration was about 278 ppm in pre-industrial times (mid 19th century), rose to about 355 ppm in 1990, and was around 386 ppm in 2008<sup>4</sup>. If multiple stressors are included, including high ocean surface-water temperature events, sea-level rise and deterioration in water quality, a CO<sub>2</sub> level of below 350 ppmv is required for the long-term survival of coral reefs (Veron, Hoegh-Guldberg et al. 2009). Impacts in the Arctic and Antarctic oceans are likely to be serious (Beardall, Stojkovic et al. 2009; Fabry, McClintock et al. 2009; McClintock, Angus et al. 2009; Olafsson, Olafsdottir et al. 2009). Deep reductions of global CO<sub>2</sub> emissions, peaking in the next decade and dropping to far below half of 1990 levels by 2050, are needed to keep CO<sub>2</sub> concentration below 450 ppmv, and ultimately to bring CO<sub>2</sub> back below 350 ppmv.

From recent scientific studies it is apparent that far more ambitious and urgent mitigation efforts are needed than those set out in the lowest stabilisation range referenced in the AWG-KP's Report on its 2008 session. The lower bound of that range (at best a 2-2.4°C limitation in global average surface temperatures above preindustrial levels and stabilisation range of 445-490 ppm) is not in keeping with the precautionary approach. A number of studies have found that even securing a limit to 2° C is not likely unless a stabilisation concentration well below 400 ppm is achieved (Hare and Meinshausen 2006; Meinshausen 2006). And again, even a limit to 2°C would devastate many small island developing countries.

Since the IPCC's Fourth Assessment Report was issued, and since the materials underlying the report were collected, many studies have found that climate change is happening more rapidly, and impacting key natural systems more severely and earlier than projected by the IPCC AR4. This information must be made part of the AWG-KP's deliberations on appropriate targets for Annex I Parties in the second commitment period. Under the Convention, the Parties are to protect the climate system for the benefit of present and future generations of humankind and developed country Parties are to take the lead in combating climate change and its adverse impacts.

The Recent Literature list below contains a list of studies for consideration by the AWG-KP.

---

<sup>4</sup> [ftp://ftp.cmdl.noaa.gov/ccg/co2/trends/co2\\_annmean\\_mlo.txt](ftp://ftp.cmdl.noaa.gov/ccg/co2/trends/co2_annmean_mlo.txt)

## D. Quantitative Impact of LULUCF Accounting Rules and Surplus AAUS on Environmental Outcomes

It is essential to have a clear understanding of overall effective environmental outcomes of the current pledges from Annex I Parties, in terms of emission reductions relative to 1990 emission levels that the atmosphere would actually see, from current and enhanced pledges.

**Decisions on LULUCF accounting rules** and on the treatment of **surplus assigned amount units** will have a substantial quantitative impact on the overall effective environmental outcomes that can be achieved from Annex I Party pledges. The potential effect of full use and trading of surplus assigned amount units on emission reductions by Annex I in aggregate is illustrated in Figure 1.

At the June session of the AWG-KP, AOSIS had put before the AWG-KP a table that indicates the effective environmental outcomes that may be achieved from Annex I Parties' proposed pledges. Grenada fully supports and reiterates the issues raised therein.

In sum, aggregate Annex I reductions below 1990 levels by 2020, from pledges that have now been made, are estimated to result in a **12 to 18% reduction** in industrial emissions, before accounting for deforestation and land use, land use change and forestry (LULUCF). Inclusion of Parties' preferred options for accounting for LULUCF, and deforestation in 1990 where that applies, would reduce the estimated effective reductions to **7 to 13% below** 1990 levels by 2020.

Where pledges by Annex I Parties exceed projected real emissions in 2020, **surplus allowances** (AAUs) result. If such surplus allowances were taken out of the trading system (i.e. not transferred to other Parties), aggregate effective reductions by Annex I Parties 2020 would be **improved to 10 to 17% below 1990 emissions**, depending on the business as usual scenario assumed. If expected surplus allowances from the first commitment period are carried over to the second commitment period and transferred to other Parties, **effective reductions by 2020 would deteriorate by about 6% (compared to 1990 emissions)**.

**Figure 1. Potential effect of surplus assigned amount units (AAUs) on Annex I allowed emissions in 2020**

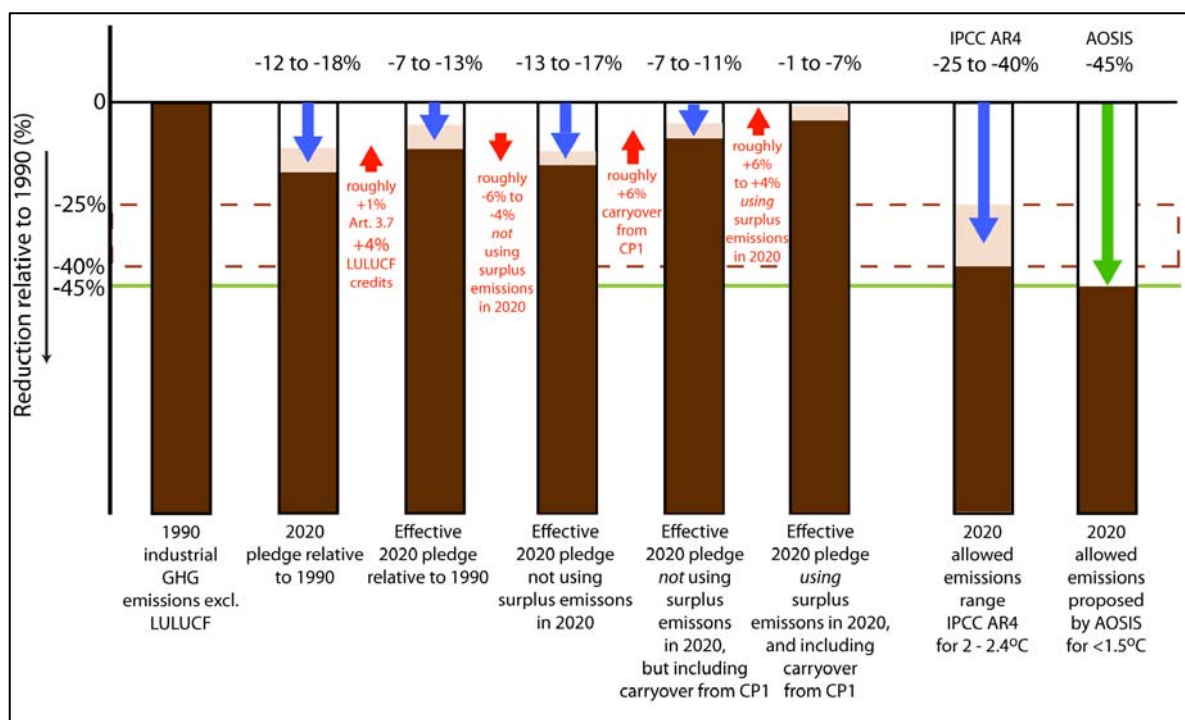


Figure 1 illustrates the potential effect of surplus assigned amount units (AAUs) on Annex I allowed emissions in 2020. The vertical bar at the far left represents a 0% reduction below 1990 emission levels. The two vertical bars on the far right illustrate reductions implied by IPCC AR4 emission scenarios limiting global warming to between 2 and 2.4°C (blue), and the more than 45% reduction below 1990 levels proposed by AOSIS (green) to limit global warming to below 1.5 °C, respectively.

In between, the second, third, fourth, fifth and sixth vertical bars each represent a reduction below 1990 emission levels under current Annex I pledges for 2020, if credits are added or subtracted as specified for each column. Blue arrows pointing down indicate reductions from 1990 emission levels; red arrows indicate a change in these reductions due to the addition or subtraction of credits from one column to the next. The shaded areas at the top of each column represent the fact that certain pledges have been given in ranges. These numbers represent aggregate Annex I emission reduction pledges as of 3 June 2010. Data source: CRF (2009). (UNFCCC AWG-KP Submissions 2009: see [http://unfccc.int/national\\_reports/annex\\_i\\_ghg\\_inventories/national\\_inventories\\_submissions/items/4771.php](http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/4771.php) )

#### **IV. Conclusion**

Much has changed since the IPCC issued its Fourth Assessment Report and since the AWG-KP adopted its Vienna conclusions. New scientific information is available with direct relevance to the scale of emission reductions to be achieved by Annex I Parties in aggregate and the contribution of Annex I Parties, individually or jointly to this scale. New low stabilization scenarios, beyond those considered by the IPCC AR4, are also now available for consideration.

There is a widening gap between proposed pledges for post-2012 commitments from Annex I Parties under the Kyoto Protocol, and what best available science clearly requires. Accordingly, there is a more pressing need to identify ways to increase the level of ambition of Annex I Parties in the Kyoto Protocol's second commitment period.

Grenada looks forward to active participation in the upcoming in-session workshop on the topics highlighted above.

#### **Recent Literature: Non-Exhaustive List of Studies for Consideration by AWG-KP**

- Allen, M. R., D. J. Frame, C. Huntingford, C. D. Jones, J. A. Lowe, M. Meinshausen and N. Meinshausen (2009). "Warming caused by cumulative carbon emissions towards the trillionth tonne." *Nature* **458**(7242): 1163-1166.
- Archer, D., B. Buffett and V. Brovkin (2008). "Ocean methane hydrates as a slow tipping point in the global carbon cycle." *Proceedings of the National Academy of Sciences*: -.
- Barker, T. and S. S. Scierciu (2010). "Modeling Low Climate Stabilization with E3MG: Towards a 'New Economics' Approach to Simulating Energy-Environment-Economy System Dynamics." *The Energy Journal* **0**(Special I): 137-164.
- Beardall, J., S. Stojkovic and S. Larsen (2009). "Living in a high CO<sub>2</sub> world: impacts of global climate change on marine phytoplankton." *Plant Ecology & Diversity* **2**(2): 191-205.
- Boer, G. J. and V. Arora (2009). "Temperature and concentration feedbacks in the carbon cycle." *Geophys. Res. Lett.* **36**.
- Bonan, G. B. and S. Levis (2010). "Quantifying carbon-nitrogen feedbacks in the Community Land Model (CLM4)." *Geophysical Research Letters* **37**(7): L07401.
- Cao, L. and K. Caldeira (2008). "Atmospheric CO<sub>2</sub> stabilization and ocean acidification." *Geophysical Research Letters* **35**: L19609.
- Cazenave, A., K. Dominh, S. Guinehut, E. Berthier, W. Llovel, G. Ramillien, M. Ablain and G. Larnicol (2009). "Sea level budget over 2003-2008: A reevaluation from GRACE space gravimetry, satellite altimetry and Argo." *Global and Planetary Change* **65**(1-2): 83-88.
- Chen, J. L., C. R. Wilson, D. Blankenship and B. D. Tapley (2009). "Accelerated Antarctic ice loss from satellite gravity measurements." *Nature Geosci* **2**(12): 859-862.
- Cooper, T. F., G. De'Ath, K. E. Fabricius and J. M. Lough (2008). "Declining coral calcification in massive Porites in two nearshore regions of the northern Great Barrier Reef." *Global Change Biology* **14**(3): 529-538.
- De'ath, G., J. M. Lough and K. E. Fabricius (2009). "Declining Coral Calcification on the Great Barrier Reef." *Science* **323**(5910): 116-119.

- Denman, K. L., G. Brasseur, A. Chidthaisong, P. Ciais, P. M. Cox, R. E. Dickinson, D. Hauglustaine, C. Heinze, E. Holland, D. Jacob, U. Lohmann, S. Ramachandran, P. L. da Silva Dias, S. C. Wofsy and X. Zhang (2007). Couplings Between Changes in the Climate System and Biogeochemistry. Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. S. Solomon, D. Qin, M. Manning et al. Cambridge, United Kingdom and New York, NY, USA, Cambridge University Press: 499-587.
- Edenhofer, O., B. Knopf, T. Barker, L. Baumstark, E. Bellevrat, B. Chateau, P. Criqui, M. Isaac, A. Kitous and S. Kypreos (2010). "The Economics of Low Stabilization: Model comparison of mitigation strategies and costs." The energy journal.
- Fabry, V. J., J. B. McClintock, J. T. Mathis and J. M. Grebmeier (2009). "Ocean Acidification at High Latitudes: The Bellweather." Oceanography **22**(4): 160-171.
- Gerber, S., L. O. Hedin, M. Oppenheimer, S. W. Pacala and E. Shevliakova (2010). "Nitrogen cycling and feedbacks in a global dynamic land model." Global Biogeochem. Cycles **24**(1): GB1001.
- Goosse, H. (2010). "Carbon cycle: Degrees of climate feedback." Nature **463**(7280): 438-439.
- Greene, C. H., A. J. Pershing, T. M. Cronin and N. Ceci (2008). "Arctic climate change and its impacts on the ecology of the North Atlantic." Ecology **89**(sp11): S24-S38.
- Hansen, J. E. (2009). "Target atmospheric CO<sub>2</sub>: Where should humanity aim?" Open Atmos. Sci. J. **2**: 217-231.
- Hare, B. and M. Meinshausen (2006). "How Much Warming are We Committed to and How Much can be Avoided?" Climatic Change: 1-39.
- Hofmann, M. and H. J. Schellnhuber (2009). "Oceanic acidification affects marine carbon pump and triggers extended marine oxygen holes." Proceedings of the National Academy of Sciences of the United States of America **106**(9): 3017-3022.
- IPCC (2007). Climate Change 2007: Synthesis Report. An Assessment of the Intergovernmental Panel on Climate Change. Geneva, Intergovernmental Panel on Climate Change.
- Jenkins, A., P. Dutrieux, S. S. Jacobs, S. D. McPhail, J. R. Perrett, A. T. Webb and D. White (2010). "Observations beneath Pine Island Glacier in West Antarctica and implications for its retreat." Nature Geosci **advance online publication**.
- Jevrejeva, S., J. C. Moore and A. Grinsted (2010). "How will sea level respond to changes in natural and anthropogenic forcings by 2100?" Geophysical Research Letters **37**(7): L07703.
- Joughline, I., I. Tulaczyk, J. L. Bamber, D. Blankenship, J. W. Holt, T. Scambos and D. G. Vaughn (2009). "Basal conditions for Pine Island and Thwaites Glaciers, West Antarctica, determined using satellite and airborne data." Journal of Glaciology **55**(190): 245-257.
- Katz, R. F. and M. G. Worster (2010). "Stability of ice-sheet grounding lines." Proceedings of the Royal Society A: Mathematical, Physical and Engineering Science **466**(2118): 1597-1620.
- Kerr, R. A. (2010). "Antarctic Glacier Off Its Leash." Science **327**(5964): 409-a-.
- Kitous, A., P. Criqui, E. Bellevrat and C. Bertrand (2010). "Transformation Patterns of the Worldwide Energy System - Scenarios for the Century with the POLES Model." The Energy Journal **0**(Special I): 49-82.
- Knopf, B., O. Edenhofer, C. Flachsland, M. T. J. Kok, H. Lotze-Campen, G. Luderer, A. Popp and D. P. v. Vuuren (2010). "Managing the Low-Carbon Transition - From Model Results to Policies." The Energy Journal **0**(Special I): 223-245.
- Knopf, B., O. Edenhofer, H. Turton, T. Barker, S. Scricciu, M. Leimbach, L. Baumstark and A. Kitous (2008). D-M2.6 Report on first assessment of low stabilisation scenarios. Adaptation and Mitigation Strategies: Supporting European Climate Policy. Project co-funded by the European Commission within the Sixth Framework Programme (2002-2006). ADAM. Potsdam, Potsdam Institute for Climate Impact Research (PIK): 44.
- Kopp, R. E., F. J. Simons, J. X. Mitrovica, A. C. Maloof and M. Oppenheimer (2009). "Probabilistic assessment of sea level during the last interglacial stage." Nature **462**(7275): 863-867.
- Kriegler, E., J. W. Hall, H. Held, R. Dawson and H. J. Schellnhuber (2009). "Imprecise probability assessment of tipping points in the climate system." Proceedings of the National Academy of Sciences **106**(13): 5041-5046.
- Latif, M. and N. S. Keenlyside (2008). "El Nino/Southern Oscillation response to global warming." Proceedings of the National Academy of Sciences: -.
- Leimbach, M., N. Bauer, L. Baumstark, M. Luken and E. Ottmar (2010). "Technological Change and International Trade - Insights from REMIND-R." The Energy Journal **0**(Special I): 109-136.
- Lenton, T. M., H. Held, E. Kriegler, J. W. Hall, W. Lucht, S. Rahmstorf and H. J. Schellnhuber (2008). "Inaugural Article: Tipping elements in the Earth's climate system." Proceedings of the National Academy of Sciences **105**(6): 1786-1793.
- Magne, B., S. Kypreos and T. Hal (2010). "Technology Options for Low Stabilization Pathways with MERGE." The Energy Journal **0**(Special I): 83-108.

- Malhi, Y., L. E. O. C. Aragão, D. Galbraith, C. Huntingford, R. Fisher, P. Zelazowski, S. Sitch, C. McSweeney and P. Meir (2009). "Exploring the likelihood and mechanism of a climate-change-induced dieback of the Amazon rainforest." Proceedings of the National Academy of Sciences **106**(49): 20610-20615.
- Markus, T., J. C. Stroeve and J. Miller (2009). "Recent changes in Arctic sea ice melt onset, freezeup, and melt season length." J. Geophys. Res. **114**(C12): C12024.
- McClintock, J. B., R. A. Angus, M. R. McDonald, C. D. Amsler, S. A. Catledge and Y. K. Vohra (2009). "Rapid dissolution of shells of weakly calcified Antarctic benthic macroorganisms indicates high vulnerability to ocean acidification." Antarctic Science **21**(5): 449-456.
- Meinshausen, M. (2006). What Does a 2°C Target Mean for Greenhouse Gas Concentrations? A Brief Analysis Based on Multi-Gas Emission Pathways and Several Climate Sensitivity Uncertainty Estimates. Avoiding Dangerous Climate Change. H. Schellnhuber, W. Cramer, N. Nakicenovic, T. Wigley and G. Yohe. Cambridge, UK, Cambridge University Press, 2006: 265-280.
- Meinshausen, M., N. Meinshausen, W. Hare, S. C. B. Raper, K. Frieler, R. Knutti, D. J. Frame and M. R. Allen (2009). "Greenhouse-gas emission targets for limiting global warming to 2°C." Nature **458**(7242): 1158-1162.
- Mercer, J. H. (1978). "West Antarctic Ice Sheet and CO<sub>2</sub> Greenhouse Effect - Threat of Disaster." Nature **271**(5643): 321-325.
- Notz, D. (2009a). "The future of ice sheets and sea ice: Between reversible retreat and unstoppable loss." Proceedings of the National Academy of Sciences **106**(49): 20590-20595.
- Notz, D. (2009b). "Tipping Elements in Earth Systems Special Feature: The future of ice sheets and sea ice: Between reversible retreat and unstoppable loss." Proc Natl Acad Sci U S A.
- Olafsson, J., S. R. Olafsdottir, A. Benoit-Cattin, M. Danielsen, T. S. Arnarson and T. Takahashi (2009). "Rate of Iceland Sea acidification from time series measurements." Biogeosciences **6**(11): 2661-2668.
- Oppenheimer, M. (1998). "Global warming and the stability of the West Antarctic Ice Sheet." Nature **393**(6683): 325-332.
- Pfeffer, W. T., J. T. Harper and S. O'Neel (2008). "Kinematic Constraints on Glacier Contributions to 21st-Century Sea-Level Rise." Science **321**(5894): 1340-1343.
- Rahmstorf, S. (2007). "A Semi-Empirical Approach to Projecting Future Sea-Level Rise." Science **315**(5810): 368-370.
- Rahmstorf, S., A. Cazenave, J. A. Church, J. E. Hansen, R. F. Keeling, D. E. Parker and R. C. J. Somerville (2007). "Recent Climate Observations Compared to Projections." Science **316**(5825): 709-714.
- Rao, S., K. Riahi, C. Cho, D. v. Vuuren, E. Stehfest, M. d. Elzen, J. v. Vliet and M. Isaac (2008). IMAGE and MESSAGE Scenarios Limiting GHG Concentrations to Low Levels Laxenberg, IIASA.
- Rennermalm, A. K., L. C. Smith, J. C. Stroeve and V. W. Chu (2009). "Does sea ice influence Greenland ice sheet surface-melt?" Environmental Research Letters(2): 024011.
- Richardson, K., W. Steffen, H. Schellnhuber, J. Alcamo, T. Barker, D. Kammen and O. Wêver (2009). Synthesis report from Climate Change-Global Risks, Challenges & Decisions: Copenhagen 2009, 10-12 March, University of Copenhagen.
- Rignot, E. (2008). "Changes in West Antarctic ice stream dynamics observed with ALOS PALSAR data." Geophysical Research Letters **35**(12).
- Rignot, E., J. L. Bamber, M. R. Van Den Broeke, C. Davis, Y. H. Li, W. J. Van De Berg and E. Van Meijgaard (2008). "Recent Antarctic ice mass loss from radar interferometry and regional climate modelling." Nature Geoscience **1**(2): 106-110.
- Rignot, E., J. E. Box, E. Burgess and E. Hanna (2008). "Mass balance of the Greenland ice sheet from 1958 to 2007." Geophys. Res. Lett. **35**(L20502).
- Rignot, E., M. Koppes and I. Velicogna (2010). "Rapid submarine melting of the calving faces of West Greenland glaciers." Nature Geoscience **3**(3): 187-191.
- Rignot, E. and K. Steffen (2008). "Changes in West Antarctic ice stream dynamics observed with ALOS PALSAR data." Geophys. Res. Lett. **35**(L12505 doi:10.1029/2008GL033365.): 1-5.
- Rockstrom, J., W. Steffen, K. Noone, A. Persson, F. S. Chapin, E. F. Lambin, T. M. Lenton, M. Scheffer, C. Folke, H. J. Schellnhuber, B. Nykvist, C. A. de Wit, T. Hughes, S. van der Leeuw, H. Rodhe, S. Sorlin, P. K. Snyder, R. Costanza, U. Svedin, M. Falkenmark, L. Karlberg, R. W. Corell, V. J. Fabry, J. Hansen, B. Walker, D. Liverman, K. Richardson, P. Crutzen and J. A. Foley (2009). "A safe operating space for humanity." Nature **461**(7263): 472-475.
- Rogelj, J., J. Nabel, C. Chen, W. Hare, K. Markmann, M. Meinshausen, M. Schaeffer, K. Macey and N. Hohné (2010). "Copenhagen Accord pledges are paltry." Nature **464**(7292): 1126-1128.
- Rohling, E. J., K. Grant, M. Bolshaw, A. P. Roberts, M. Siddall, C. Hemleben and M. Kucera (2009). "Antarctic temperature and global sea level closely coupled over the past five glacial cycles." Nature Geosci **2**(7): 500-504.
- Rohling, E. J., K. Grant, C. Hemleben, M. Siddall, B. A. A. Hoogakker, M. Bolshaw and M. Kucera (2008). "High rates of sea-level rise during the last interglacial period." Nature Geosci **1**(1): 38-42.

- Schellnhuber, H. J. (2009). "Tipping elements in the Earth System." Proceedings of the National Academy of Sciences **106**(49): 20561-20563.
- Schneider, B. and R. Schneider (2010). "Palaeoclimate: Global warmth with little extra CO<sub>2</sub>." Nature Geosci **3**(1): 6-7.
- Schoof, C. (2010). "Glaciology: Beneath a floating ice shelf." Nature Geosci **advance online publication**.
- Scott, J. B. T., G. H. Gudmundsson, A. M. Smith, R. G. Bingham, H. D. Pritchard and D. G. Vaughan (2009). "Increased rate of acceleration on Pine Island Glacier strongly coupled to changes in gravitational driving stress." The Cryosphere **3**: 125–131.
- Serreze, M. C., A. P. Barrett, J. C. Stroeve, D. N. Kindig and M. M. Holland (2009). "The emergence of surface-based Arctic amplification." The Cryosphere **3**(1): 11-19.
- Serreze, M. C., M. M. Holland and J. Stroeve (2007). "Perspectives on the Arctic's Shrinking Sea-Ice Cover." Science **315**(5818): 1533-1536.
- Silverman, J., B. Lazar, L. Cao, K. Caldeira and J. Erez (2009). "Coral reefs may start dissolving when atmospheric CO<sub>2</sub> doubles." Geophysical Research Letters **36**: L05606.
- Simmonds, I. and K. Keay (2009). "Extraordinary September Arctic sea ice reductions and their relationships with storm behavior over 1979–2008." Geophysical Research Letters **36**.
- Smith, J. B., S. H. Schneider, M. Oppenheimer, G. W. Yohe, W. Hare, M. D. Mastrandrea, A. Patwardhan, I. Burton, J. Corfee-Morlot, C. H. D. Magadza, H.-M. Fässel, A. B. Pittock, A. Rahman, A. Suarez and J.-P. van Ypersele (2009). "Assessing dangerous climate change through an update of the Intergovernmental Panel on Climate Change (IPCC) reasons for concern." Proceedings of the National Academy of Sciences: -.
- Smith, P. and C. Fang (2010). "Carbon cycle: A warm response by soils." Nature **464**(7288): 499-500.
- Stroeve, J., M. M. Holland, W. Meier, T. Scambos and M. Serreze (2007). "Arctic sea ice decline: Faster than forecast." Geophys. Res. Lett. **34**(9): 1-5.
- Stroeve, J., M. Serreze, S. Drobot, S. Gearheard, M. Holland, J. Maslanik, W. Meier and T. Scambos (2008). "Arctic Sea Ice Extent Plummets in 2007." EOS Transactions American Geophysical Union **89**.
- Tanzil, J., B. Brown, A. Tudhope and R. Dunne (2009). "Decline in skeletal growth of the coral *Porites lutea* from the Andaman Sea, South Thailand between 1984 and 2005." Coral Reefs **28**(2): 519-528.
- van den Broeke, M., J. Bamber, J. Ettema, E. Rignot, E. Schrama, W. J. van de Berg, E. van Meijgaard, I. Velicogna and B. Wouters (2009). "Partitioning Recent Greenland Mass Loss." Science **326**(5955): 984-986.
- van Vuuren, D. P., M. G. J. den Elzen, J. van Vliet, T. Kram, P. Lucas and M. Isaac (2009). "Comparison of different climate regimes: the impact of broadening participation." Energy Policy **37**(12): 5351-5362.
- van Vuuren, D. P., E. Stehfest, M. G. J. den Elzen, J. van Vliet and M. Isaac (2010). "Exploring IMAGE model scenarios that keep greenhouse gas radiative forcing below 3 W/m<sup>2</sup> in 2100." Energy Economics **In Press, Corrected Proof**.
- Velicogna, I. (2009). "Increasing rates of ice mass loss from the Greenland and Antarctic ice sheets revealed by GRACE." Geophys. Res. Lett. **36**.
- Vermeer, M. and S. Rahmstorf (2009). "Global sea level linked to global temperature." Proceedings of the National Academy of Sciences **106**(51): 21527-21532.
- Veron, J. E. N., O. Hoegh-Guldberg, T. M. Lenton, J. M. Lough, D. O. Obura, P. Pearce-Kelly, C. R. C. Sheppard, M. Spalding, M. G. Stafford-Smith and A. D. Rogers (2009). "The coral reef crisis: The critical importance of <350 ppm CO<sub>2</sub>." Marine Pollution Bulletin **58**(10): 1428-1436.
- Vuuren, D. P. v., M. G. J. d. Elzen, P. L. Lucas, B. Eickhout, J. S. Bart, B. v. Ruijven, S. Wonink and R. v. Houdt (2007). "Stabilizing greenhouse gas concentrations at low levels: an assessment of reduction strategies and costs." Climatic Change **V81**(2): 119-159.
- Vuuren, D. P. v., M. Isaac, M. G. J. d. Elzen, E. Stehfest and V. Jasper van (2010). "Low Stabilization Scenarios and Implications for Major World Regions from an Integrated Assessment Perspective." The Energy Journal **0**(Special I): 165-192.
- Wang, M. and J. E. Overland (2009). "A sea ice free summer Arctic within 30 years?" Geophys. Res. Lett. **36**.
- Wingham, D. J., D. W. Wallis and A. Shepherd (2009). "Spatial and temporal evolution of Pine Island Glacier thinning, 1995–2006." Geophysical Research Letters **36**.
- Zachle, S., P. Friedlingstein and A. D. Friend (2010). "Terrestrial nitrogen feedbacks may accelerate future climate change." Geophysical Research Letters **37**(1): L01401.
- ZHANG, X. (2010). "Sensitivity of arctic summer sea ice coverage to global warming forcing: towards reducing uncertainty in arctic climate change projections." Tellus A **62**(3): 220-227.

## Submission by Grenada

### **Additional views on topics to be covered in the in-session workshop on the scale of emission reductions to be achieved by Annex I Parties in aggregate and the contribution of Annex I Parties, individually or jointly, to this scale (AWG-KP)**

**9 July 2010**

This submission responds to the AWG-KP's call for the submission of views of Parties in paragraph 28(a) of document FCCC/KP/AWG/2010/7, on the topics to be covered at the upcoming in-session workshop on the scale of emission reductions to be achieved by Annex I Parties in aggregate and the contribution of Annex I Parties, individually or jointly to this scale.

Over 100 state parties have called for at least a **45% reduction** from Annex I Parties in aggregate by 2020 as a fair and necessary contribution to global efforts to limit global average surface temperature increases to well below a **1.5 degree Celsius** rise over pre-industrial levels over the long-term and for stabilisation of greenhouse gas concentrations at well below 350 ppmv of CO<sub>2</sub> equivalent.

One of the topics that Grenada has recommended for consideration at the in-session workshop is the *"Gap between the effective emission reductions that can be achieved by 2020 through the pledges for emission reduction targets now put forward by Annex I Parties, and what the best available science indicates is a fair and equitable contribution of Annex I Parties to global efforts to achieve emission reductions sufficient to limit global average surface temperature increases to below 1.5 degrees above pre-industrial levels consistent with the objective of the Convention and Kyoto Protocol"*.

In support of this recommendation, Grenada has compiled the table below and supporting information to provide all Parties with an estimate of the aggregate emission reductions by 2020 that would result from the implementation of current pledges for emission reductions and related assumptions by Annex I Parties to the Convention. This is done to highlight the environmental outcomes of these pledges relative to 1990 emission levels.

In sum, aggregate Annex I reductions below 1990 levels by 2020, from pledges that have now been made, are estimated to result in a **12 to 18% reduction** in industrial emissions, before accounting for deforestation and land use, land use change and forestry (LULUCF). Inclusion of Parties' preferred options for accounting for LULUCF, and deforestation in 1990 where that applies, would reduce the estimated effective reductions from current Annex I Party pledges to **7 to 13% below** 1990 levels by 2020.

Where pledges by Annex I Parties exceed projected real emissions in 2020, **surplus allowances** (AAUs) result. If such surplus allowances were taken out of the trading system (i.e. not transferred to other Parties), aggregate effective reductions by Annex I Parties 2020 would be **improved to 10 to 17% below 1990 emissions**, depending on the business as usual scenario assumed. If expected surplus allowances from the first commitment period are carried over to the second commitment period and transferred to other Parties, effective reductions by 2020 would deteriorate **by about 6% (compared to 1990 emissions)**.

This submission elaborates on the underlying data and data sources used for the three-slide presentation made on 8 June 2010 by Micronesia on behalf of AOSIS during the twelfth session of the AWG-KP, a presentation which Grenada endorses. This presentation may be found at [http://unfccc.int/kyoto\\_protocol/items/4577.php](http://unfccc.int/kyoto_protocol/items/4577.php) (AOSIS) and [http://unfccc.int/files/meetings/ad\\_hoc\\_working\\_groups/kp/application/pdf/aosis\\_awgkp12.pdf](http://unfccc.int/files/meetings/ad_hoc_working_groups/kp/application/pdf/aosis_awgkp12.pdf)

## Aggregate Annex I reductions for 2020 as of 4 June 2010 compiled by Grenada

This table aims to provide an accessible overview of the effects of the proposed targets Annex I Parties have provided for 2020 relative to 1990 emission levels, taking into account Kyoto Protocol Article 3.7 where it applies, and the land use, land use change and forestry (LULUCF) activities or accounting options proposed by Parties under Articles 3.3 and 3.4 of the Protocol. This table compares pledges to 1990 GHG emissions excluding LULUCF. Column 2 below shows Parties' commitments in the Kyoto Protocol's first commitment period, for comparison purposes.

Annex I Party <sup>1</sup>	Kyoto Target for 2008-2012 relative to 1990 (%)	Proposed 2020 reduction target	Proposed Inclusion of LULUCF <sup>2</sup>	Proposed 2020 target relative to 1990 (and before LULUCF accounting) (%) <sup>3</sup>	Article 3.7 addition to 2020 allowed emissions, relative to 1990 (%) <sup>4</sup>	LULUCF credits in 2020 relative to 1990 <sup>5</sup> (%)	Effective 2020 target relative to 1990 <sup>6</sup> (%)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<b>Kyoto Parties</b>							
Australia	+8	5 - (15) - 25% below 2000	Y	+13 to -11	+36 to +28 <sup>7</sup>	-18 <sup>8</sup>	+30 to -1
Belarus	-8 <sup>9</sup>	5-10% below 1990	Y	-5 to -10	-	- <sup>10</sup>	-5 to -10
Canada	-6	17% below 2005	Y	+3	-	0 <sup>11</sup>	+3
Croatia	-5	5% below 1990 <sup>12</sup>	Y	-5	-	- <sup>13</sup>	-5
EU27	-8	20-30% below 1990	N/Y <sup>14</sup>	-20 to -30	0	0 <sup>15</sup>	-20 to -30
Iceland	+10	15-30% below 1990	Y	-15 to -30	-	+1 <sup>16</sup>	-14 to -29
Japan	-6	25% below 1990	Y	-25	-	0 <sup>17</sup>	-25
Kazakhstan	0 <sup>9</sup>	15% below 1992	-	-10	-	- <sup>18</sup>	-10
Liechtenstein	-8	20-30% below 1990	N	-20 to -30	-	0	-20 to -30
Monaco	-8	20-30% below 1990	N	-20 to -30	-	0	-20 to -30
New Zealand	0	10-20% below 1990	Y	-10 to -20	-	+25 <sup>19</sup>	+15 to +5
Norway	+1	30-40% below 1990	Y	-30 to -40	-	+10 <sup>20</sup>	-20 to -30
Russian Federation	0	15-25% below 1990	Y	-15 to -25	-	+13 <sup>21</sup>	-2 to -12
Switzerland	-8	20-30% below 1990	Y	-20 to -30	-	+1 <sup>22</sup>	-19 to -29
Ukraine	0	20% below 1990	Y	-20	-	+2 <sup>23</sup>	-18
<b>Sub-total</b>		<b>Aggregate Kyoto Parties in Annex I</b>		<b>-17 to -25</b>	<b>+1</b>	<b>+3</b>	<b>-12 to -21</b>
<b>Non-Kyoto Parties</b> <sup>24</sup>	-7	17% below 2005	Y	-3	Does not apply	+7 <sup>25</sup>	+3
<b>Total</b>	<b>-5%</b>	<b>Aggregate Annex I reductions from 1990 levels*</b>		<b>-12 to -18</b>	<b>+1</b>	<b>+4</b>	<b>-7 to -13</b>
IPCC				-25 to 40			-25 to 40
AOSIS				> -45			> -45

Note: Columns 5, 6 and 7 when added together produce the effective 2020 target relative to 1990 in column 8; small differences are due to rounding.

\*Excluding Turkey.

## Assumptions

Annex I Party pledges and/or targets are drawn from the 'Compilation of pledges for emission reductions and related assumptions provided by Parties to date and the associated emission reductions' (FCCC/KP/AWG/2010/INF.1) and information submitted by Parties for inscription in Appendix I to the Copenhagen Accord (<http://unfccc.int/home/items/5264.php>, March 10 2010).

The table incorporates alterations made to emission reduction pledges and/or targets since 2009. Canada has reduced its pledge from a previous 20% reduction against 2006 levels to 17% reduction from 2005 levels (equivalent to a change from a 3% reduction against 1990 levels, to an increase of 3% above 1990 levels); Monaco and Iceland have both enhanced their pledges, from a 20% to a 30% reduction below 1990 levels by 2020. The table includes Kazakhstan's announced emission reduction target.

For three Parties – Belarus, the Russian Federation and the Ukraine – business as usual emissions for 2020 are projected to be below the levels of the proposed targets for 2020 for a number of combinations of low and high targets with different business as usual emissions projections. Estimated emissions used here include an assessment of current mitigation policies in effect and the consequences of the recent financial recession according to PRIMAP Baseline Reference, Potsdam Real-time Integrated Model for Probabilistic Assessment of Emission Paths (PRIMAP), [www.primap.org](http://www.primap.org) at <http://sites.google.com/a/primap.org/www/the-primap-model/documentation/baselines>.

LULUCF data sources for calculating LULUCF options for Parties are based on informal data submissions provided to the AWG-KP from September to November 2009, available at: [http://unfccc.int/meetings/ad\\_hoc\\_working\\_groups/kp/items/4907.php](http://unfccc.int/meetings/ad_hoc_working_groups/kp/items/4907.php). For Parties that did not submit data, assumptions on calculating the Kyoto Protocol's LULUCF activities were made through data proxies estimated using the CRF2009 tables: [http://unfccc.int/national\\_reports/annex\\_i\\_ghg\\_inventories/national\\_inventories\\_submissions/items/4771.php](http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/4771.php).

Calculations have been made in accordance with the provisions of the Kyoto Protocol and relevant decisions of the CMP. However, the implications of Article 3.5 (which allows alternative base years for countries with economies in transition) and Article 3.8 (which allows Parties to choose to use either 1990 or 1995 as their base year for fluorinated gases) have not been calculated in this table. Further details of assumptions used are provided in the endnotes at the end of this document.

## Explanatory Notes

The above table is intended to facilitate comparison of proposed targets for 2020 with the reduction ranges expressed in the IPCC AR4 and the AOSIS proposal for an aggregate reduction by Annex I Parties of their emissions by at least 45% below 1990 levels by 2020.

Under the Kyoto Protocol's Article 3.1 national targets (quantified emission limitation and reduction commitments) are set out in Annex B as a percentage of 1990 emissions (or another base year for economies in transition as defined in Article 3.5) excluding emissions or removals from land use, land use change and forestry (LULUCF). These targets are then used to calculate assigned amounts for the commitment period.

Assigned amounts are calculated taking into account other provisions of Article 3 of the Kyoto Protocol. The LULUCF provisions of Article 3.3 and 3.4 permit Parties to add their accounted sinks ('removals') from the LULUCF sector (or debit where there is a net emission) to their assigned amount for the period of concern. This amounts to an aggregate **4%** credit by 2020, based on the LULUCF accounting preferences by all Annex I Parties.

Article 3.7 allows Parties that have a net source of emissions from their land-use change and forestry sector in 1990 to add their emissions from land-use change (i.e. deforestation) to their base year for the purposes of calculating their assigned amount. If this provision continues to apply in a second commitment period, it would reduce the effective aggregate Annex I 2020 emission reductions by about **1%**.

Article 3.13 allows Parties to transfer unused or “surplus” assigned amount units (AAUs) into subsequent commitment periods if their emissions in a given commitment period are less than their assigned amount, which they may then either use or transfer to other Parties -- with the net result that overall allowed emissions in 2020 would be higher than if this carryover did not occur. Surplus AAUs that are carried forward, or transferred to other Annex I Parties, effectively increase the overall carbon budget available to Annex I Parties. It is estimated that the application of Article 3.13 in the second commitment period could add approximately **10 GtCO<sub>2e</sub>** to allowed emissions of Annex I Parties in the second commitment period, effectively adding about **6%** to the aggregate allowed emissions for Annex I Parties in 2020. See figure below.

If, for the period after 2012, Parties that are expected to have surplus emissions (Russia, Belarus and Ukraine) are not permitted to transfer their surplus AAUs, then the aggregate effective Annex I targets (Col. 8) would be increased to 10-14% below 1990 emission levels by 2020 for the highest business-as-usual case, and increased to 13-17% for the lowest business-as-usual case. This does not include carryover of surplus AAUs from the first commitment period, which would reduce the effective target by about **6%**.

An estimate of the expected future emissions from Annex I Parties is required to calculate surplus AAUs at the end of the 2008-2012 period, as well as for the period of 2013 to 2020. Estimated emissions used here include an assessment of current mitigation policies in effect and the consequences of the recent financial recession according to PRIMAP Baseline Reference, Potsdam Real-time Integrated Model for Probabilistic Assessment of Emission Paths (PRIMAP), [www.primap.org](http://www.primap.org) at <http://sites.google.com/a/primap.org/www/the-primap-model/documentation/baselines>.

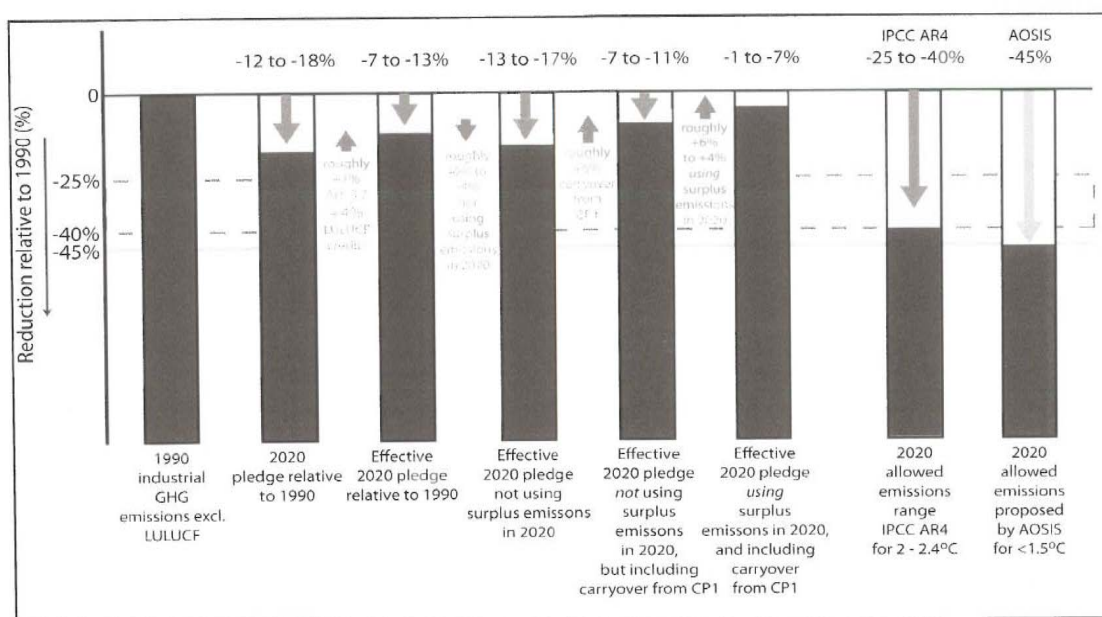
### **Potential Combined Impact of LULUCF Rules and Surplus**

Figure 1 below relates directly to the table above and illustrates the potential combined impact of LULUCF rules and surplus AAUs on the effective emission reductions that may be achieved through current Annex I Party pledges.

The figure shows, schematically, how the pledges proposed for 2020 (Column 3 in the table above), when presented relative to 1990 GHG emission levels excluding LULUCF (Column 5 in the table above), and calculated taking into account Article 3.7 (Column 6 in the table above), and LULUCF credits (Column 7), yield an effective 2020 target relative to 1990 emission levels (Column 8 in the table above). This effective target is shown in the third vertical bar in Figure 1 below.

Figure 1 then illustrates the potential effect of surplus assigned amount units (AAUs) on Annex I allowed emissions in 2020.

**Figure 1. Potential combined effect of LULUCF accounting rules and surplus assigned amount units (AAUs) on Annex I allowed emissions in 2020**



The vertical bar at the far left of the figure represents 1990 emission levels. The two vertical bars on the far right illustrate reductions implied by IPCC AR4 emission scenarios limiting global warming to between 2 and 2.4°C (blue), and the more than 45% reduction below 1990 levels proposed by AOSIS (green) to limit global warming to below 1.5 °C, respectively.

In between, the second, third, fourth, fifth and sixth vertical bars each represent a reduction below 1990 emission levels under current Annex I pledges for 2020, if credits are added or subtracted as specified for each column. Blue arrows pointing down indicate reductions from 1990 emission levels; red arrows indicate a change in these reductions due to the addition or subtraction of credits from one column to the next. The shaded areas at the top of each column represent the fact that certain pledges have been given in ranges. These numbers represent aggregate Annex I emission reduction pledges as of 3 June 2010. Data source: CRF (2009).<sup>1</sup>

<sup>1</sup> UNFCCC AWG-KP Submissions 2009: see [http://unfccc.int/national\\_reports/annex\\_i\\_ghg\\_inventories/national\\_inventories\\_submissions/items/4771.php](http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/4771.php)

## Endnotes to Table

<sup>1</sup> Unless indicated otherwise, UNFCCC inventory submissions from Parties for emissions in the relevant reference years (1990, 2000, 2005) were used to convert emission reduction targets and/or pledges to a common base year of 1990, and thereby facilitate the calculation of estimated aggregate emission reductions by Annex I Parties below 1990 levels by 2020. See UNFCCC, "National Inventory Submissions 2009", [http://unfccc.int/national\\_reports/annex\\_i\\_ghg\\_inventories/national\\_inventories\\_submissions/items/4771.php](http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/4771.php), accessed October 2009.

<sup>2</sup> LULUCF data sources: The data sources for calculating LULUCF options for Parties are based on informal data submissions provided to the AWG-KP from September to November 2009, available at: [http://unfccc.int/meetings/ad\\_hoc\\_working\\_groups/kp/items/4907.php](http://unfccc.int/meetings/ad_hoc_working_groups/kp/items/4907.php). For Parties that did not submit data, assumptions on calculating the Kyoto Protocol's LULUCF activities were made through data proxies estimated using the CRF2009 tables: [http://unfccc.int/national\\_reports/annex\\_i\\_ghg\\_inventories/national\\_inventories\\_submissions/items/4771.php](http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/4771.php).

<sup>3</sup> Column (5) shows the target expressed relative to 1990) after the target proposed by the Annex I Party concerned (Column (3)) is converted to 1990 levels, with both emissions in the reference year (from Column (3)) and 1990 emissions assumed to be GHG emissions excluding LULUCF (Kyoto Protocol Annex A gases and sources only). Note that LULUCF accounting is only added to a country's target if that Party has chosen to include it.

<sup>4</sup> Column (6) shows the effect of Article 3.7 on 2020 allowed emissions, as a percentage of 1990 GHG emissions excluding LULUCF. The countries qualifying for Article 3.7 are Australia, Ireland, the Netherlands, Portugal and the United Kingdom. Deforestation emissions in 1990 for these countries may be added to the 1990 GHG emissions excluding LUCF to establish base year emissions for the purpose of calculating the assigned amount (or allowed emissions) in the first commitment period of the Kyoto Protocol (2008-2012). It is assumed that this provision continues to apply for the purpose of calculating allowed emissions through to 2020. Hence the number shown here (Col.6) is the target for 2020 (Col.5) multiplied by the deforestation emissions in 2020, expressed as a % of 1990 GHG emissions excluding LUCF (Annex A emissions and sources). Effectively, this column illustrates the benefit obtained from Article 3.7 in terms of allowed emissions in 2020.

<sup>5</sup> Column (7) shows the effect of LULUCF accounting, assuming a country's preferred accounting is applied, expressed as a percentage of 1990 GHG emissions excluding LULUCF. Note that a positive percentage means that the LULUCF accounting indicates a sink in 2020 and is hence to be added to the allowed emissions of the Party, and vice versa.

<sup>6</sup> Column (8) shows the effective 2020 targets after including the effects of Article 3.7 and LULUCF accounting: in algebraic terms Col. 8 = Col. 5 + Col. 6 + Col. 7. Note that LULUCF accounting is only added to a country's target if that Party has chosen to include it, indicated in the column "Inclusion of LULUCF". The effective target is expressed as a percentage of 1990 GHG emissions excluding LULUCF. Note that numbers in this column may not exactly equal the sum of the components due to rounding.

<sup>7</sup> If Australia's 2020 target is calculated from 2000 levels of GHG emissions, including 2000 levels deforestation but with the provisions of Article 3.7 applying this target could be calculated as amounting to -2 to -22% below 1990 emissions of GHG excluding LULUCF but including deforestation emissions. However, Article 3.7 is quite specific in referring to 1990 deforestation emissions being used to form the 1990 base year emissions for calculating a Party's assigned amount. Hence a calculation using 2000 emissions levels is not consistent with Article 3.7. There is currently no proposed amendment (FCCC/KP/AWG/2010/6/Add.1) of the second sentence of Article 3.7, which would change the base year to an alternative base year (i.e. 2000). Australia's deforestation emissions in 1990 amounted to 131.5 Mt CO<sub>2</sub>eq, their deforestation emissions in 2000 amounted to 73.2 Mt CO<sub>2</sub>eq.

<sup>8</sup> Australia's preferred LULUCF option is assumed to be net-net accounting for all activities. (FCCC/KP/AWG/2009/MISC.11) and retaining Article 3.7 (FCCC/KP/AWG/2009/MISC.8).

<sup>9</sup> Amendment to the Kyoto Protocol.

<sup>10</sup> Belarus preferred option is unknown and there is little data for the LULUCF sector.

<sup>11</sup> Canada's preferred LULUCF option is a forward-looking baseline for forest management, which, in this case, produces zero credit or debit, based on their submissions in 2009. However, Canada has a credit from afforestation/reforestation and deforestation activities based on publicly available submissions. The Secretariat's compilation of pledges paper indicates that Canada assumes its LULUCF credits to be between -2 to 2%, based on a variety of LULUCF options.

<sup>12</sup> Assigned amounts and base year calculated according to the Report of the Review of Initial Report of Croatia (<http://unfccc.int/resource/docs/2009/irr/hrv.pdf>). Croatia's inscription in Appendix I to the

---

Copenhagen Accord states that its target is temporary pending accession to the European Union, whereupon Croatia would take the EU target of 20-30% reduction below 1990 levels by 2020. In November 2009, the Executive Board of the Compliance Committee made a decision on the Questions of Implementation in Croatia that the "addition of 3.5 Mt CO<sub>2</sub>eq by Croatia to the level of emissions for its base year following decision 7/CP.12 is not in compliance with Article 3, paragraphs 7 and 8, of the Kyoto Protocol and the modalities for the accounting of assigned amounts" see [http://unfccc.int/files/kyoto\\_protocol/compliance/enforcement\\_branch/application/pdf/cc-2009-1-8\\_croatia\\_eb\\_final\\_decision.pdf](http://unfccc.int/files/kyoto_protocol/compliance/enforcement_branch/application/pdf/cc-2009-1-8_croatia_eb_final_decision.pdf).

<sup>13</sup> Croatia's preferred option is not known and there is only sparse data on the LULUCF sector.

<sup>14</sup> Under a 20% reduction target, the EU27 indicates no LULUCF accounting, whereas under a 30% reduction LULUCF, accounting is assumed. See endnote 15.

<sup>15</sup> Based on submissions in 2009, the EU27's preferred LULUCF option has been calculated as a reference level (BAR) with a band of +/-5%. The Secretariat's compilation of pledges paper reflects an EU statement that LULUCF credits are between -3 to 3% based on a variety of LULUCF options. We have estimated zero credits based on publically available data and positions.

<sup>16</sup> Iceland's preferred LULUCF option is the same as the current LULUCF accounting rules for the first commitment period.

<sup>17</sup> Japan's preferred LULUCF option is the same as the current LULUCF accounting rules for the first commitment period.

<sup>18</sup> Kazakhstan's preferred LULUCF option is unknown.

<sup>19</sup> New Zealand's preferred LULUCF option is a forward-looking baseline for forest management, which we estimate to produce zero credit. However, New Zealand has a large credit from afforestation/reforestation and deforestation activities.

<sup>20</sup> Norway's preferred LULUCF option is calculated as net-net accounting for all LULUCF activities based on submissions in 2009. We note that in the Secretariat's compilation of pledges paper, Norway states that LULUCF credits are 6% and these are based on the current rules. We have estimated a credit of 10% based on publically available data and positions.

<sup>21</sup> The Russian Federation's preferred LULUCF option is the current Kyoto rules without a cap on forest management.

<sup>22</sup> Switzerland's preferred LULUCF option is net-net accounting for forest management, based on submissions in 2009, and that is assumed here. We note that Switzerland's inclusion of LULUCF in the compilation of pledges paper by the Secretariat states that present accounting rules apply with an estimate of 1% to 8%. We have estimated 1% credit based on publically available data and positions.

<sup>23</sup> Ukraine's preferred LULUCF option for 2020 is assumed to be the LULUCF accounting rules for the first commitment period, however it is to be noted that this is uncertain.

<sup>24</sup> Annex I Party that has not ratified the Kyoto Protocol.

<sup>25</sup> Assumed to be use of a land-based approach, calculated as net-net against the UNFCCC LULUCF reporting categories.

**Proposal by the Government of Indonesia on  
In-Session Workshop at the Thirteenth Session of the AWG KP on the Scale of Emission Reduction to be  
Achieved by Annex I Parties in Aggregate and the Contribution of Annex I Parties, Individually or Jointly, to  
This Scale**

In response to the paragraph 5 of the Conclusions adopted by the Ad Hoc Working Group on Further Commitments for Annex I Parties under the Kyoto Protocol at its twelfth session, Government of Indonesia wishes to submit its views, as follows:

1. On topics to be covered by the in-session workshop, the following issues should be considered:
  - a. how to increase the level of ambition of emission reduction to be achieved by Annex I Parties, in aggregate and the contribution of Annex I Parties, individually or jointly, to this scale, taking into consideration efforts undertaken to date by Annex I Parties, including most appropriate and possible instruments for reaching such ambition;
  - b. how to formulate further emission reduction target based on “top down” approach as suggested by the IPCC under AWGKP in the most efficient way to avoid duplication with process undertaken in other subsidiary bodies.
  - c. the most viable duration for second and subsequent commitment periods to ensure the deliverable of emission reduction targets;
  - d. the meaningful measures on comparability of efforts in order to achieve the aggregate emission reduction target by 2020, including the need to determine a single and uniform base year (1990).
  - e. the use of LULUCF activities to achieve part of emission reduction target of Annex I Parties in the second commitment period, taking into account progress made by AWGKP during its twelfth session.
2. On organizations/experts to be invited as speakers/facilitators, Indonesia is of the opinion that the In-Session Workshop should have comprehensive participations from the followings:
  - a. a balanced composition on experts from developed and developing countries;
  - b. representative(s) of the IPCC, particularly the writers of the AR-4;
  - c. government representatives and independent experts that has expertise on, *inter alia*: defining LULUCF, measuring pledges, bridging gap between existing pledges and scientific findings on potential emission reductions, and assessing the comparability of efforts; and
  - d. representative(s) and expert(s) from civil society.

3. In order to address the implications of the issues identified in the work program of AWG KP, Indonesia is of the view that the following issues should be properly considered:
- a. how to address in an integrated manner the Other Issues arising from the implementation of the work program;
  - b. how to maximise contribution of other gases addressed under Other Issues to achieve the objective of the Convention;
  - c. the importance of reaching agreement on definitions, rules, modalities and guidelines for LULUCF in the second commitment period; and
  - d. how to incorporate current performance of Annex 1 parties in achieving their first commitment period target into a compliance mechanism that take into consideration issues such as incentives/disincentives and carryover.

## Japan's submission on views and proposals on an in-session workshop at the thirteenth session of the AWG-KP

Japan welcomes its opportunity to submit its views and proposals on an in-session workshop at the 13<sup>th</sup> session of the AWG-KP.

1. We need to promote the global emission reduction of GHGs to achieve the ultimate objective of the UNFCCC, which is also the objective of the Kyoto Protocol. In this regard, although the workshop is on the scale of emission reductions to be achieved by Annex I Parties in aggregate and the contribution of Annex I Parties, individually or jointly, to this scale, it is indispensable to elaborate our considerations on emission reduction targets and mitigation actions by all major economies in a comprehensive manner. It would only have limited bearings as far as we focus on Annex I Parties that are Party to the Kyoto Protocol and only discuss the scale of emission reductions, its enhancement, and the contribution by them.
2. In addition, it is appropriate to recall that Japan's mid-term target submitted to the secretariat in line with the Copenhagen Accord is premised on the establishment of a fair and effective international framework in which all major economies participate and agreement on their ambitious targets. It has not been assuming a framework in which only Annex I Parties have emission reductions obligations. Therefore it is not appropriate to treat the target in the workshop as if it were submitted for the inscription to the Annex B of the Kyoto Protocol.
3. Japan regards this workshop as a forum for technical discussion at the experts' level, which should not prejudge the results of the whole negotiation under the UNFCCC.
4. Japan thinks it appropriate that the outcome of this workshop should be orally reported by the chair of the workshop, instead of having a written report to be attached as an annex to the report of the AWG-KP at its thirteenth session since there seem considerable differences of views on the issues dealt with in this workshop and the elaboration of well-balanced written summary will prove to be extremely difficult.

Уважаемая Г-жа Фигерес,

В соответствии с решением FCCC/KP/AWG/2010/7, принятыми на сессии Специальной рабочей группы по дальнейшим обязательствам для Сторон, включенных в приложение I, согласно Киотскому протоколу (СРГ-КП, 1-11 июня 2010 года), Российская Федерация предлагает рассмотреть на семинаре, запланированном на август 2010 года следующие вопросы:

- Ход выполнения странами своих обязательств по Киотскому протоколу. Эффективность Киотского протокола в снижении глобальных эмиссий парниковых газов. Прогнозные оценки антропогенных выбросов парниковых газов на период 2020-2050 годы в развитых и развивающихся странах;
- Расширение списка стран, имеющих количественные обязательства по Киотскому протоколу. Упрощение процедуры принятия обязательств;
- Эффективность использования рыночных механизмов в первом периоде обязательств. Принцип «дополнительности» механизмов.

**IN-SESSION WORKSHOP AT THE THIRTEENTH SESSION OF THE AWG-KP ON THE SCALE OF EMISSION REDUCTIONS TO BE ACHIEVED BY ANNEX I PARTIES IN AGGREGATE AND THE CONTRIBUTION OF ANNEX I PARTIES, INDIVIDUALLY OR JOINTLY, TO THIS SCALE**

**VIEWS ON TOPICS TO BE COVERED**

**SUBMISSION FROM SINGAPORE**

1 Singapore welcomes the in-session workshop at the 13th session of the Ad-hoc Working Group on Further Commitments for Annex I Parties under the Kyoto Protocol (AWG-KP) to address the scale of emission reductions to be achieved by Annex I Parties in aggregate and the contribution of Annex I Parties, individually or jointly, to this scale.

2 Singapore is of the view that the workshop will be a useful opportunity to discuss the mitigation pledges made by Annex I Parties currently compiled in the AWGKP INF document FCCC/KP/AWG/2010/INF.1, which includes information contained in Appendix 1 of the Copenhagen Accord. This should aim at achieving greater clarity on the impact of the conditions attached to these pledges and the aggregate scale of emission reductions that can be achieved with the same. Doing so will enable Parties to better estimate the current shortfall to meet the necessary range of emission reductions for Annex I Parties as indicated in the IPCC's 4th Assessment Report.

3 In this regard, the presentations at the workshop could also cover implications to the scale of emission reductions to be achieved by Annex I Parties arising from proposals relating to:

- (a) land use, land-use change and forestry (LULUCF);
- (b) emissions trading and the project based mechanisms; and
- (c) efforts and achievements to date, including during the first commitment period.

4 This would help facilitate a focussed technical discussion on these issues, and allow Parties to explore a possible enhanced scale of emission reduction to be achieved by Annex I Parties, bearing in mind the need to maintain the environmental integrity of the Kyoto Protocol in pursuit of the ultimate objective of the Convention.

**SUBMISSION BY SPAIN AND THE EUROPEAN COMMISSION ON BEHALF OF THE EUROPEAN UNION AND ITS MEMBER STATES**

**This submission is supported by Croatia, the Former Yugoslav Republic of Macedonia, Montenegro and Serbia.**

**Madrid, June 30<sup>th</sup> 2010**

**Subject: Views on the technical workshop to be held at the thirteen session of the AWG KP on the scale of emission reductions to be achieved by Annex I Parties in aggregate and the contribution of Annex I Parties, individually or jointly to this scale.**

Spain and the European Commission, on behalf of the European Union and its Member States, welcome the opportunity to submit their views on issues relating to paragraphs 5 and 6 from the conclusions adopted at the twelfth session.

The EU believes that during the last session of the AWG KP, Parties engaged in real and substantive discussions on issues critical to advancing the work of the AWG KP. We had an intensive and constructive debate on the implications of rules on the scale of emission reduction to be achieved by AI Parties, individually or jointly, and have taken an important step forward in our understanding of the relationship between emission reduction commitments and the rules.

The EU believes that we are heading in the right direction, but the debate on technical issues needs to be taken further in order to increase the transparency of pledges; facilitate raising the level of ambition; as well as to ensure environmental integrity. In this regard, we welcome the next in-session workshop and we look forward to further engaging with colleagues in order to deepen our understanding of the implications of the rules for implementation and emission reduction commitments. We were very pleased with the joint meeting between the numbers and LULUCF groups because of the need to take LULUCF into account when considering overall emissions reduction commitments. This is essential to delivering environmental integrity.

On potential topics to be covered at the workshop the EU believes that it would be useful to engage in a discussion on how the current and proposed rules could impact the pledges. During our last session, presentations made by some Parties, including the EU, on these issues proved to be useful to deepen understanding. Further work is now needed in this context in order to advance our understanding on the impact of the rules and the transparency of pledges. The EU wants to encourage all Parties, especially other Annex I Parties, to engage into this exercise to have a more transparent and complete view on the scale of emission reductions and the overall level of ambition. Therefore, the topics proposed for this workshop could include implications of: expected use of LULUCF, efforts and achievements to date and emissions trading, project based mechanisms and new mechanisms.

The EU would be willing to present its views on these issues again in the context of the AWG KP workshop if Parties find it useful as well as on other issues that could have a positive impact on Parties pledges (e.g. establishment of new mechanisms).

In addition the EU would like to ask the Secretariat to consider inputs for the Workshop from non-Party entities, business and other stakeholders, as well as organisations and technical experts that could present quantitative analysis on how the current and proposed rules could impact the pledges. Possible organizations that could be invited to the workshop could include: Joint Research Centre (JRC), International Energy Agency, International Emissions Trading Association (IETA), the World Bank and the OECD. Other experts with proved experience in this analytical field could also be invited; this could include, inter alia, New Carbon Finance, Point Carbon, Group “climateactiontracker.org”, etc. This selection of bodies and experts is necessarily indicative and non exhaustive.

In addition, members from the CDM Executive Board and the Joint Implementation Supervisory Committee could be invited to provide some insights on whether their current work has potential implications on the rules and therefore the scale of emission reductions to be achieved by Annex I Parties.

Regarding **available data** on expected use of land use, land-use change and forestry and on emissions trading and the project based mechanisms, including expected carry over of units from the first commitment period to the next commitment period, as well as related assumptions made when presenting pledges, the EU would like to recall that relevant information has already been submitted to the secretariat, and included as an illustrative case in Annex II of document FCCC/KP/AWG/2010/INF.1 “*Compilation of pledges for emission reductions and related assumptions provided by Parties to date and the associated emission reductions*”.

- Regarding **LULUCF data**, in December last year, the EU submitted to the UNFCCC data on forest management reference levels. We would like to recall that we are currently working on most up-to-date information available, with a view to make a new submission as soon as possible, so that the information is available for the negotiation towards the next climate talks in Bonn. The estimate below is made using the best available data at the time of this submission and might be revised when new information becomes available.

The EU would like to reiterate that the EU 20% target does not include the LULUCF sector. In case the EU commits to a 30% reduction of GHG in the context of a global and comprehensive agreement for the period beyond 2012, the LULUCF sector will be included. It should be noted that LULUCF is part of the domestic effort and should not be regarded as an offset-mechanism.

The contribution of LULUCF to the overall effort depends on accounting rules that have not been decided yet. The EU made a preliminary estimate at the 12th session of the AWG-KP based on four accounting options i.e. 1) Existing Kyoto Protocol rules; 2) Gross-net with discount factor of 85 %; 3) REF LEVEL submitted in COP 15 (in May 2010 for Russia); 4) Reference Level = 1990.

The result of this estimate shows that the LULUCF contribution for the EU could result in a range between net removals equal to 0.7% of 1990 emissions and net emissions equal to 2.1% of 1990 emissions.

- **Regarding use of emissions trading and project based mechanisms;** the EU legislation limits the use of JI and CDM credits to achieve those targets. Those limitations are different for different sectors and the actual use of JI and CDM may vary over time so that it is not possible to derive a definite limit for any single year, e.g. 2020.

However, for illustrative purposes, if one assumes that JI-CDM credits are used at an equal rate over time, the total estimated ceiling for JI-CDM use in the case of a 20% target would be around 4% compared to 1990, or about a fifth of the reduction target of 20% compared to 1990. In case the EU commits to a 30% reduction of GHG in the context of a global and comprehensive agreement for the period beyond 2012, the EU legislation foresees the use of a higher amount of offsets— compared to the case of the unilateral 20% reduction commitment. It is currently foreseen that half of the additional reductions that are required could be met by use of JI-CDM credits. So if the target is increased by 10 percentage points (i.e. from 20% to 30%) an additional 5% of reductions compared to 1990 could be met using JI-CDM. As a consequence the estimated ceiling for use of JI-CDM could be about 9% compared to 1990 in the case of a 30% reduction target.

- In addition, according to the latest UNFCCC accounting report (FCCC/KP/CMP/2009/15/Add.1) the EU25 received the equivalent of 26.563 Gt in AAUs for the first commitment period of the Kyoto Protocol. According to current data, the EU and its Member States are on track to comply with their Kyoto targets, and in many cases they will have reduced emissions to a greater extent than prescribed under the Kyoto Protocol (or the relevant EU decisions). According to the latest National Communication of the European Union, expected emissions in 2010 will be 5.024 Gt (with existing measures scenario). Deducting latest emission figures for Malta and Cyprus (as they are not Parties to the KP yet) this leaves about 5.011 Gt for the EU25 in 2010. Assuming that emissions during the first commitment period would on average equal the projected volume for 2010, the EU25 should expect to use a quantity of 25.054 Gt of their AAUs for compliance. This over-achievement of the targets would result in a potential carry-over of 1.508 Gt from the first CP.

According to the fifth National Communication of the EU, the Member States' intended use of flexible mechanisms is expected to increase the projected emission units for the EU-15 in the commitment period by 93 Mt in 2010, while use of carbon sinks is expected to increase this further by 42 Mt in 2010. In addition the acquisition of emission credits stemming from the flexible mechanisms by the EU ETS operators is expected to increase the projected emission units in 2010 by a further 61.2 Mt. Over the five years of the first commitment period this would result in 0,981 Gt of emission units. If this quantity would be used for compliance in CP1, the EU25 could potentially carry forward an equivalent amount of AAUs in addition to the 1.508 Gt estimated above. The overall carry over from the over-achievement of Kyoto targets could therefore amount to as much as 2.489 Gt.

The estimates above are subject to assumptions and uncertainties which will need to be discussed in more detail in the course of further work on this issue. Moreover, the actual impact on the level of effort implied by further emission reduction commitments of developed countries will depend on the extent to which the carry-over would be used for compliance in subsequent commitment periods.

The EU is open to engage in discussions on the impact of the quantitative information and data provided by Parties, as well as proposals by Parties on options to address the implications of issues identified in the work programme of the AWG KP for the scale of emission reduction to be achieved by Annex I Parties and for further exploring a possible enhanced scale of emission reductions.

Early Submission of information and views

This has reference to your letter no: ODES/SB32/10 dated 18 June 2010 on the above subject.

Please see below our proposals on "Consideration of further commitments for Annex I Parties under the Kyoto Protocol (AWG-KP)" 1 (a).

Topics to be added in the in-session workshop;

01. The diversities of inventerisation of Green House Gas (GHG) emission reductions excluding and including LULUCF, and effects of this diversity in calculating the total aggregate emission reductions.

02. Effects of the uncertainties in calculating the aggregate figure and a possible way forward.

03. Calculation of aggregate figures when pledges are submitted with different base years. The impacts of using different methodologies in achieving real emission reduction targets in accordance with IPCC.

04. Existing gaps of current pledges and emission reduction targets set in byIPCC.

## SWITZERLAND

### Submission on the in-session workshop at AWG-KP 13

In response to the call for submissions from AWG-KP 12 on the topics to be covered and the organizations/experts to be invited to the in-session workshop during the AWG-13 on the scale of emission reductions to be achieved by Annex I Parties, in aggregate and the contribution of Annex I Parties, individually or jointly, to this scale, Switzerland presents the following views:

#### Topics to be covered

1. The in-session workshop should allow for focused technical discussions in order to clarify domestic circumstances, issues of international burden sharing and quantitative implications of issues/parameters influencing the scale of effective emission reduction achieved by Annex I Parties individually and in aggregate. An improved quantitative understanding of key parameters contributing and influencing the level of emission reductions may help to identify their individual potential in order to increase in an effective and efficient way the level of ambition in aggregate.
2. To that aim, the topics to be covered during the in-session workshop should increase the quantitative understanding on how the choice of approaches, facilitative elements and values of parameters influence the scale of emission reductions and their achievement, individually and in aggregate.
3. Therefore, the list of topics to be dealt with should contain:
  - Consideration of national circumstances of Annex I Parties and issues of international burden sharing under which current emission reductions' pledges have been done
  - Ways to transform the pledges made by Parties numerically into QELROs, taking into account *inter alia* options on the length of the second commitment period and its starting point; quantitative assessment if and how the options influence the level of ambition of emission reductions achieved by Annex I Parties individually and in aggregate
  - Quantitative assessment of the options for extending the scope of the Kyoto mechanisms under articles 6, 12 and 17, as contained *inter alia* in document FCCC/KP/AWG/2010/6/Add.1, taking into account - to the extend of possibilities - *inter alia* demand and offer side
  - Quantitative consequences of the options for accounting of LULUCF under articles 3.3 and 3.4, individually and in aggregate
  - Options - such as dynamic discount factor, restriction on selling or buying of carried-over AAUs, management of use in carried-over AAUs through tax - and their quantitative implications for dealing with the carry-over of AAU on the scale of emission reductions by Parties, individually and in aggregate
  - Numerical consequences of the options for the basket of gases, including the GWP of gases and other metrics
  - Options for increasing the QELROs at levels such as those from the scales assessed by the IPCC in its AR4.

#### Organizations/experts to be invited

4. In order to ensure that the national circumstances from Annex I Parties as well as issues of international burden sharing are well understood and that the pledges from Annex I parties are considered in this context, we suggest to invite OECD experts.
5. As regard the scale of emission reductions, we suggest to invite IPCC experts, in particular those dealing with LULUCF and modeling emission pathways, e.g. from IIASA.

## **SUBMISSION BY UKRAINE**

**Subject: Views on the technical workshop to be held at the thirteenth session of the AWG KP on the scale of emission reductions to be achieved by Annex I Parties in aggregate and the contribution of Annex I Parties, individually or jointly to this scale.**

Ukraine welcomes the opportunity to submit its views on issues relating to paragraphs 5 and 6 from the conclusions adopted at the twelfth session.

Ukraine would like to remind that

- ✓ “In the implementation of their commitments ... a certain degree of flexibility shall be allowed by the Conference of the Parties to the Parties included in Annex I undergoing the process of transition to a market economy, in order to enhance the ability of these Parties to address climate change” (Article 4.6 of Convention),
- ✓ Parties should participate in an effective and appropriate international response “in accordance with their common but differentiated responsibilities and respective capabilities and their social and economic conditions” (para 7 of Convention Preamble).

Therefore on potential **topics to be covered at the workshop** Ukraine believes that it would be useful to initiate a discussion on how the current and proposed rules, as well as the pledges could be applied to the second period for EIT countries. Ukraine considers that specific approaches should be used for determining commitments of each EIT country taking into account GDP level per capita, level of economic disproportion, the vital necessity of economic restructuring, economically-caused population decline and other factors.

The issues of **LULUCF** and **use of emissions trading and project based mechanisms** in EIT countries should be considered proceeding from necessity that their further commitments shall allow to rehabilitate economic growth and to meet their social and development needs.

---