

## CoP-6 President's text

11th & 19th June 2001

## A quantitative analysis

Malte Meinshausen and Bill Hare

### Executive Summary

The "Consolidated negotiation text proposed by the President"<sup>1</sup> (11<sup>th</sup> and 19<sup>th</sup> June 2000) has been analysed in terms of its estimated affects on allowed emissions of fossil fuel and other industrial GHG emissions to the atmosphere during the first commitment period 2008-2012 of the Kyoto Protocol.

The two main issues examined here in quantitative terms are that of the sink (Land Use, Land Use Change and Forestry) provisions and of the trading of the Russian surplus or "Hot Air". Three scenarios have been used to examine the implications of the President's proposals – full participation by all Annex B Parties, non-ratification by the USA and non-ratification by the USA, Australia and Canada.

The starting point for the analysis are the already adopted provisions of the Kyoto Protocol in Articles

3.5, 3.7 and 3.8. Whilst the Protocol has a nominal target of a 5% reduction in emissions relative to 1990 by 2008-2012, already adopted provisions reduce this to around a 3% reduction for the Annex B group as a whole. For the OECD group of countries within Annex B of the Protocol these provisions degrade the target from a 6.4% reduction to an effective 4.7% reduction.

In the case of full participation by all Annex B Parties the inclusion of sinks under Articles 3.4, 6 and 12 is likely to result in an increase in the allowed emissions in 2008-2012 of about 3.6%. This would result in an overall emissions increase of about 0.6% above 1990 levels. For the OECD group of countries in Annex B of the Protocol, there is likely to be an increase in the allowed emissions by about 3.9% due to the inclusion of sinks. This would reduce the effective target from a 4.7% reduction to about a 0.8% reduction relative to 1990 emissions (see Table 1).

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<sup>1</sup> Relevant documents for this quantitative analysis are FCCC/CP/2001/2/Add.2 and Add.3/Rev.1, available at [www.unfccc.int](http://www.unfccc.int)

No restriction on the sale or purchase of "Hot Air" (Art.17) would, if all available "Hot Air" emission allowances are sold, result in a substantial increase of emission allowances for OECD countries within Annex B. This would result in allowed emissions of this group being 6.5% to 9% higher (see Table 9), leading to emissions being 5.3%-8.1% higher than 1990.

Whilst this is already unacceptable in environmental terms the most worrying result of this analysis relates to the scenarios wherein the USA or the USA, Canada and Australia do not ratify the Protocol.

In this case of the USA not ratifying, the availability of "Hot Air" would completely nullify the emission reduction targets of the remaining OECD countries in Annex B. The allowed emissions of the remaining Annex B countries would be 72 to 125 MtC/year above business as usual emission (BAU) projections – (see Table 10). This effect is even more pronounced if Canada and Australia join the USA in not ratifying the Kyoto Protocol, with allowed emissions being some 125 to 150 MtC/year above BAU projections.

This analyses has not looked at the issue of the Clean Development Mechanism (CDM) in the President's proposals (besides analysing allowances for purchasing sink credits under the CDM). Credits from CDM projects add to the allowed emissions of the Annex B Parties, and hence would tend to exacerbate the results described here. The high relative availability of "Hot Air" would likely exclude any significant CDM market developing, nevertheless it needs to be noted that the baseline and additionality proposals in the President's proposal are relatively weak. This would result in large volumes of cheap CDM project credits being attainable in principle with only weak tests as to the true additionality of these projects.

It is clear from this quantitative analysis and in light of the current US position, that the issue of "Hot Air" and sinks has reached a critical point. Whilst previously a defence was made against arguments for the control of

"Hot Air", largely by the Umbrella Group members, that there still would be the need for emission reductions this is clearly no longer the case if the US does not ratify. The Russian Federation has insisted that this issue not be controlled, however it must review its position in the light of this evidence.

A further issue arises in relation to the boundary conditions on the sink or Land Use, Land-Use Change and Forestry (LULUCF) provisions proposed by the President. It is proposed that all LULUCF activities falling under Article 3.4 ("2<sup>nd</sup> and 3<sup>rd</sup> tier"), 6 and 12 be limited under a cap, however this cap does not apply to afforestation, reforestation and deforestation activities under Article 3.3. This exemption would result in Iceland's target increasing by +3.4%, Ireland by +6.3%, and New Zealand by +40% relative to 1990 emissions. This could become disastrous in the light of tremendous uncertainties regarding potential Art. 3.3 credits from Russia, and other countries, for whom little or no reliable data on afforestation, reforestation and deforestation (ARD) exists in the public domain. It is imperative that Article 3.3 activities be placed under any overall boundary condition for sink activities and that this condition be made as small as possible.

The choice is clear: Either "sinks" and "Hot Air" have to be dramatically reduced below levels proposed by the President in the current text (if not excluded completely) or the Kyoto Protocol will most likely be ineffective in terms of reducing emissions to the atmosphere.

As a legally binding framework to control greenhouse gas emissions the Kyoto Protocol is a vital tool. It must however be effective in achieving real emission reductions to the atmosphere. It would be ironic in the extreme if the rules adopted for the Protocol at COPbis were to permit virtually business as usual emissions from Annex B Parties by adopting rules which the USA had long fought for.

## Abbreviations

Annex B	Countries listed in Annex B of the Kyoto Protocol; all countries with emission reduction targets
ARD	Afforestation, Reforestation and Deforestation under Art. 3.3
base year emissions	A country's GHG-emissions (without LULUCF) which define the 100% level from which the emission reduction targets are calculated. For most countries, base year emissions are equal to 1990 emissions, except for those, where Art. 3.5, 3.7 or 3.8 of the Kyoto Protocol apply
BAU	Business as Usual
EIT	Economies in Transition
LULUCF	Land Use, Land-Use Change and Forestry
NON-EIT	Annex B countries except those with Economies in transitions
OECD Countries	OECD member countries within Annex B of the Protocol. This term here does not refer to Mexico, South Korea or Turkey

see for climate change policy glossary: <http://www.unfccc.de/siteinfo/glossary.html>

## Authors:

Malte Meinshausen<sup>°</sup> and Bill Hare<sup>§</sup>

<sup>°</sup>Institute for Atmospheric and Climate Science (IACETH), Swiss Federal Institute of Technology, ETH, 8093 Zürich, Switzerland

<sup>§</sup>Greenpeace International, 1016 DW Amsterdam, The Netherlands

## For more information:

Bill Hare, Climate Policy Director, Greenpeace International, Keizersgracht 176, 1016 DW Amsterdam, The Netherlands, Phone: +31-20-523-6222, Fax: +31-20-523-6200, [bhare@ams.greenpeace.org](mailto:bhare@ams.greenpeace.org)

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## Disclaimer

The presented results have been carefully calculated and verified. However, errors of various kinds can not be excluded. Owing to uncertainties in the underlying data (e.g. data estimates for business as usual emissions, LULUCF projections and estimates and gaps in these) most of the following results are bound to be indicative and are by no means exact. The authors stress that the results and data, which are presented in this report, should be used with these uncertainties in mind.

## Part I: What is the effect on emission reduction targets?

The Kyoto Protocol, as adopted in Kyoto in 1997, would require fossil fuel and other industrial greenhouse gas (GHG) emissions listed in Annex A of the Protocol from industrialised (Annex B) countries<sup>2</sup> to be 3.0% lower than emissions in 1990<sup>3</sup>.

By including sinks under Art. 3.3, Art. 3.4, Art. 6 and Art. 12 of the Kyoto Protocol, as proposed under the "Consolidated negotiation text proposed by the President", the actual effective targets for fossil fuel and other industrial gas emissions are weakened – allowed emissions are reflected in Assigned Amount Units (AAUs) are shifted upwards. Furthermore, by *not* substantively limiting the transfer of "Hot Air" (the Russian/Ukrainian surplus), trading of these ERUs<sup>4</sup> under Art. 17 would further weaken the effective emission reduction targets of OECD countries.

In the following, the proposed regulations by the new President's text are analysed in terms of their effect on emission reduction targets of all "Annex B" countries and their effect on emissions reduction targets of OECD countries<sup>5</sup>. The overall effect of sink-related regulations on individual countries is outlined in the third section "Country by Country" (on page 7) and explored in more detail in Part II.

1. Overall effect on Annex B: Instead of a decrease, 0.6% higher emissions than 1990.

Sinks under Art. 3.3 and Art. 3.4 would cause an upward shift of Annex B allowed emissions by 104 to 122 MtC/year, which is 2.1% to 2.5% of 1990 emissions. Furthermore, sink credits under Art. 6 and 12 of the order of 54 to 66 MtC/year would be allowed (see Table 4 and Table 5). In effect, Annex B fossil fuel and other industrial GHG emissions would be allowed to rise by 0.6% above 1990 levels. In other words, even if all Annex B countries would ratify and implement the Kyoto Protocol, emissions from fossil fuels and other industrial GHG emissions would still be allowed to rise above 1990 levels (see Fig 1).

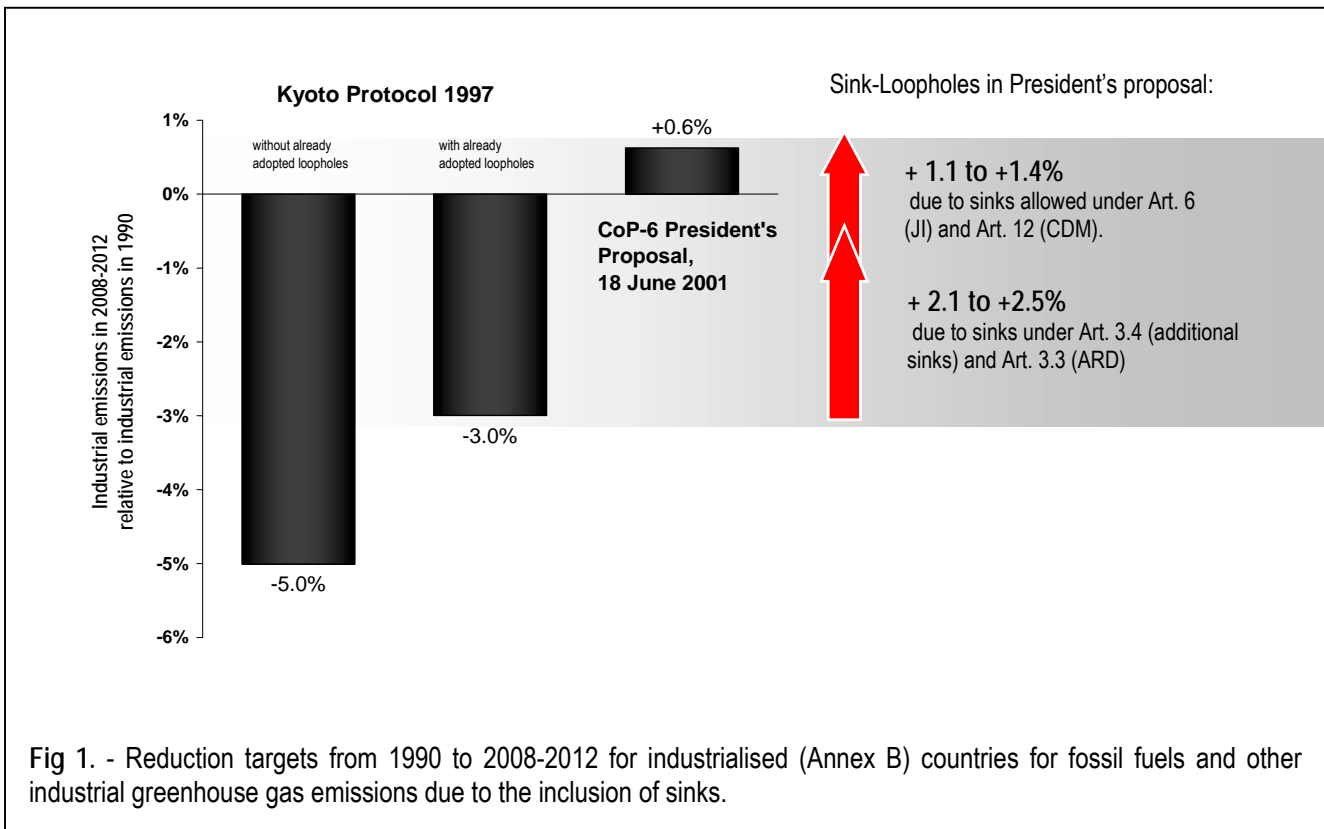
In fact, *domestic* fossil fuel emissions might well rise more than +0.6% above 1990 levels, since further increases could be "offset" by credits from non-LULUCF CDM projects. Assuming fully additional CDM projects, this "offset on paper" might well reflect a "true offset" in terms of emissions to the atmosphere. However, since many non-LULUCF CDM projects are (just as LULUCF projects) not fully additional, the Kyoto Protocol's overall effect would probably be worse than limiting emission increases to +0.6% above 1990 levels.

<sup>2</sup> "Annex B" countries are the countries that face emission reduction targets under the Kyoto Protocol (most of the countries included in Annex B of the UN Framework Convention of Climate Change).

<sup>3</sup> The target of -3.0% is the actual, effective target of the Kyoto Protocol (1997) after taking into account the already adopted "loopholes" in Art. 3.5, 3.7 and 3.8. As stated by Art. 3.1 the nominal intention of the Kyoto Protocol is to reduce overall emissions by -5.0%.

<sup>4</sup> ERU= Emission Reduction Unit

<sup>5</sup> The term 'OECD countries' is used here to mean "OECD member countries within Annex B" of the Kyoto Protocol.



By not limiting the transfer of “Hot Air” (or the Russian surplus) under emission trading (Art. 17) and sinks – as proposed in the President’s text, Annex B countries would be allowed to emit 4,930 MtC/year fossil fuel and other industrial GHG emissions by 2008-2012. For Annex B countries, the business-as-usual (BAU) emissions for the first commitment period are estimated to be as high as 5,236 MtC/year and 5,398 MtC/year based on 2<sup>nd</sup> National Communications and data from the International Energy Outlook (2000), respectively<sup>6</sup>. The gap between allowed emissions (4,930 MtC/year) and BAU emissions (5,236 and 5,398 MtC/year) is the amount of emissions, which has effectively to be reduced (-304 and -466 MtC/year) (cp. Table 2).

In other words, if the President’s text were to be adopted in its current form (19<sup>th</sup> June 2001), real

emission reductions would have to be undertaken, with the extent of these depending upon the BAU growth in emissions. However, these reductions are significantly lower than if no accounting for sinks were allowed. Furthermore, in the case that the US (or if the US were joined by Canada and Australia) does not ratify the Protocol, any of the targets for emission reductions by Annex B countries could be effectively nullified by the use “Hot Air” transfers from Russia and the Ukraine, and the exploiting of the sink provisions in the President’s proposal (see Part III).

<sup>6</sup> see Appendix “Data Sources” for information about these two scenarios.

## 2. OECD Countries in Annex B

The President's text results in an increase in OECD countries allowed emissions of 3.9% due to sinks (see Table 1). The allowed emissions are further inflated by unlimited use of "Hot Air" trading, which would permit an increase by 6.4% to 9% - see Table 8. As a consequence, if fully exploited, these provisions would lead to the overall target for OECD countries shifting from a reduction of -6.4% to an increase +5.6% or 8.2%% above 1990 emission levels. This weakening of the overall OECD targets is within the range of proposals tabled in Den Haag, 2000, which spanned a reduction of 2.8% to an increase of 18.6% (see Fig 2).

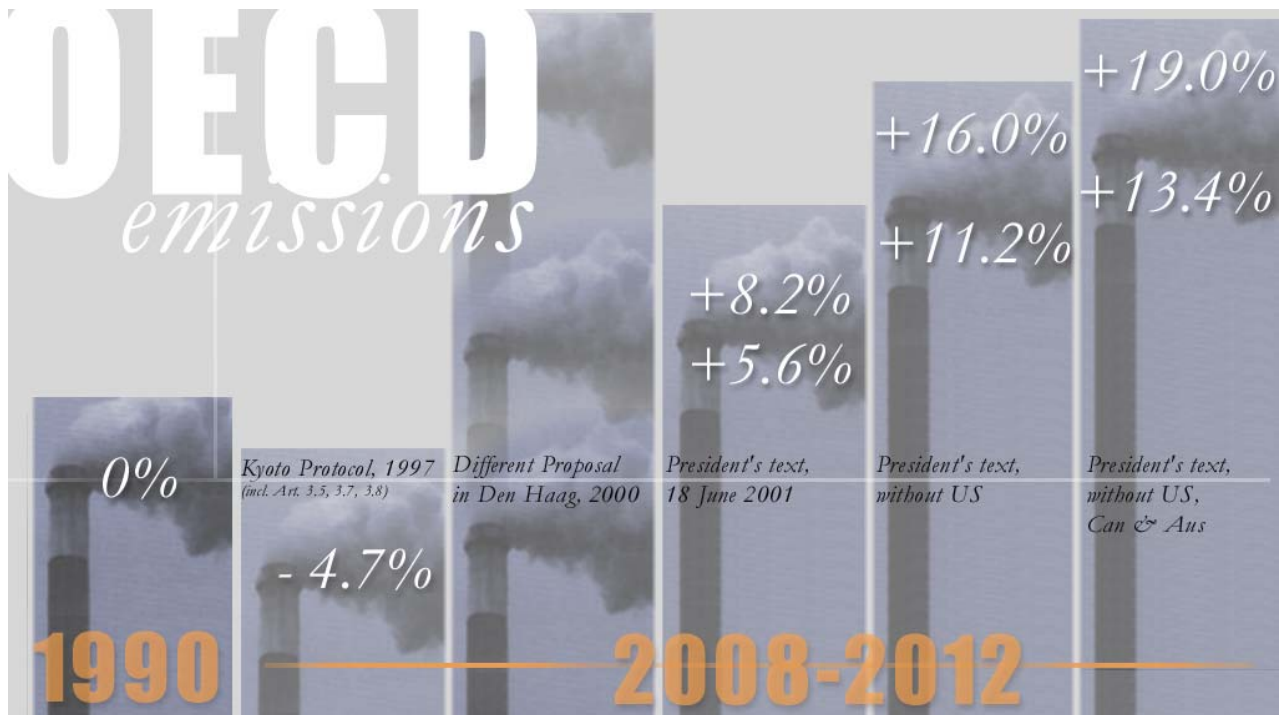


Fig 2. Emission allowances in 2008-2012 for fossil fuels and other industrial greenhouse gas emissions from OECD countries in comparison to 1990 emissions. The effect of the President's proposal is strongly dependent on whether the US and others are taking part in the Kyoto Protocol (see in more detail part III). Without any regulation, business as usual emissions in 2008-2012 are expected to be 14% to +21% higher than 1990<sup>7</sup>.

The upward shift of OECD allowed emissions due to sinks can be ascribed to (see Table 6 and Table 7):

- Art. 3.4 LULUCF activities: +2.2% to +2.5% of 1990 emissions,
- Art. 3.3 ARD activities: -0.2% of 1990 emissions,
- LULUCF activities under Art. 6 (JI) and Art. 12 (CDM) up to the cap on LULUCF: +1.1% to +1.4% of 1990 emissions.

Without any additional efforts, fossil fuel and other industrial GHG emissions of OECD countries are expected to rise +14% and +21% for 2008-2012 above 1990 levels (see Table 2). These are "business as usual" (BAU) emission projections for OECD countries based on the 2<sup>nd</sup> National Communications to the UNFCCC and the International Energy Outlook (2000), respectively<sup>8</sup>.

<sup>7</sup> These so-called "Business as usual" projections are based on the 2<sup>nd</sup> National Communications and IEO (2000) respectively.

<sup>8</sup> see Appendix "Data Sources" for more information.

Thus, the required emission reductions which are to be undertaken by OECD countries in order to close the gap between BAU-projections and targets are significantly decreased under the President's proposal. Whereas the Kyoto Protocol required<sup>9</sup> an emission reduction of 20% to 27% below BAU-levels, the President's proposal results in 15% to 22% reductions below BAU when only sinks are counted (Table 2) and 8.6% to 13% below when both sinks and "Hot Air"<sup>10</sup> are counted. For the cases where the US only or the US, Canada and Australia drop out of the Kyoto Protocol, the required emissions reductions of OECD countries are *completely nullified* by the loopholes "Hot Air" and "sinks" (see part III).

### 3. Country by Country

The following table (Table 1) offers a concise overview over individual countries' emission reduction targets and how they are effectively changed from the Kyoto Protocol as adopted in 1997 to the President's text today. The President's proposal (column H) is compared to the Kyoto targets without Hot Air and sinks (but including Art. 3.5, 3.7 and 3.8) (columns C to E).

As a guidance to the effectiveness of the emission reduction targets, they are contrasted with two different business as usual emission projections. The gap between BAU emissions and "new targets" is an indicator as to whether a country has to undertake real emission reduction efforts (see Table 2). For example, the projections for Australia given in its 2<sup>nd</sup> National Communications indicates that it may not have to undertake any emission reductions due to its use of the Art. 3.7 loophole: the gap between its allowed emissions (163 MtC/year) and "BAU emissions (2<sup>nd</sup> NC)" (148 MtC/year) is positive (14 MtC/year<sup>11</sup>).

The countries with economies in transition (EIT) might have "surplus emission reductions" of 226 to 324 MtC/year, whereas all other country groups (including Annex B countries as a whole) will need to undertake additional emission reductions below BAU-projections and beyond accounting for sinks up to the proposed LULUCF-cap (e.g. -531 to -784 MtC/year for the OECD with US, Canada and the US) (see Table 2).

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<sup>9</sup>The calculation here refers to an estimate of the effect of the Kyoto Protocol without sinks and "Hot Air", but including the effects Art. 3.5, 3.7, and 3.8. Whilst Article 3.3 is in effect in the same category of these provisions in being adopted at Kyoto, the substantial uncertainty surrounding the effect of definitions associated with this article and linkages with Article 3.4 has meant that in this analysis we have separated an estimation of Article 3.3 effects from the estimated effects of Art. 3.5, 3.7, and 3.8.

<sup>10</sup> The values -8.6% to -13% are obtained by subtracting "Hot Air" of 6.4% (scenario 2<sup>nd</sup> Nat. Com.) or 8.98% (scenario IEO, 2000 - see Table 9 a.) from the aforementioned emission reductions "after sinks" (-15% to -22%).

<sup>11</sup> see Table 2, row Australia, column G.

Column code (calculation)	Kyoto Protocol as in 1997				President's text				
	1990 emissions <sup>a</sup>	base year emissions	Kyoto targets (with EU Burden Sharing) <sup>b</sup>		Assigned Amounts	TOTAL LULUCF (Art. 3.3, Art. 3.4, Art. 6 and 12) <sup>d</sup>		"New Targets"	
	A	B	C % of base year	D=C*B/A % of 1990	E=C*B GgC/year	F GgC/year	G=F/A % of 1990	H=F+E GgC/year	I=H/A % of 1990
Annex I Parties	GgC/year	GgC/year	% of base year	% of 1990	GgC/year	GgC/year	% of 1990	GgC/year	% of 1990
Australia	115,428	148,208 <sup>e</sup>	108.0%	138.7%	160,064	2,845	2.5%	162,910	141.1%
Austria	20,578	20,578	87.0%	87.0%	17,903	823	4.0%	18,726	91.0%
Belgium	37,217	37,217	92.5%	92.5%	34,426	1,489	4.0%	35,915	96.5%
Bulgaria	37,532	42,813	92.0%	104.9%	39,388	1,713	4.6%	41,100	109.5%
Canada	166,846	166,846	94.0%	94.0%	156,836	5,005	3.0%	161,841	97.0%
Czech Republic	51,774	51,774	92.0%	92.0%	47,632	2,071	4.0%	49,703	96.0%
Denmark	18,973	19,039	79.0%	79.3%	15,041	856	4.5%	15,897	83.8%
Estonia	11,105	11,105	92.0%	92.0%	10,217	444	4.0%	10,661	96.0%
Finland	20,510	20,510	100.0%	100.0%	20,510	820	4.0%	21,330	104.0%
France	151,030	151,030	100.0%	100.0%	151,030	8,493	5.6%	159,523	105.6%
Germany	329,675	330,276	79.0%	79.1%	260,918	13,211	4.0%	274,129	83.2%
Greece	28,731	29,284	125.0%	127.4%	36,605	1,171	4.1%	37,776	131.5%
Hungary	23,599	27,723	94.0%	110.4%	26,059	832	3.5%	26,891	114.0%
Iceland	703	703	110.0%	110.0%	773	42	5.9%	814	115.9%
Ireland	14,590	14,590	113.0%	113.0%	16,487	1,498	10.3%	17,985	123.3%
Italy	141,410	141,693	93.5%	93.7%	132,483	6,141	4.3%	138,624	98.0%
Japan	330,890	340,937	94.0%	96.9%	320,481	10,228	3.1%	330,709	99.9%
Latvia	9,728	9,728	92.0%	92.0%	8,950	389	4.0%	9,339	96.0%
Liechtenstein	71	71	92.0%	92.0%	65	3	4.0%	68	96.0%
Lithuania	14,059	14,059	92.0%	92.0%	12,934	562	4.0%	13,496	96.0%
Luxembourg	3,668	3,668	72.0%	72.0%	2,641	147	4.0%	2,787	76.0%
Monaco	30	30	92.0%	92.0%	28	1	4.0%	29	96.0%
Netherlands	59,422	59,773	94.0%	94.6%	56,186	2,427	4.1%	58,613	98.6%
NewZealand	19,928	19,928	100.0%	100.0%	19,928	8,214	41.2%	28,142	141.2%
Norway	14,220	14,220	101.0%	101.0%	14,362	374	2.6%	14,736	103.6%
Poland	125,195	153,896	94.0%	115.5%	144,662	4,617	3.7%	149,279	119.2%
Portugal	17,416	17,416	127.0%	127.0%	22,118	697	4.0%	22,815	131.0%
Romania	62,508	72,214	92.0%	106.3%	66,436	2,889	4.6%	69,325	110.9%
Russian Federation	829,108	829,108	100.0%	100.0%	829,108	20,728	2.5%	849,836	102.5%
Slovakia	20,810	20,810	92.0%	92.0%	19,145	832	4.0%	19,978	96.0%
Slovenia	5,231	5,231	92.0%	92.0%	4,813	209	4.0%	5,022	96.0%
Spain	83,385	84,125	125.0%	126.1%	105,156	3,365	4.0%	108,521	130.1%
Sweden	18,927	19,250	104.0%	105.8%	20,020	770	4.1%	20,790	109.8%
Switzerland	14,456	14,456	92.0%	92.0%	13,299	578	4.0%	13,878	96.0%
Ukraine	250,696	250,696	100.0%	100.0%	250,696	6,267	2.5%	256,964	102.5%
United Kingdom	202,224	203,057	87.5%	87.9%	177,675	8,684	4.3%	186,359	92.2%
United States	1,649,669	1,655,380	93.0%	93.3%	1,539,504	57,938	3.5%	1,597,442	96.8%
Country groups									
OECD	3,535,267	3,591,680	93.8%	95.3%	3,368,137	138,719	3.9%	3,506,857	99.2%
EU <sup>c</sup>	1,147,755	1,151,506	92.9% <sup>c</sup>	93.2% <sup>c</sup>	1,069,199	50,592	4.4%	1,119,791	97.6%
EIT	1,441,344	1,489,156	98.0%	101.3%	1,460,040	41,553	2.9%	1,501,593	104.2%
NON-EIT	3,459,996	3,512,285	93.8%	95.2%	3,294,539	135,821	3.9%	3,430,360	99.1%
TOTAL (Annex1)	4,901,340	5,001,441	95.1%	97.0%	4,754,580	177,374	3.6%	4,931,953	100.6%

Table 1. The "New Targets" compared to the Kyoto targets<sup>12</sup>.

<sup>12</sup> The calculations are mostly based on officially reported data to the UNFCCC. Note that high uncertainties exist regarding the potential Art. 3.3 and Art. 3.4 credits, with Art. 3.3 credits being particularly critical as they could inflate the countries' targets further.

Description	Kyoto Protocol targets		New Targets		BAU projections I (2nd NC)		GAP I		BAU projections II (IEO 2000)		GAP II	
	Kyoto Protocol Targets (including the effect of loopholes under Art. 3.5, 3.7 and 3.8) (Assigned Amounts AA)	New Targets implied by the President's text (19 <sup>th</sup> June 2001) due to the inclusion of sinks under Art. 3.3/3.4, Art. 6 and Art. 12	Business as usual emission projections based on 2 <sup>nd</sup> National Communications	Reduction Effort ("more emission reduction needed" (-); "surplus reductions" (+))	Business as usual emission projections based on International Energy Outlook (2000)	Reduction Effort ("more emission reduction needed" (-); "surplus reductions" (+))						
Column code	A	B=A/1990	C	D=C/1990	E	F=E/1990	G=C-E	H=G/1990	I	J=I/1990	K=C-I	L=K/1990
	GgC/year	% of 1990	GgC/year	% of 1990	GgC/year	% of 1990	GgC/year	% of 1990	GgC/year	% of 1990	GgC/year	% of 1990
Australia	160,064	138.7%	162,910	141.1%	148,519	128.7%	14,391	12.5%	169,965	147.2%	-7,055	-6.1%
Austria	17,903	87.0%	18,726	91.0%	22,802	110.8%	-4,076	-19.8%	21,986	106.8%	-3,260	-15.8%
Belgium	34,426	92.5%	35,915	96.5%	43,191	116.1%	-7,277	-19.6%	40,090	107.7%	-4,175	-11.2%
Bulgaria	39,388	104.9%	41,100	109.5%	29,864	79.6%	11,236	29.9%	37,374	99.6%	3,727	9.9%
Canada	156,836	94.0%	161,841	97.0%	197,116	118.1%	-35,275	-21.1%	205,880	123.4%	-44,039	-26.4%
Czech Republic	47,632	92.0%	49,703	96.0%	51,954	100.3%	-2,252	-4.3%	47,322	91.4%	2,381	4.6%
Denmark	15,041	79.3%	15,897	83.8%	14,562	76.8%	1,336	7.0%	20,433	107.7%	-4,535	-23.9%
Estonia	10,217	92.0%	10,661	96.0%	5,443	49.0%	5,218	47.0%	8,059	72.6%	2,602	23.4%
Finland	20,510	100.0%	21,330	104.0%	21,799	106.3%	-469	-2.3%	22,115	107.8%	-785	-3.8%
France	151,030	100.0%	159,523	105.6%	151,622	100.4%	7,902	5.2%	162,074	107.3%	-2,551	-1.7%
Germany	260,918	79.1%	274,129	83.2%	266,795	80.9%	7,333	2.2%	354,326	107.5%	-80,197	-24.3%
Greece	36,605	127.4%	37,776	131.5%	41,085	143.0%	-3,308	-11.5%	31,047	108.1%	6,730	23.4%
Hungary	26,059	110.4%	26,891	114.0%	25,760	109.2%	1,131	4.8%	21,928	92.9%	4,963	21.0%
Iceland	773	110.0%	814	115.9%	878	125.0%	-64	-9.1%	828	117.9%	-14	-2.0%
Ireland	16,487	113.0%	17,985	123.3%	17,051	116.9%	934	6.4%	15,352	105.2%	2,633	18.0%
Italy	132,483	93.7%	138,624	98.0%	159,386	112.7%	-20,762	-14.7%	152,383	107.8%	-13,759	-9.7%
Japan	320,481	96.9%	330,709	99.9%	395,941	119.7%	-65,231	-19.7%	412,860	124.8%	-82,151	-24.8%
Latvia	8,950	92.0%	9,339	96.0%	5,473	56.3%	3,866	39.7%	7,795	80.1%	1,543	15.9%
Liechtenstein	65	92.0%	68	96.0%	71	100.0%	-3	-4.0%	67	94.6%	1	1.4%
Lithuania	12,934	92.0%	13,496	96.0%	7,849	55.8%	5,647	40.2%	10,959	78.0%	2,537	18.0%
Luxembourg	2,641	72.0%	2,787	76.0%	2,193	59.8%	594	16.2%	4,005	109.2%	-1,217	-33.2%
Monaco	28	92.0%	29	96.0%	39	127.9%	-10	-31.9%	32	105.8%	-3	-9.8%
Netherlands	56,186	94.6%	58,613	98.6%	62,703	105.5%	-4,090	-6.9%	64,523	108.6%	-5,910	-9.9%
NewZealand	19,928	100.0%	28,142	141.2%	21,803	109.4%	6,339	31.8%	23,489	117.9%	4,653	23.3%
Norway	14,362	101.0%	14,736	103.6%	16,593	116.7%	-1,857	-13.1%	17,099	120.2%	-2,363	-16.6%
Poland	144,662	115.5%	149,279	119.2%	136,663	109.2%	12,616	10.1%	116,259	92.9%	33,020	26.4%
Portugal	22,118	127.0%	22,815	131.0%	24,311	139.6%	-1,497	-8.6%	18,374	105.5%	4,440	25.5%
Romania	66,436	106.3%	69,325	110.9%	55,673	89.1%	13,652	21.8%	59,633	95.4%	9,692	15.5%
Russian Federation	829,108	100.0%	849,836	102.5%	729,615	88.0%	120,221	14.5%	646,269	77.9%	203,566	24.6%
Slovakia	19,145	92.0%	19,978	96.0%	19,076	91.7%	902	4.3%	19,346	93.0%	631	3.0%
Slovenia	4,813	92.0%	5,022	96.0%	4,795	91.7%	227	4.3%	5,033	96.2%	-11	-0.2%
Spain	105,156	126.1%	108,521	130.1%	100,151	120.1%	8,370	10.0%	90,005	107.9%	18,516	22.2%
Sweden	20,020	105.8%	20,790	109.8%	20,805	109.9%	-15	-0.1%	20,675	109.2%	115	0.6%
Switzerland	13,299	92.0%	13,878	96.0%	13,794	95.4%	84	0.6%	17,955	124.2%	-4,077	-28.2%
Ukraine	250,696	100.0%	256,964	102.5%	203,390	81.1%	53,573	21.4%	196,814	78.5%	60,149	24.0%
United Kingdom	177,675	87.9%	186,359	92.2%	190,036	94.0%	-3,677	-1.8%	219,517	108.6%	-33,158	-16.4%
United States	1,539,504	93.3%	1,597,442	96.8%	2,027,957	122.9%	-430,515	-26.1%	2,137,016	129.5%	-539,574	-32.7%
Country groups												
OECD	3,368,137	95.3%	3,506,857	99.2%	4,038,807	114.2%	-531,950	-15.0%	4,291,248	121.4%	-784,391	-22.2%
EU	1,069,199	93.2%	1,119,791	97.6%	1,138,492	99.2%	-18,701	-1.6%	1,236,905	107.8%	-117,114	-10.2%
EIT	1,460,040	101.3%	1,501,593	104.2%	1,275,556	88.5%	226,037	15.7%	1,176,793	81.6%	324,800	22.5%
NON-EIT	3,294,539	95.2%	3,430,360	99.1%	3,961,202	114.5%	-530,842	-15.3%	4,222,097	122.0%	-791,737	-22.9%
TOTAL (Annex1)	4,754,580	97.0%	4,931,953	100.6%	5,236,758	106.8%	-304,805	-6.2%	5,398,890	110.2%	-466,937	-9.5%

Table 2. New emission reduction targets according the President's text proposal and gaps to BAU emission projections.

## Annotations to Table 1.

<sup>a</sup> 1990 emissions are Kyoto Protocol Annex A emissions: Aggregated emissions of all greenhouse gases *excluding* emissions and removals from Land Use, Land Use Change and Forestry as given in FCCC/SBI/2000/11 Table A1.

<sup>b</sup> Kyoto targets (including EU Burden Sharing): Note that the legal Kyoto emission targets (Assigned Amounts) are calculated by multiplying the percentage targets as given in Annex B of the Kyoto Protocol with the country's base year emissions, not 1990 emissions. The difference between base year emissions and 1990 emissions is due to Art. 3.8, Art. 3.7 and 3.5 of the Kyoto Protocol. Art. 3.8 allows countries to use 1995 emissions for HFCs, PFCs and SF6 as base year instead of 1995. Art. 3.7 allows some countries (basically only Australia) to include Land Use Change emissions in the base year and Art. 3.5 allows countries with economies in transition to use years prior to 1990 as base year. Art. 3.5, 3.7 and 3.8 are often labelled as "already adopted loopholes", since they cause a relaxation of emission reduction targets.

<sup>c</sup> Based on the most recent emission inventories the EU member state "burden sharing" targets do not sum up to -8%, which is the target each of the member states has in Annex B of the Protocol. Although the nominal Kyoto Protocol emission reduction target for the EU is -8% (Annex B), the sum of the burden sharing targets seems to be only -7.1% relative to the base year and -6.8% relative to 1990 emission (calculated by using the EU Burden Sharing Agreement and base year emissions according to the latest submissions to the UNFCCC, e.g. as given in FCCC/SBI/2000/11). In other words, whereas the legal EU target is to reduce its emissions 8% below the base year, the current EU Burden Sharing targets seem only to deliver -7.1%. It might be that this gap is caused by revised emission inventories subsequent to the latest EU Burden Sharing Agreement, so that the share of 1990 emissions caused by EU countries with Burden Sharing targets smaller than 8% was found to be less than assumed in earlier emission inventories. The EU will need to adjust the burden sharing regime to ensure that its overall target equals or exceeds the legal Kyoto Protocol targets.

<sup>d</sup> Total LULUCF credits are identical for the "high and low" scenario for Art. 3.4 (as given in Table 4 and Table 5), due to the "boundary condition". This analysis used one dataset on Art. 3.3 credits in both scenarios. Only for Australia and Austria Total LULUCF credits differ in the high and low case since their "forest management" activities are - according to the low dataset - not sufficient to offset their debit under Art. 3.3.

<sup>e</sup> The Australian base year emissions are subject to ongoing debate due to major uncertainties as to whether and how Art. 3.7 applies (see e.g. Greenpeace background paper "Full Reporting from Australia under Art. 3.7 needed" (November, 2000)). The accompanying tables to CoP-6 President's informal paper of April 2001 indicate base year emissions of 134.54 MtC/year for Australia in contrast to the 148.28 MtC/year assumed here. Assuming 1990 emissions of 115.42 MtC/year (FCCC/SBSTA/2000/11 Table A1), the President's table seems to assume "land use change and forestry" emissions  $134 - 115 = 19$  MtC/year as the amount that Australia is allowed to add to its base year emissions. The relevant section of Art. 3.7 states however, that the country is allowed to include its "land use change" emissions (not "land use change and forestry"), which are reported under the category "forest and grassland conversion" in the UNFCCC-GHG online database (<http://ghg.unfccc.int/>) with 33 MtC/year for Australia for 1990. Consequently, this analysis here assumes  $115 + 33 = 148$  MtC/year (=148 000 GgC/year) as Australia's base year emissions.

## Part II: Loopholes in Detail

### 4. The Sinks loophole

The inclusion of sinks, which means the allowance to offset fossil fuel and other industrial GHG emissions by biotic sequestration, is a major loophole and undermines the potential effectiveness of the Kyoto Protocol in its ambition of being a small, but first, step towards dramatically reduced fossil fuel emissions of the order of -80%. Such deep cuts in fossil fuel emissions are necessary in the coming decades if a stabilisation of CO<sub>2</sub>-concentrations at "safe levels" is to be achieved. Any deferral of innovations in the energy technology and efficiency sector due to the inclusion of sinks makes the common goal of a future without drastic climate change even more difficult and expensive to achieve. Going into details of the potentially serious flaws of biotic carbon sequestration as a matter to offset fossil fuel emissions, such as permanence, leakage, effect on biodiversity, additionality etc. is beyond the scope of this paper<sup>13</sup>. The following paragraphs provide a quantitative analysis of how much sinks may be included if the President's text of the 19<sup>th</sup> of June was to be adopted.

#### Three main sink categories

Sinks in the new President's text can be categorised into three main areas:

1) *Art. 3.3, first tier of Art. 3.4:*

Under Art. 3.3, emissions and "emission removals" from Afforestation, Reforestation and Deforestation (ARD) activities under IPCC Definitions will be counted towards the countries' target (Assigned Amount). Any potential net-emissions, which might accrue from higher deforestation than afforestation, are offset by the "first tier" of Art. 3.4. The "first tier" of Article 3.4 allows countries to count emission removals from forest management without discount up to the

height of the debit under Art. 3.3<sup>14</sup>. In effect, these regulations mean that countries that get net-credits under Art. 3.3 can use these, and all other countries can set their net debits equal to zero.

2) *"second and third tier" of Art. 3.4 and "extra-sink-allowance" for Japan:*

The "tier approach" under Art. 3.4 divides "additional sink activities", namely forest management, and agricultural management into three "tiers". The "first tier" cancels off any debits under Art. 3.3 (see category 1 above). The "second tier" allows countries to use the rest of "forest management" (which was not used by the "first tier") after being discounted by 85%. The "third tier" proposes full accounting of any sequestration or emission due to cropland management, grazing-land management and revegetation. Note that the inclusion of "revegetation" would urgently require the inclusion of its accompanying process "de-vegetation". Accounting for the sinks due to "revegetation", but not considering re-emissions due to "de-vegetation" is unbalanced accounting – and similar to the effect that FAO definitions under Art. 3.3 would have had.

Furthermore, the President's proposal includes a special allowance for Japan to account for "forest management" sinks without discounting up to 13 MtC/year in the "second tier".

3) *LULUCF under Art. 6 (JI) and Art. 12 (CDM):*

Countries are allowed to acquire additional credits from LULUCF activities under Art. 6 and Art. 12 provided that the sum of credits under the "second and third tier" of Art. 3.4 and Art. 6/Art. 12 does not exceed the proposed "boundary condition". Under Art. 12, the eligible LULUCF activities are proposed to be afforestation and reforestation.

<sup>13</sup> See for example on the issue of permanence the policy paper by Bill Hare and Malte Meinshausen (2000)

"Temporary sinks do not cause permanent climatic benefits", available at [www.carbonsinks.de](http://www.carbonsinks.de)

<sup>14</sup> The proposed cap of 9MtC/year on the first tier of Art. 3.4 does not seem to be filled by any country, assuming the data sets used here for Art. 3.4 "Forest management".

According to the IPCC Special Report on Land Use, Land Use Change and Forestry (2000), the potential for afforestation and reforestation credits is very large (170 to 415 MtC/year)<sup>15</sup>.

Thus, there are two strong reasons why the amount of LULUCF credits, which is allowed to be bought from CDM projects, will actually be bought. First, the "boundary condition" for all sinks (except Art. 3.3) is relatively small (165 MtC/year – see Table 4) in comparison to the Afforestation and Reforestation potential under Art. 12 (170 to 415 MtC/year). Secondly, the price of sink-credits, particularly in an emission trading market without the US, can be assumed to be very low.

### The "Boundary Condition" on sinks

The "Consolidated negotiation text proposed by the President" includes a cap ("boundary condition") on LULUCF-credits, which stems from the "second and third tier" of Art. 3.4, and from Art. 6 or 12. The "boundary condition" (in GgC/year) for countries with emission reduction targets below 100% (as given in Annex B of the Kyoto Protocol<sup>15</sup>) is calculated as:  $0.5 \times ((100 - \text{QELRC}) / 100) \times \text{base year emissions}$  (GgC/year). The LULUCF "boundary condition" for countries with emission reduction targets above 100% is 2.5% of the base year emissions (see FCCC/CP/2001/2/Add.3/Rev.1, p.8).

Such a "boundary condition" effectively halves the fossil fuel and other industrial GHG emission reduction targets. In addition to this, credits from Art. 3.3 could well inflate the targets much more. Of particular concern is the unknown extent of potential Art. 3.3 afforestation, reforestation and deforestation data and projections for Russia, which have not been reported (see below).

The "boundary condition" on Art. 3.4 credits has the positive effect that the absolute amount of allowed LULUCF credits is rather insensitive to variations in Art. 3.4 activities, as long as the sinks "forest management" can offset any Art. 3.3 debit. Using the "high and low" estimates underlying this study, "forest

management" can offset Art. 3.3 debits in the case of all countries except Australia and Austria.

If a "boundary condition" were applied to all sinks (including Art. 3.3), as proposed by earlier texts from the President (see FCCC/CP/2001/2/Add.3), it would be possible to be sure that the sink credits would be contained within any overall limit set. Thus, the following two points are essential for the effectiveness of the Kyoto Protocol:

#### *"Boundary condition" on Art. 3.3 needed*

Whereas Art. 3.3 credits were under the all-encompassing "boundary condition" for LULUCF credits (Art. 3.3, 3.4, 6 and 12) in the President's proposal dated 11<sup>th</sup> June, the current proposal, dated 19<sup>th</sup> June, does not include Art. 3.3 credits in the cap on LULUCF. This omission could further weaken the effectiveness of the Kyoto Protocol, since countries with net credits under Art. 3.3 would be allowed to emit significantly more fossil fuel and other industrial GHG emissions, e.g. Iceland's target increases by +8.4%, Ireland +6.3%, New Zealand +40% relative to 1990 emissions). This exemption could be disastrous in the light of tremendous uncertainties regarding potential Art. 3.3 credits from Russia and other countries for whom little or no reliable data on afforestation, reforestation and deforestation (ARD) exists in the public domain.

#### *Permanent "Boundary condition" needed*

The President's proposal limits the "boundary condition" to "the first commitment period"<sup>16</sup>. Recognizing the fact that biotic carbon sequestration comes with a large natural variability, omitting a "boundary condition" on sinks in for future commitment periods is likely to render the Kyoto Protocol unverifiable and not enforceable. Thus, a "boundary condition" for sinks in all subsequent commitment periods at the lowest level is urgently needed.

<sup>15</sup> see e.g. Summary for Policy Makers, IPCC Special Report LULUCF, Table 3

<sup>15</sup> Not taking into account the EU Burden Sharing Agreement targets.

<sup>16</sup> see FCCC/CP/2001/2/Rev.1, paragraph 23 (f)

### The big unknown - Russian Art. 3.3

There is no official data available for Russian afforestation, reforestation and deforestation under Art. 3.3. However, Russian credits for ARD could have a large impact on the overall effect of the Kyoto Protocol, since the volume could be very large. Numbers circulating at CoP-6 indicated this.

The following rough estimation of potential Art. 3.3 credits for Russia sheds some light on the scale of the problem. The following "back of an envelope" order of magnitude calculation has been done because of the lack of published data on Russian ARD.

Assuming that deforestation can be roughly estimated by adding medium "harvest" and "forest products" projections, as given in IIASA (2000)<sup>17</sup>, deforestation in 2010 can roughly be quantified as 57 to 63 MtC/year. It is further assumed, that the accountable carbon flux due to afforestation/ reforestation under Art. 3.3 is rather higher than lower in relation to deforestation, since the overall forest carbon stock is growing significantly<sup>18</sup>. Thus, net credits due to afforestation/reforestation and deforestation could be of the same order of approximately magnitude (0 to 60MtC/year).

60MtC/year is equivalent to 7.2% of Russian non-LULUCF emissions in 1990. Assuming that equivalently more "Hot Air" will enter the OECD-market, this translates into 1.7% of 1990 OECD emissions or 3.7%, in the case that the US, Canada and Australia drop out of the Kyoto Protocol. In relation to all Annex B countries, these 60MtC/year translate into 1.2% of 1990 emissions. Note that Russian Art. 3.3 credits were – in absence of any reliable data –

assumed to be zero in the calculations of this study, causing all results to be estimates on the low side of potential loopholes.

Acknowledging the fact that reliable data on potential Russian Art. 3.3 credits will not be generated in the near future and recognizing its potentially high impact on the overall emission reduction achievements, it is urgently required that Art. 3.3 be placed within any overall boundary condition on LULUCF set at the lowest possible level.

### Quantitative Results

Potential sink credits for all Annex B countries would sum up to an equivalent of 3.6% of Annex B emissions in 1990 (see Table 3). The US would get the most LULUCF credit allowances (57 MtC/year; rank 1), which would be equivalent to 3.5% of the US's non-LULUCF emissions in 1990 (rank 33). Calculating the sink credits per capita, New Zealand is the indisputable leader of the list (2,146 kgC/year; rank 1) due to the vast amount of credits gained under Art. 3.3 (see all rankings in Table 3).

The different sorts of sink credits for each country are calculated with two different underlying data sets about Art. 3.4 activities in each country (see Table 4, Table 5, Table 6, Table 7). The low scenario is purely based on data reported by countries in their August 1 submissions<sup>19</sup>. The high scenario uses, in addition, past inventory data on forest management and independent projections for agricultural management – mainly to fill the gaps of not reported data in the low scenario (see Appendix "Data sources").

<sup>17</sup> see Table A. 6.11 in Sten Nilsson, Anatoly Shvidenko, Vladimir Stolbovoi, Michael Gluck, Matthias Jonas, Michael Obersteiner, )IIASA report IR-00-021 "Full Carbon Account for Russia".

<sup>18</sup> The IIASA report (2000: Table55) projects the total Russian forest carbon stock increases from 32,861 TgC (1990) to 34,640 TgC (2010 low scenario) up to 36.010 TgC (2010 high scenario). Assuming a linear annual increase of forest carbon stock, this annual carbon uptake by Russian forests is equivalent to 10% to 19% of Russian 1990 emissions or 1.8% to 3.2% of all Annex B emissions in 1990. In other words, if the net carbon uptake by Russian forests could be used towards the Kyoto targets, Annex B countries

were allowed to emit 3.2% more fossil fuel and other industrial GHG emissions.

<sup>19</sup> see FCCC/SBSTA/2000/9/Add.1

	Total LULUCF credits			Total LULUCF credits per capita			
	GgC/year	RANK	% of 1990	RANK	kgC/ person	% of average	RANK
UnitedStates	57,938	1	3.5%	32	210	135%	5
EU	50,592	2	4.4%	8	135	87%	22
RussianFederation	20,728	3	2.5%	36	141	91%	21
Germany	13,211	4	4.0%	15	161	104%	11
Japan	10,228	5	3.1%	33	81	52%	35
UnitedKingdom	8,684	6	4.3%	10	147	95%	18
France	8,493	7	5.6%	4	144	93%	20
NewZealand	8,214	8	41.2%	1	2,146	1386%	1
Ukraine	6,267	9	2.5%	37	124	80%	24
Italy	6,141	10	4.3%	9	107	69%	27
Canada	5,005	11	3.0%	34	162	105%	9
Poland	4,617	12	3.7%	30	119	77%	25
Spain	3,365	13	4.0%	14	85	55%	32
Romania	2,889	14	4.6%	5	129	83%	23
Australia	2,845	15	2.5%	38	152	98%	16
Netherlands	2,427	16	4.1%	11	154	100%	14
CzechRepublic	2,071	17	4.0%	18	202	130%	7
Bulgaria	1,713	18	4.6%	6	207	134%	6
Ireland	1,498	19	10.3%	2	404	261%	2
Belgium	1,489	20	4.0%	17	147	95%	19
Greece	1,171	21	4.1%	12	110	71%	26
Denmark	856	22	4.5%	7	162	105%	10
Slovakia	832	23	4.0%	27	155	100%	13
Hungary	832	24	3.5%	31	83	53%	34
Austria	823	25	4.0%	16	101	65%	29
Finland	820	26	4.0%	20	159	103%	12
Sweden	770	27	4.1%	13	87	56%	31
Portugal	697	28	4.0%	26	71	46%	37
Switzerland	578	29	4.0%	29	79	51%	36
Lithuania	562	30	4.0%	23	153	99%	15
Estonia	444	31	4.0%	19	315	203%	4
Latvia	389	32	4.0%	21	163	105%	8
Norway	374	33	2.6%	35	84	54%	33
Slovenia	209	34	4.0%	28	105	68%	28
Luxembourg	147	35	4.0%	24	344	222%	3
Iceland	42	36	5.9%	3	149	96%	17
Liechtenstein	3	37	4.0%	22	89	57%	30
Monaco	1	38	4.0%	25	37	24%	38
Country groups							
OECD	138,719		3.9%		161	104%	
EU	50,592		4.4%		135	87%	
EIT	41,553		2.9%		137	89%	
NON-EIT	135,821		3.9%		161	104%	
Annex1	177,374		3.6%		155	100%	

Table 3 – Total LULUCF credits (Art. 3.3, Art. 3.4, Art. 6 and Art. 12) and total LULUCF credits per capita. Ranking according to absolute amount of potential LULUCF credits, the share of the country's 1990 emissions and LULUCF credits per capita. \*Note that the EU is listed as a whole and as its member countries.

LOW SCENARIO	Art. 3.3	Art. 3.4 (without boundary condition)						Art. 3.4 "second and third tier"	Art. 3.3 & Art. 3.4 sinks	allowances to buy sinks under Art. 6 and Art. 12	Total Sinks	
		first tier		second tier	third tier	without bound. c.	"boundary condition" <sup>20</sup>					with bound. condition
		column code	A	B	C	D	E=C+D					F
	GgC/year	GgC/year	GgC/year	GgC/year	GgC/year	GgC/year	% of b.c.	GgC/year	GgC/year	GgC/year	GgC/year	
Australia	-6,800 <sup>a</sup>	-	-	2,181	2,181	3,705	59%	2,181	-4,619	1,524	-3,095	
Austria	-205	-	-	-	-	823	0%	-	-205	823	619	
Belgium	-	-	-	-	-	1,489	0%	-	-	1,489	1,489	
Bulgaria	-	-	-	-	-	1,713	0%	-	-	1,713	1,713	
Canada	-4,300	4,300	795	4,126	4,921	5,005	98%	4,921	4,921	84	5,005	
Czech Republic	-	-	-	-	-	2,071	0%	-	-	2,071	2,071	
Denmark	95	-	-	-	-	762	0%	-	95	762	856	
Estonia	-	-	-	-	-	444	0%	-	-	444	444	
Finland	-278	278	288	-	288	820	35%	288	288	532	820	
France	2,452	-	389	107	496	6,041	8%	496	2,948	5,545	8,493	
Germany	-140	140	1,247	-	1,247	13,211	9%	1,247	1,247	11,964	13,211	
Greece	-	-	-	-	-	1,171	0%	-	-	1,171	1,171	
Hungary	-	-	-	-	-	832	0%	-	-	832	832	
Iceland	24	-	-	53	53	18	299%	18	42	-	42	
Ireland	915	-	-	-	-	584	0%	-	915	584	1,498	
Italy	473	-	-	-	-	5,668	0%	-	473	5,668	6,141	
Japan	-747	747	12,253	76	12,328	10,228	121%	10,228	10,228	-	10,228	
Latvia	-	-	-	-	-	389	0%	-	-	389	389	
Liechtenstein	-	-	-	-	-	3	0%	-	-	3	3	
Lithuania	-	-	-	-	-	562	0%	-	-	562	562	
Luxembourg	-	-	-	-	-	147	0%	-	-	147	147	
Monaco	-	-	-	-	-	1	0%	-	-	1	1	
Netherlands	36	-	5	-	5	2,391	0%	5	41	2,386	2,427	
New Zealand	7,716	-	-	-	-	498	0%	-	7,716	498	8,214	
Norway	18	-	-	37	37	356	10%	37	55	318	374	
Poland	-	-	-	-	-	4,617	0%	-	-	4,617	4,617	
Portugal	-	-	-	-	-	697	0%	-	-	697	697	
Romania	-	-	-	-	-	2,889	0%	-	-	2,889	2,889	
Russian Federation	-	-	20,618	3,611	24,230	20,728	117%	20,728	20,728	-	20,728	
Slovakia	-	-	-	-	-	832	0%	-	-	832	832	
Slovenia	-	-	-	-	-	209	0%	-	-	209	209	
Spain	-	-	-	-	-	3,365	0%	-	-	3,365	3,365	
Sweden	-90	90	670	-	670	770	87%	670	670	100	770	
Switzerland	-11	11	42	11	53	578	9%	53	53	525	578	
Ukraine	-	-	-	-	-	6,267	0%	-	-	6,267	6,267	
United Kingdom	561	-	368	251	619	8,122	8%	619	1,180	7,503	8,684	
United States	-7,200	7,200	42,219	23,822	66,041	57,938	114%	57,938	57,938	-	57,938	
Country groups												
OECD	-7,481	12,766	58,276	30,663	88,939	127,289	70%	78,701	83,986	48,588	132,574	
EU	3,819	508	2,967	358	3,325	46,060	7%	3,325	7,652	42,735	50,387	
EIT	-	-	20,618	3,611	24,230	41,553	58%	20,728	20,728	20,825	41,553	
NON-EIT	-7,481	12,766	58,276	30,663	88,939	124,391	71%	78,701	83,986	45,689	129,676	
Annex1	-7,481	12,766	78,894	34,275	113,169	165,944	68%	99,429	104,714	66,515	171,229	

Table 4. Low scenario for LULUCF credits under Art. 3.3, Art. 3.4, Art. 6 and 12. This scenario is based on August 1 submissions. Note that several countries did not report data, which is – under the current negotiation proposal – particularly critical under for potential credits under Art. 3.3, e.g. ARD under Art. 3.3 for Russia.

<sup>20</sup> Note that the LULUCF cap in the President's proposal is given relative to *base year emissions* (cp. FCCC/CP/2001/2/Add.3, p.8), not 1990 emissions. Thus, for countries with base year emissions higher than 1990 emissions (Art. 3.5, 3.7, 3.8), the LULUCF "boundary condition" is higher than would be if related to 1990 emissions.

HIGH SCENARIO	Art. 3.3	Art. 3.4 (without boundary condition)						Art. 3.4 "second and third tier"	Art. 3.3 & Art. 3.4 sinks	allowances to buy sinks under Art. 6 and Art. 12	Total Sinks	
		first tier		second tier	third tier	without bound. c.	"boundary condition"					with bound. condition
		column code	A	B	C	D	E=C+D					F
	GgC/year	GgC/year	GgC/year	GgC/year	GgC/year	GgC/year	% of b.c.	GgC/year	GgC/year	GgC/year	GgC/year	
Australia	-6,800 <sup>a</sup>	5,940	-	7,045	7,045	3,705	190%	3,705	2,845	-	2,845	
Austria	-205	205	251	-	251	823	30%	251	251	572	823	
Belgium	-	-	-	-	-	1,489	0%	-	-	1,489	1,489	
Bulgaria	-	-	256	-	256	1,713	15%	256	256	1,457	1,713	
Canada	-4,300	4,300	795	4,467	5,262	5,005	105%	5,005	5,005	-	5,005	
Czech Republic	-	-	176	-	176	2,071	8%	176	176	1,895	2,071	
Denmark	95	-	39	-	39	762	5%	39	134	722	856	
Estonia	-	-	185	-	185	444	42%	185	185	259	444	
Finland	-278	278	550	-	550	820	67%	550	550	271	820	
France	2,452	-	3,442	107	3,549	6,041	59%	3,549	6,001	2,492	8,493	
Germany	-140	140	1,349	-	1,349	13,211	10%	1,349	1,349	11,862	13,211	
Greece	-	-	-	-	-	1,171	0%	-	-	1,171	1,171	
Hungary	-	-	235	-	235	832	28%	235	235	597	832	
Iceland	24	-	-	53	53	18	299%	18	42	-	42	
Ireland	915	-	274	-	274	584	47%	274	1,189	310	1,498	
Italy	473	-	1,070	-	1,070	5,668	19%	1,070	1,543	4,598	6,141	
Japan	-747	747	12,253	694	12,946	10,228	127%	10,228	10,228	-	10,228	
Latvia	-	-	535	-	535	389	138%	389	389	-	389	
Liechtenstein	-	-	-	-	-	3	0%	-	-	3	3	
Lithuania	-	-	353	-	353	562	63%	353	353	210	562	
Luxembourg	-	-	-	-	-	147	0%	-	-	147	147	
Monaco	-	-	-	-	-	1	0%	-	-	1	1	
Netherlands	36	-	70	-	70	2,391	3%	70	106	2,321	2,427	
New Zealand	7,716	-	819	31	849	498	170%	498	8,214	-	8,214	
Norway	18	-	705	37	742	356	209%	356	374	-	374	
Poland	-	-	1,105	-	1,105	4,617	24%	1,105	1,105	3,512	4,617	
Portugal	-	-	112	-	112	697	16%	112	112	585	697	
Romania	-	-	231	-	231	2,889	8%	231	231	2,658	2,889	
Russian Federation	-	-	20,618	16,429	37,048	20,728	179%	20,728	20,728	-	20,728	
Slovakia	-	-	91	-	91	832	11%	91	91	742	832	
Slovenia	-	-	126	-	126	209	60%	126	126	84	209	
Spain	-	-	1,197	-	1,197	3,365	36%	1,197	1,197	2,168	3,365	
Sweden	-90	90	1,238	-	1,238	770	161%	770	770	-	770	
Switzerland	-11	11	247	11	258	578	45%	258	258	321	578	
Ukraine	-	-	-	-	-	6,267	0%	-	-	6,267	6,267	
United Kingdom	561	-	368	-	368	8,122	5%	368	930	7,754	8,684	
United States	-7,200	7,200	42,219	61,092	103,311	57,938	178%	57,938	57,938	-	57,938	
Country groups												
OECD	-7,481	18,911	67,407	73,535	140,942	127,289	111%	88,015	99,445	39,275	138,719	
EU	3,819	712	9,959	107	10,066	46,060	22%	9,598	14,130	36,462	50,592	
EIT	-	-	23,910	16,429	40,339	41,553	97%	23,873	23,873	17,680	41,553	
NON-EIT	-7,481	18,911	66,996	73,535	140,531	124,391	113%	87,604	99,034	36,787	135,821	
Annex1	-7,481	18,911	90,906	89,965	180,870	165,944	109%	111,477	122,907	54,467	177,374	

Table 5. High scenario for LULUCF credits under Art. 3.3, Art. 3.4 , Art. 6 and 12. This table is identical to Table 4, except that the underlying data for Art. 3.4 activities is based on August 1 submissions and inventory data<sup>21</sup>. Note that the "Total LULUCF" credits do not differ (except for Australia and Austria) in the high and low scenario.

<sup>21</sup> Estimates based on inventory data supplement to August 1, 2000 submission data, where no or lower estimates were provided in the August 1, 2000 submissions. See Appendix "Data Sources".

LOW SCENARIO % of 1990	Art. 3.3	Art. 3.4 (without boundary condition)			Art. 3.4 "second and third tier"			Art. 3.3 & Art. 3.4 sinks	allowances to buy sinks under Art. 6. and Art. 12	Total Sinks	
		first tier	second tier	third tier	without bound. c.	"boundary condition" <sup>22</sup>	with bound. condition				
column code	A	B	C	D	E=C+D	F	G=E/F	H=min(F,G)	I=H+A+B	J=F-H	K=I+J
	% of 1990	% of 1990	% of 1990	% of 1990	% of 1990	% of 1990	% of b.c.	% of 1990	% of 1990	% of 1990	% of 1990
Australia	-5.9%	-	-	1.9%	1.9%	3.2%	59%	1.9%	-4.0%	1.3%	-2.7%
Austria	-1.0%	-	-	-	-	4.0%	0%	-	-1.0%	4.0%	3.0%
Belgium	-	-	-	-	-	4.0%	0%	-	-	4.0%	4.0%
Bulgaria	-	-	-	-	-	4.6%	0%	-	-	4.6%	4.6%
Canada	-2.6%	2.6%	0.5%	2.5%	2.9%	3.0%	98%	2.9%	2.9%	0.1%	3.0%
Czech Republic	-	-	-	-	-	4.0%	0%	-	-	4.0%	4.0%
Denmark	0.5%	-	-	-	-	4.0%	0%	-	0.5%	4.0%	4.5%
Estonia	-	-	-	-	-	4.0%	0%	-	-	4.0%	4.0%
Finland	-1.4%	1.4%	1.4%	-	1.4%	4.0%	35%	1.4%	1.4%	2.6%	4.0%
France	1.6%	-	0.3%	0.1%	0.3%	4.0%	8%	0.3%	2.0%	3.7%	5.6%
Germany	0.0%	0.0%	0.4%	-	0.4%	4.0%	9%	0.4%	0.4%	3.6%	4.0%
Greece	-	-	-	-	-	4.1%	0%	-	-	4.1%	4.1%
Hungary	-	-	-	-	-	3.5%	0%	-	-	3.5%	3.5%
Iceland	3.4%	-	-	7.5%	7.5%	2.6%	299%	2.6%	6.0%	-	6.0%
Ireland	6.3%	-	-	-	-	4.0%	0%	-	6.3%	4.0%	10.3%
Italy	0.3%	-	-	-	-	4.0%	0%	-	0.3%	4.0%	4.3%
Japan	-0.2%	0.2%	3.7%	0.0%	3.7%	3.1%	121%	3.1%	3.1%	-	3.1%
Latvia	-	-	-	-	-	4.0%	0%	-	-	4.0%	4.0%
Liechtenstein	-	-	-	-	-	4.2%	0%	-	-	4.2%	4.2%
Lithuania	-	-	-	-	-	4.0%	0%	-	-	4.0%	4.0%
Luxembourg	-	-	-	-	-	4.0%	0%	-	-	4.0%	4.0%
Monaco	-	-	-	-	-	3.3%	0%	-	-	3.3%	3.3%
Netherlands	0.1%	-	0.0%	-	0.0%	4.0%	0%	0.0%	0.1%	4.0%	4.1%
New Zealand	38.7%	-	-	-	-	2.5%	0%	-	38.7%	2.5%	41.2%
Norway	0.1%	-	-	0.3%	0.3%	2.5%	10%	0.3%	0.4%	2.2%	2.6%
Poland	-	-	-	-	-	3.7%	0%	-	-	3.7%	3.7%
Portugal	-	-	-	-	-	4.0%	0%	-	-	4.0%	4.0%
Romania	-	-	-	-	-	4.6%	0%	-	-	4.6%	4.6%
Russian Federation	-	-	2.5%	0.4%	2.9%	2.5%	117%	2.5%	2.5%	-	2.5%
Slovakia	-	-	-	-	-	4.0%	0%	-	-	4.0%	4.0%
Slovenia	-	-	-	-	-	4.0%	0%	-	-	4.0%	4.0%
Spain	-	-	-	-	-	4.0%	0%	-	-	4.0%	4.0%
Sweden	-0.5%	0.5%	3.5%	-	3.5%	4.1%	87%	3.5%	3.5%	0.5%	4.1%
Switzerland	-0.1%	0.1%	0.3%	0.1%	0.4%	4.0%	9%	0.4%	0.4%	3.6%	4.0%
Ukraine	-	-	-	-	-	2.5%	0%	-	-	2.5%	2.5%
United Kingdom	0.3%	-	0.2%	0.1%	0.3%	4.0%	8%	0.3%	0.6%	3.7%	4.3%
United States	-0.4%	0.4%	2.6%	1.4%	4.0%	3.5%	114%	3.5%	3.5%	-	3.5%
Country groups											
OECD	-0.2%	0.4%	1.6%	0.9%	2.5%	3.6%	70%	2.2%	2.4%	1.4%	3.8%
EU	0.3%	0.0%	0.3%	0.0%	0.3%	4.0%	7%	0.3%	0.7%	3.7%	4.4%
EIT	-	-	1.4%	0.3%	1.7%	2.9%	58%	1.4%	1.4%	1.4%	2.9%
NON-EIT	-0.2%	0.4%	1.7%	0.9%	2.6%	3.6%	71%	2.3%	2.4%	1.3%	3.7%
Annex1	-0.2%	0.3%	1.6%	0.7%	2.3%	3.4%	68%	2.0%	2.1%	1.4%	3.5%

Table 6. Low scenario for LULUCF credits given in relation to 1990 emissions. As Table 4, but values given in relation to non-LULUCF emissions in 1990.

<sup>22</sup> Note that the LULUCF cap in the President's proposal is given relative to *base year emissions* (cp. FCCC/CP/2001/2/Add.3, p.8), not 1990 emissions. Thus, for countries with base year emissions higher than 1990 emissions (Art. 3.5, 3.7, 3.8), the LULUCF "boundary condition" is higher than would be if related to 1990 emissions.

HIGH SCENARIO % of 1990	allowances to buy sinks under Art. 6 and Art. 12									Total Sinks	
	Art. 3.3	Art. 3.4 (without boundary condition)			Art. 3.4 "second and third tier"			Art. 3.3 & Art. 3.4 sinks	Art. 3.4		
		first tier	second tier	third tier	without bound. c.	"boundary condition"	with bound. condition	low	low		
column code	A	B	C	D	E=C+D	F	G=E/F	H=min(F,G)	I=H+A+B	J=F-H	K=I+J
	% of 1990	% of 1990	% of 1990	% of 1990	% of 1990	% of 1990	% of b.c.	% of 1990	% of 1990	% of 1990	% of 1990
Australia	-5.9%	5.1%	-	6.1%	6.1%	3.2%	190%	3.2%	2.5%	-	2.5%
Austria	-1.0%	1.0%	1.2%	-	1.2%	4.0%	30%	1.2%	1.2%	2.8%	4.0%
Belgium	-	-	-	-	-	4.0%	0%	-	-	4.0%	4.0%
Bulgaria	-	-	0.7%	-	0.7%	4.6%	15%	0.7%	0.7%	3.9%	4.6%
Canada	-2.6%	2.6%	0.5%	2.7%	3.2%	3.0%	105%	3.0%	3.0%	-	3.0%
Czech Republic	-	-	0.3%	-	0.3%	4.0%	8%	0.3%	0.3%	3.7%	4.0%
Denmark	0.5%	-	0.2%	-	0.2%	4.0%	5%	0.2%	0.7%	3.8%	4.5%
Estonia	-	-	1.7%	-	1.7%	4.0%	42%	1.7%	1.7%	2.3%	4.0%
Finland	-1.4%	1.4%	2.7%	-	2.7%	4.0%	67%	2.7%	2.7%	1.3%	4.0%
France	1.6%	-	2.3%	0.1%	2.3%	4.0%	59%	2.3%	4.0%	1.6%	5.6%
Germany	0.0%	0.0%	0.4%	-	0.4%	4.0%	10%	0.4%	0.4%	3.6%	4.0%
Greece	-	-	-	-	-	4.1%	0%	-	-	4.1%	4.1%
Hungary	-	-	1.0%	-	1.0%	3.5%	28%	1.0%	1.0%	2.5%	3.5%
Iceland	3.4%	-	-	7.5%	7.5%	2.6%	299%	2.6%	6.0%	-	6.0%
Ireland	6.3%	-	1.9%	-	1.9%	4.0%	47%	1.9%	8.1%	2.1%	10.3%
Italy	0.3%	-	0.8%	-	0.8%	4.0%	19%	0.8%	1.1%	3.3%	4.3%
Japan	-0.2%	0.2%	3.7%	0.2%	3.9%	3.1%	127%	3.1%	3.1%	-	3.1%
Latvia	-	-	5.5%	-	5.5%	4.0%	138%	4.0%	4.0%	-	4.0%
Liechtenstein	-	-	-	-	-	4.2%	0%	-	-	4.2%	4.2%
Lithuania	-	-	2.5%	-	2.5%	4.0%	63%	2.5%	2.5%	1.5%	4.0%
Luxembourg	-	-	-	-	-	4.0%	0%	-	-	4.0%	4.0%
Monaco	-	-	-	-	-	3.3%	0%	-	-	3.3%	3.3%
Netherlands	0.1%	-	0.1%	-	0.1%	4.0%	3%	0.1%	0.2%	3.9%	4.1%
New Zealand	38.7%	-	4.1%	0.2%	4.3%	2.5%	170%	2.5%	41.2%	-	41.2%
Norway	0.1%	-	5.0%	0.3%	5.2%	2.5%	209%	2.5%	2.6%	-	2.6%
Poland	-	-	0.9%	-	0.9%	3.7%	24%	0.9%	0.9%	2.8%	3.7%
Portugal	-	-	0.6%	-	0.6%	4.0%	16%	0.6%	0.6%	3.4%	4.0%
Romania	-	-	0.4%	-	0.4%	4.6%	8%	0.4%	0.4%	4.3%	4.6%
Russian Federation	-	-	2.5%	2.0%	4.5%	2.5%	179%	2.5%	2.5%	-	2.5%
Slovakia	-	-	0.4%	-	0.4%	4.0%	11%	0.4%	0.4%	3.6%	4.0%
Slovenia	-	-	2.4%	-	2.4%	4.0%	60%	2.4%	2.4%	1.6%	4.0%
Spain	-	-	1.4%	-	1.4%	4.0%	36%	1.4%	1.4%	2.6%	4.0%
Sweden	-0.5%	0.5%	6.5%	-	6.5%	4.1%	161%	4.1%	4.1%	-	4.1%
Switzerland	-0.1%	0.1%	1.7%	0.1%	1.8%	4.0%	45%	1.8%	1.8%	2.2%	4.0%
Ukraine	-	-	-	-	-	2.5%	0%	-	-	2.5%	2.5%
United Kingdom	0.3%	-	0.2%	-	0.2%	4.0%	5%	0.2%	0.5%	3.8%	4.3%
United States	-0.4%	0.4%	2.6%	3.7%	6.3%	3.5%	178%	3.5%	3.5%	-	3.5%
Country groups											
OECD	-0.2%	0.5%	1.9%	2.1%	4.0%	3.6%	111%	2.5%	2.8%	1.1%	3.9%
EU	0.3%	0.1%	0.9%	0.0%	0.9%	4.0%	22%	0.8%	1.2%	3.2%	4.4%
EIT	-	-	1.7%	1.1%	2.8%	2.9%	97%	1.7%	1.7%	1.2%	2.9%
NON-EIT	-0.2%	0.5%	1.9%	2.1%	4.1%	3.6%	113%	2.5%	2.9%	1.1%	3.9%
Annex1	-0.2%	0.4%	1.9%	1.8%	3.7%	3.4%	109%	2.3%	2.5%	1.1%	3.6%

Table 7. High scenario for LULUCF credits given in relation to 1990 emissions. As Table 5, but values given in relation to non-LULUCF emissions in 1990.

## Annotation to Table 4 and Table 5

<sup>a</sup> Note that in relation to Art. 3.3 Australia's submission states that it is expected that Australia's emissions from the land-use change and forestry sector in 1990 would constitute a net source and therefore, Art.3.7 would operate in conjunction with Art.3.3. The debit under Art.3.3 has therefore, been set at zero in the accompanying tables of the President's proposal of April 2001. However, since the legal text and the President's proposal does not seem to resolve the issue of how land use change emissions are treated in countries that claim Art. 3.7, Art. 3.3 credits/debits were here treated equivalently as in all other countries (see as well annotation "k").

## 5. The "Hot Air" loophole

Any substantive provisions to prevent or limit trading with emission reductions that have been achieved as the result of economic contraction (the so called "hot air" or "Russian surplus") are missing from the proposal. The ability to meet ones target by buying up "hot air" will result in an increase of GHG emissions beyond that which would otherwise occur and undermine the integrity of the Kyoto Protocol. Allowing "Hot Air" to be freely traded under Art. 17, could *completely nullify* all necessary emission reductions in the event that the US is not part of the buyers (see part III).

Provisions that can substantially limit the supply of "hot air" credits to the emission trading market are possible and needed to substantially limit this problem.

The available amount of "Hot Air" is also dependent on the amount of sinks. The more sinks Russia can account towards its targets, the more "Hot Air" will be available under Art. 17. This effect could be termed "Sink credit laundering via Art. 17". (see Box below). The quantitative effect of this would be to add at least 10-20 MtC/yr to the supply of "Hot Air" (see Table 9).

### Box 1– What is "Sink credit laundering via Art. 17"

This is explained in the following example: Country A (e.g. Russia), which does not require the use of LULUCF credits, because its projected emissions are below its targets anyway, might want to make use of its Art. 3.4 activities or acquire additional LULUCF credits under Art. 12 (CDM) up to its specific LULUCF-cap. Thus, this country A is allowed to sell an additional amount of "Hot Air" as credits under Art. 17 (AAUs), which is equivalent to its LULUCF-cap. Country B (e.g. United Kingdom), could acquire some of these additional Art. 17 credits, which originate from LULUCF-activities. Thus, country B is allowed to acquire more LULUCF credits from Art. 3.4 and Art. 12 than its "boundary condition" (which is 4.0% in the case of United Kingdom) might suggest.

The phenomenon "sink credit laundering" is not newly introduced by the President's text. However, before an introduction of a LULUCF-cap, "sink credit laundering" was not an issue, since the direct acquirement by the "end-consumer" country B of LULUCF credits under Art. 12 or via Art. 6 was possible.

The policy implication is that by keeping the (generally welcomed) overall cap on LULUCF credits, "sink credit laundering" should be prevented from undermining the "boundary condition" for individual countries. "No Fungibility" of CERs, Art. 3.4 credits and AAUs, or (better) no inclusion of sinks under Art. 12 and very limited (or no) additional sinks under Art. 3.4 are urgently required in order to keep the Kyoto Protocol's targets meaningful in terms of making a first step towards significant fossil fuel emission reductions.

Description	"Hot Air" excluding "sinks-credit laundering"				"Hot Air" including "sink-credit laundering"			
	Kyoto Targets (including Art. 3.5, 3.7, 3.8) minus BAU- projections (2 <sup>nd</sup> NC)		Kyoto Targets (including Art. 3.5, 3.7, 3.8) minus BAU- projections (IEO 2000)		New targets (including Art. 3.5, 3.7, 3.8 and sink credits) minus 2 <sup>nd</sup> NC		New targets (including Art. 3.5, 3.7, 3.8 and sink credits) minus IEO 2000	
	% of OECD 1990		% of OECD 1990		% of OECD 1990		% of OECD 1990	
	GgC/year	emissions	GgC/year	emissions	GgC/year	emissions	GgC/year	emissions
Australia	11,546	0.33%	-	0.00%	8,450.92	0.24%	-	0.00%
Bulgaria	9,523	0.27%	2,014	0.06%	11,235.87	0.32%	3,726.62	0.11%
CzechRepublic	-	0.00%	310	0.01%	-	0.00%	2,381.10	0.07%
Denmark	479	0.01%	-	0.00%	1,335.60	0.04%	-	0.00%
Estonia	4,774	0.14%	2,158	0.06%	5,218.37	0.15%	2,601.99	0.07%
France	-	0.00%	-	0.00%	7,901.66	0.22%	-	0.00%
Germany	-	0.00%	-	0.00%	7,333.46	0.21%	-	0.00%
Greece	-	0.00%	5,558	0.16%	-	0.00%	6,729.51	0.19%
Hungary	299	0.01%	4,131	0.12%	1,130.80	0.03%	4,962.58	0.14%
Ireland	-	0.00%	1,135	0.03%	934.33	0.03%	2,633.23	0.07%
Latvia	3,477	0.10%	1,154	0.03%	3,865.67	0.11%	1,543.46	0.04%
Liechtenstein	-	0.00%	-	0.00%	-	0.00%	0.96	0.00%
Lithuania	5,085	0.14%	1,975	0.06%	5,647.28	0.16%	2,537.34	0.07%
Luxembourg	447	0.01%	-	0.00%	594.07	0.02%	-	0.00%
NewZealand	-	0.00%	-	0.00%	6,339.10	0.18%	4,652.92	0.13%
Norway	-	0.00%	-	0.00%	-	0.00%	-	0.00%
Poland	7,999	0.23%	28,403	0.80%	12,616.15	0.36%	33,019.91	0.93%
Portugal	-	0.00%	3,744	0.11%	-	0.00%	4,440.44	0.13%
Romania	10,764	0.30%	6,803	0.19%	13,652.09	0.39%	9,691.76	0.27%
RussianFederation	99,493	2.81%	182,838	5.17%	120,220.63	3.40%	203,566.15	5.76%
Slovakia	69	0.00%	-	0.00%	901.87	0.03%	631.48	0.02%
Slovenia	17	0.00%	-	0.00%	226.71	0.01%	-	0.00%
Spain	5,005	0.14%	15,151	0.43%	8,370.01	0.24%	18,516.34	0.52%
Sweden	-	0.00%	-	0.00%	-	0.00%	115.32	0.00%
Switzerland	-	0.00%	-	0.00%	83.55	0.00%	-	0.00%
Ukraine	47,306	1.34%	53,882	1.52%	53,573.32	1.52%	60,149.31	1.70%
<b>TOTAL "Hot Air"</b>	<b>206,284.1</b>	<b>5.84%</b>	<b>309,257.2</b>	<b>8.75%</b>	<b>269,631.5</b>	<b>7.63%</b>	<b>361,900.4</b>	<b>10.24%</b>
<b>TOTAL "Hot Air" from NON-OECD countries</b>	<b>188,507.6</b>	<b>5.33%</b>	<b>279,227.8</b>	<b>7.90%</b>	<b>227,158.0</b>	<b>6.43%</b>	<b>317,469.0</b>	<b>8.98%</b>

Table 8. "Producers of Hot Air": Business as usual emission reductions below targets, which could be transferred to countries whose BAU-emissions are above targets. The individual countries' "Hot Air" is given as percentage of OECD emissions, since the main buyers of "Hot Air" are estimated to be within the OECD. The problem of "Hot Air", often defined as "BAU emission reduction below the effective targets" could be effectively limited by the restricting "sink credit laundering" (see Box 1)

## Part III: Does “Hot Air” nullify Kyoto targets if the US drops out?

There is concern, that if the US (or perhaps the US, Canada and Australia) drop out of the Kyoto Protocol process, Russian “Hot Air” and credits for sinks will offset the remaining need for emission reductions. The following calculations support this concern.

The basic question is, whether it would be possible for ratifying countries to meet their targets by making use of the proposed (lack of) regulations in the President's text for emission trading and sinks, and *without* doing any fossil fuel or other industrial GHG emission reduction. If this is the case, there could be no question that the rules of Kyoto Protocol would have to be significantly strengthened (e.g. not including sinks under Art. 3.4, Art. 6 and Art. 12 and limiting “Hot Air”).

### Methodology and Assumptions

The appropriate indicator for this analysis is the *aggregated* “gaps between BAU and new targets” (see e.g. “Country groups” in Table 2). These gaps represent the overall effect of the President's proposal on fossil fuel and other industrial GHG emissions. Should the aggregated BAU emissions be lower than the targets (i.e. the gap positive), no emission reduction would have to be done to meet the targets.

Three variants of the effects of the President's proposal are examined in the following:

1. All Annex B countries take part in (ratify) the Kyoto Protocol (see Table 2, Table 10.a. and b.)
2. All Annex B countries except the US ratify the Kyoto Protocol<sup>23</sup> (see, Table 10.c. and d)

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<sup>23</sup> The “Actual targets” (Table 10, column A) were assumed to be equal to the “New targets” (as calculated in Table 1, column H) except for the US. For the US, the “Actual targets” were assumed to be equal to its respective BAU-emission projections (Table 10, column C).

3. All Annex B countries except the US, Canada and Australia ratify the Kyoto Protocol<sup>24</sup> (Table 10.e. and f)

Each of the above variants is examined by assuming two different business-as-usual (BAU) emission projections

- a) “2<sup>nd</sup> NC”: BAU-emissions according to the 2<sup>nd</sup> National Communications to the UNFCCC (Table 10. a, c and e)
- b) “IEO 2000”: BAU-emissions projections based on the International Energy Outlook (2000) prognosis for CO<sub>2</sub> emissions<sup>25</sup>. Table 10. b, d and f)

There are currently no substantive regulations proposed in the President's text to a) limit “Hot Air”<sup>26</sup> or b) to avoid “laundering of sink credits via Art. 17” (see definition in Box 1). Thus, the calculation, which assumes full “Hot Air including sinks credit laundering” (see Table 9) accurately reflects the President's proposals effect on OECD country targets in case that the US or the US, Canada and Australia do not ratify the Kyoto Protocol.

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<sup>24</sup>The “Actual targets” (Table 10, column A), were assumed to be equal to the “New targets” (as calculated in Table 1, column H) except for the US, Canada and Australia. For the US, Canada and Australia, the “Actual targets” were assumed to be equal to its respective BAU-emission projections (Table 10, column A).

<sup>25</sup> Non-CO<sub>2</sub> emission projections were derived by scaling projections from Reilly (2000) appropriately.

<sup>26</sup> “Hot Air” is commonly defined as the selling of surplus emissions reductions (AAUs) under Art. 17 from Russia and other countries with economies in transition.

**Targets for OECD countries:**

Obviously, the detrimental effect of emission trading with "Hot Air" is significantly increased, if the "surplus emission reductions" are used by a smaller fraction of OECD countries. For example, assuming BAU emissions according to IEO (2000), "Hot Air" (including "sink-credit laundering") would inflate the allowed OECD emissions by 9%. For the case, that US does not ratify the Kyoto Protocol, the combined allowed emissions of the remaining OECD countries would be inflated by 16.8%. An inflation of 19.8% (US, Canada and Australia do not join the Kyoto Protocol) would basically mean that no emission reductions had to be undertaken in OECD countries in order to meet the (new) Kyoto targets.

**Targets for all Annex B countries:**

The striking result of this analysis is that under the current proposals Annex B countries could meet their emission reduction targets only by trading "Hot Air" and using allowed sink-credits, and would not need any real fossil fuel or other industrial GHG emission reduction, *if* the US does not ratify the Kyoto Protocol.

In fact, there is a "surplus" of emission reductions for Annex B countries of 72MtC/ year (1.5% of 1990 emissions of Annex B) and 125 MtC/year (2.6%) if BAU-emissions are assumed to follow the projections as derived from the 2<sup>nd</sup> National Communications and the IEO (2000) data, respectively (see. c) und d)). This is in sharp contrast to the overall required emission reduction effort of -304 MtC/year (-6.2%) to -466 MtC/year (-9.5%) (see Table 10a) and b)), if *all* Annex B countries ratify the Kyoto Protocol. In the case that Canada and Australia follow the "US leadership" and do not ratify the Kyoto Protocol, this problem is amplified

Description	"Hot Air" excluding "sinks-credit laundering"		"Hot Air" including "sink-credit laundering"	
	Kyoto Targets (including Art. 3.5, 3.7, 3.8) minus BAU-projections (2 <sup>nd</sup> NC)	Kyoto Targets (including Art. 3.5, 3.7, 3.8) minus BAU-projections (IEO 2000)	New targets (including Art. 3.5, 3.7, 3.8 and sink credits) minus 2 <sup>nd</sup> NC	New targets (including Art. 3.5, 3.7, 3.8 and sink credits) minus IEO 2000

**a) all Annex B Parties ratify (as assumed in Table 8)**

	GgC/year	% of 1990 OECD	GgC/year	% of 1990 OECD	GgC/year	% of 1990 OECD	GgC/year	% of 1990 OECD
Total "Hot Air" from NON-OECD countries	188,507.6	5.33%	279,227.8	7.90%	227,158.0	6.43%	317,469.0	8.98%

**b) all Annex B Parties ratify except the US**

	GgC/year	% of 1990 OECD without US	GgC/year	% of 1990 OECD without US	GgC/year	% of 1990 OECD without US	GgC/year	% of 1990 OECD without US
Total "Hot Air" from NON-OECD countries	188,508	10.0%	279,228	14.8%	227,158	12.0%	317,469	16.8%

**b) all Annex B Parties ratify except the US, Canada and Australia**

	GgC/year	% of 1990 OECD without US,CAN,AUS	GgC/year	% of 1990 OECD without US,CAN,AUS	GgC/year	% of 1990 OECD without US,CAN,AUS	GgC/year	% of 1990 OECD without US,CAN,AUS
Total "Hot Air" from NON-OECD countries	188,508	11.8%	279,228	17.4%	227,158	14.2%	317,469	19.8%

Table 9. "Hot Air" if the US (b), or US, Canada and Australia(c) do not take part in the Kyoto Protocol (cp. to Table 8).

	"Actual targets"		BAU Projections		Gap between target and BAU	
Column-Description	The "actual target" is the amount of fossil fuel and other industrial GHG emissions allowed per year between 2008 to 2012. Furthermore, the "actual target's" share of the groups' emissions in 1990 is given.		Two different sets of Business-as usual (BAU) emissions, based on the 2 <sup>nd</sup> National Communications and the Int. Energy Outlook (2000), respectively, are given.		The needed effort to achieve the targets is the difference (gap) between the "actual target" and the "BAU emission". Positive values (+) indicate, that the group of countries will make more emissions reductions in the Business as usual scenario than needed to meet its targets. Negative values (-) indicate that additional reductions in fossil fuel and other industrial GHG emissions have to be made to meet the targets for 2008-2012.	
Column Code	A	B	C	D	E=A-B	F
	GgC/year	% of 1990	GgC/year	% of 1990	GgC/year	% of 1990
<b>a. All Annex B parties ratify; BAU emissions according to 2nd National Communications (2nd NC)</b>						
OECD	3,506,857	99.2%	4,038,807	114.2%	-531,950	-15.0%
EU	1,119,791	97.6%	1,138,492	99.2%	-18,701	-1.6%
EIT	1,501,593	104.2%	1,275,556	88.5%	226,037	15.7%
NON-EIT	3,430,360	99.1%	3,961,202	114.5%	-530,842	-15.3%
Annex1	4,931,953	100.6%	5,236,758	106.8%	-304,805	<b>-6.2%</b>
<b>b. All Annex B parties ratify; BAU emissions according to International Energy Outlook (IEO 2000)</b>						
OECD	3,506,857	99.2%	4,291,248	121.4%	-784,391	-22.2%
EU	1,119,791	97.6%	1,236,905	107.8%	-117,114	-10.2%
EIT	1,501,593	104.2%	1,176,793	81.6%	324,800	22.5%
NON-EIT	3,430,360	99.1%	4,222,097	122.0%	-791,737	-22.9%
Annex1	4,931,953	100.6%	5,398,890	110.2%	-466,937	<b>-9.5%</b>
<b>c. as a. except that US does not ratify, which means that US targets equal BAU emissions (2nd NC)</b>						
OECD	3,937,371	111.4%	4,038,807	114.2%	-101,435	-2.9%
EU	1,119,791	97.6%	1,138,492	99.2%	-18,701	-1.6%
EIT	1,501,593	104.2%	1,275,556	88.5%	226,037	15.7%
NON-EIT	3,860,875	111.6%	3,961,202	114.5%	-100,327	-2.9%
Annex1	5,362,468	109.4%	5,236,758	106.8%	125,710	<b>2.6%</b>
<b>d. as b. except that US does not ratify, which means that US targets equal BAU emissions (IEO 2000)</b>						
OECD	4,046,431	114.5%	4,291,248	121.4%	-244,817	-6.9%
EU	1,119,791	97.6%	1,236,905	107.8%	-117,114	-10.2%
EIT	1,501,593	104.2%	1,176,793	81.6%	324,800	22.5%
NON-EIT	3,969,934	114.7%	4,222,097	122.0%	-252,163	-7.3%
Annex1	5,471,527	111.6%	5,398,890	110.2%	72,638	<b>1.5%</b>
<b>e. as a. and c. except that US, CAN and AUS do not ratify (2nd NC)</b>						
OECD	3,958,255	112.0%	4,038,807	114.2%	-80,552	-2.3%
EU	1,119,791	97.6%	1,138,492	99.2%	-18,701	-1.6%
EIT	1,501,593	104.2%	1,275,556	88.5%	226,037	15.7%
NON-EIT	3,881,759	112.2%	3,961,202	114.5%	-79,443	-2.3%
Annex1	5,383,352	109.8%	5,236,758	106.8%	146,594	<b>3.0%</b>
<b>f. as b. and d. except that US, CAN and AUS do not ratify (IEO 2000)</b>						
OECD	4,097,525	115.9%	4,291,248	121.4%	-193,723	-5.5%
EU	1,119,791	97.6%	1,236,905	107.8%	-117,114	-10.2%
EIT	1,501,593	104.2%	1,176,793	81.6%	324,800	22.5%
NON-EIT	4,021,029	116.2%	4,222,097	122.0%	-201,068	-5.8%
Annex1	5,522,622	112.7%	5,398,890	110.2%	123,732	<b>2.5%</b>

Table 10. Gaps between targets and business as usual emissions. Note that without the US, *no net emission reductions* are necessary by the remaining Annex B countries (positive gaps in column E, rows c to f for Annex B countries).

## Appendix "Data sources"

### a) Data Art. 3.3:

Calculations have been based on IPCC definitional data for Afforestation, Reforestation and Deforestation as provided in the August 1 submissions (FCCC/SBSTA/2000/9/Add.1)

### b) Data Art. 3.4:

Two scenarios have been used to calculate the LULUCF credits under Art. 3.4.

The low "August 1 submissions" scenario is purely based on August 1 submissions data (FCCC/SBSTA/2000/9/Add.1), except Russia (Russian estimate based on estimates by Gurney and Neff (2000)).

The high scenario "August 1 submissions or inventory data" assumes following "forest management" data: August 1 submissions or averaged inventory of 'changes in forests and other woody biomass stocks<sup>27</sup>' data for 1995 to 1998 (Source: Greenhouse Gas emissions online database at [www.unfccc.int](http://www.unfccc.int)), whichever is higher. Non-Forest Management data (Art. 3.4) is based on August 1 submissions or model results from the ALTERRA, ACSD model, whichever is higher.

	Reported forest management activities [GgC/year]	Reported non-forest management activities [GgC/year]	Description of reported non-forest management Art. 3.4 activities
United States	288662	23822	Crop-land and Grazing-land Management
Russian Federation <sup>a</sup>	137455	3611	Cropland and Rangeland Management
Japan	11368	76	Urban Greening
Canada	9600	4126	Cropland, Grazing-land Management and Shelterbed
Germany	8455	-	
Sweden	4555	-	
France	2593	107	1. Conversion of mixed coppice/high forest stands into high forest stands and Bioenergy Crops (Note that "Bioenergy crops" are currently not explicitly proposed to be included under Art. 3.4. However, since no data was provided on cropland, grazingland management and revegetation, this study assumes 251 GgC/year for non-forest management activities)
United Kingdom	2455	251	
Finland	2200	-	
Netherlands	31	-724	Cropland and Grazingland
Australia	-	2181	Revegetation activities
Iceland	-	53	Revegetation
Norway	-	37	Fertilisation
Switzerland	-	345	Establishment of carbon forests and forest reserves to increase carbon stock and various others (including cropland management and increase in wood stocks)

Table 11 – Reported Additional Sinks under Art. 3.4 in countries' August 1 submissions.<sup>28</sup>

<sup>27</sup> According to the IPCC Reporting Instructions for Greenhouse Gas Reporting, section 1.14, the category "change in forests and woody biomass includes the related changes in soil carbon". Thus the category "change in forests and woody biomass" was seen as fully compatible with "forest management under Art. 3.4".

<sup>28</sup> Note: Data Source: SBSTA/2000/MISC.6 (Add.1) In the case that countries reported not one number, but a low/high range of potential credits for additional sinks, an averaged medium value was taken for the calculations here. This is likely to be very conservative since countries would possibly apply the US discount model to the upper end values.

<sup>a</sup> The Russian Federation did not report on additional sinks in Art. 3.4. The Russian data-estimates on forest management, and non-forest management activities were based on Gurney and Neff (2000).

Annex B party	Forest Management*		Non-Forest Management	
	[MtC/year]	Source	Art. 3.4 [MtC/year]	Source
Australia	5.94	Inv95-98	7.05	ACSD, KAT
Austria	1.88	Inv95-98	-	
Belgium	-		-	
Bulgaria	1.71	Inv95-98	-	
Canada	9.60	Aug1	23.72	ACSD, KAT
Czech Republic	1.17	Inv95-98	-	
Denmark	0.26	Inv95-98	-	
Estonia	1.23	Inv95-98	-	
Finland	3.94	Inv95-98	-	
France	22.95	Inv95-98	0.11	Aug1
Germany	9.13	Inv95-98	-	
Greece	-		-	
Hungary	1.57	Inv95-98	-	
Iceland	-		0.05	Aug1
Ireland	1.83	Inv95-98	-	
Italy	7.13	Inv95-98	-	
Japan	11.37	Aug1	0.69	ACSD, KAT
Latvia	3.57	Inv95-98	-	
Liechtenstein	-		-	
Lithuania	2.35	Inv95-98	-	
Luxembourg	-		-	
Monaco	-		-	
Netherlands	0.46	Inv95-98	-0.72	Aug1
New Zealand	5.46	Inv95-98	1.64	ACSD, KAT
Norway	4.70	Inv95-98	0.04	
Poland	7.37	Inv95-98	-	
Portugal	0.74	Inv95-98	-	
Romania	1.54	Inv95-98	-	
Russian Federation	137.46	Gurney2000	21.39	ACSD, KAT
Slovakia	0.60	Inv95-98	-	
Slovenia	0.84	Inv95-98	-	
Spain	7.98	Inv95-98	-	
Sweden	8.34	Inv95-98	-	
Switzerland	1.65	Inv95-98	0.34	
Ukraine	-		-	
United Kingdom	2.45	Aug1	0.25	
United States	288.66	Aug1	61.09	ACSD, KAT

Table 12. Carbon removal due to Art. 3.4 activities. Note: The above data is the higher number of two data sources: 1) data reported for Art.3.4 activities or 2) the average inventory data for 1995-1998 "Change in Forests and Woody Biomass"

° No data was available for Belgium, Greece, Iceland, Liechtenstein, Luxembourg, Monaco and Ukraine.

### c) BAU emissions IEO (2000)

Assumptions in the BAU-emissions based on the International Energy Outlook (2000):

Carbon emissions assumed according to IEO(2000) "Reference Case scenario", available at [http://www.eia.doe.gov/oiaf/archive/ieo00/pdf/0484\(2000\).pdf](http://www.eia.doe.gov/oiaf/archive/ieo00/pdf/0484(2000).pdf)

Non-CO2 emission projections were derived by scaling projections from Reilly (2000) appropriately.

Source: The Kyoto Protocol and non-CO2 Greenhouse Gases and Carbon Sinks - J. Reilly, Joint Program on the Science and Policy of Global Change, Massachusetts Institute of Technology, 77 Massachusetts Ave., Bldg. E40-263, Cambridge, MA 02139

d) BAU emissions (2<sup>nd</sup> National Communications):

Assumptions for generating the BAU emission projections based on 2<sup>nd</sup> National Communications and subsequent In Depth Reviews:

Annex – 1 country	Projection for 2010 (GgC/year)	Description of data source
Australia	148,519	Based on FCCC/SBI/1999/5/Add1, Table C6; scaling factor 1.03 (due to difference in projection base to latest inventory data (FCCC/SBI/2000/11))
Austria	22,802	Based on CO2-projections from Austrian 2nd National Communications (page 92); derived scaling factor to include other GHGs: 1.07
Belgium	43,191	Based on FCCC/SBI/1999/5/Add1, Table C6; scaling factor 0.99 (due to difference in projection base to latest inventory data(FCCC/SBI/2000/11)); since no 2010 projection given, same growth as Netherlands assumed between 2005 and 2010
Bulgaria	29,864	Based on growth rates from 2nd In-Depth-Review (IDR-2) and latest inventory data (1998) given in FCCC/SBI/2000/11
Canada	197,116	Based on FCCC/SBI/1999/5/Add1, Table C6; scaling factor 1.08 (due to difference in projection base to latest inventory data(FCCC/SBI/2000/11))
Czech Republic	51,954	Based on FCCC/SBI/1999/5/Add1, Table C6; scaling factor 0.98 (due to difference in projection base to latest inventory data(FCCC/SBI/2000/11))
Denmark	14,562	Based on FCCC/SBI/1999/5/Add1, Table C6; scaling factor 0.88 (!) (due to difference in projection base to latest inventory data(FCCC/SBI/2000/11))
Estonia	5,443	Based on "high energy demand" growth rates (Fig V) from IDR-2 and latest inventory data given in FCCC/SBI/2000/11
Finland	21,799	Based on growth rates based on average values between the EMS (BAU) and EPO scenarios as given in Finland IDR-2 and latest inventory data given in FCCC/SBI/2000/11
France	151,622	Based on FCCC/SBI/1999/5/Add1, Table C6; scaling factor 1.17 (!) (due to difference in projection base to latest inventory data(FCCC/SBI/2000/11))
Germany	266,795	Based on FCCC/SBI/1999/5/Add1, Table C6; no scaling factor applied due to minimal difference in projection base to latest inventory data (FCCC/SBI/2000/11)
Greece	41,085	Based on CO2-growth rates from (IDR-2 Greece, page 21, para 78) and inventory data (1990) given in FCCC/SBI/2000/11
Hungary	25,760	Owing to scarce data basis, same growth rate as in Poland from 1990 to 2010 assumed (!)
Iceland	878	Based on CO2-growth rates from Iceland 2nd In-Depth-Review (IDR-2) and projection base given in FCCC/SBI/2000/11. Note that 1990 emissions as given in IDR-2 are far higher than in SBI/2000/11
Ireland	17,051	Based on FCCC/SBI/1999/5/Add1, Table C6; scaling factor 0.94 (due to difference in projection base to latest inventory data(FCCC/SBI/2000/11))
Italy	159,386	Based on CO2-growth rates as given in IDR-2 Italy and projection base given in FCCC/SBI/2000/11. Note that "baseline" 2010 projections in IDR-2 is 168 MtC/year and thus far higher than assumed here, since the used 1990 emissions base from FCCC/SBI/2000/11 is far lower than in IDR-2 (518MtC/year instead 548MtC/year) (!).
Japan	395,941	Based on FCCC/SBI/1999/5/Add1, Table C6; scaling factor 1.02 (due to difference in projection base to latest inventory data(FCCC/SBI/2000/11))
Latvia	5,473	Based on FCCC/SBI/1999/5/Add1, Table C6;
Liechtenstein	71	Based on 1990 emissions FCCC/SBI/1999/5/Add1; assumed to be constant until 2010.
Lithuania	7,849	Based on growth rates between 2000-2010 as given in IDR-2 Lithuania and projection base year 1998 from FCCC/SBI/2000/11. Attention: very uncertain data source; very dependent on whether Ignalina II will be shut down or not (-18 or +13 % in 2010 from 1990) - see page 18 IDR2-Lithuania; cp. much higher 2010 projections (11.51MtC/year) in CP/1998/11/Add2.
Luxembourg	2,193	Based on CO2-growth rates from Luxembourg 2nd In-Depth-Review (IDR-2) and projection base given in FCCC/SBI/2000/11.
Monaco	39	assumed to be constant on 1990 levels
Netherlands	62,703	Based on FCCC/SBI/1999/5/Add1, Table C6; scaling factor 0.98 (due to difference in projection base to latest inventory data(FCCC/SBI/2000/11))
New Zealand	21,803	Based on FCCC/SBI/1999/5/Add1, Table C6; scaling factor 0.95 (due to difference in projection base to latest inventory data(FCCC/SBI/2000/11))
Norway	16,593	Based on FCCC/SBI/1999/5/Add1, Table C6; scaling factor 0.96 (due to difference in projection base to latest inventory data(FCCC/SBI/2000/11))
Poland	136,663	Based on FCCC/SBI/1999/5/Add1, Table C6; scaling factor 1.00 since projection base and latest inventory data equal (FCCC/SBI/2000/11)
Portugal	24,311	Based on FCCC/SBI/1999/5/Add1, Table C6; scaling factor 1.09 (due to difference in projection base to latest inventory data(FCCC/SBI/2000/11))
Romania	55,673	Based on FCCC/SBI/1999/5/Add1, Table C6; scaling factor 1.00 since projection base and latest inventory data equal (FCCC/SBI/2000/11)
Russian Federation	729,615	Taken from IDR-2 Russia "probable scenario" of the reported "recent study" (see IDR-2 Russia).
Slovakia	19,076	Based on FCCC/SBI/1999/5/Add1, Table C6; scaling factor 1.04 (due to difference in projection base to latest inventory data(FCCC/SBI/2000/11))
Slovenia	4,795	Due to lack of projections for Slovenia, based on projected growth rates equivalent to Slovakian growth rates(!); projection base given in FCCC/SBI/2000/11
Spain	100,151	Based on FCCC/SBI/1999/5/Add1, Table C6; scaling factor 1.01 (due to difference in projection base to latest inventory data(FCCC/SBI/2000/11))
Sweden	20,805	Based on FCCC/SBI/1999/5/Add1, Table C6; scaling factor 1.02 (due to difference in projection base to latest inventory data(FCCC/SBI/2000/11))
Switzerland	13,794	Based on FCCC/SBI/1999/5/Add1, Table C6; scaling factor 0.95 (due to difference in projection base to latest inventory data(FCCC/SBI/2000/11))
Ukraine	203,390	
United Kingdom	190,036	Based on FCCC/SBI/1999/5/Add1, Table C6; scaling factor 1.03 (due to difference in projection base to latest inventory data(FCCC/SBI/2000/11))
United States of America	2,027,957	Based on FCCC/SBI/1999/5/Add1, Table C6; scaling factor 1.04 (due to difference in projection base to latest inventory data(FCCC/SBI/2000/11))

Table 13 – Assumptions and Sources for BAU emission projections based predominantly on 2<sup>nd</sup> National Communications and subsequent In-Depth Reports (IDR). Particularly uncertain data is marked with (!).

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## For more information:

Bill Hare,  
Climate Policy Director,  
Greenpeace International,  
Keizersgracht 176,  
1016 DW Amsterdam,  
The Netherlands,  
Phone: +31-20-523-6222,  
Fax: +31-20-523-6200,  
[bhare@ams.greenpeace.org](mailto:bhare@ams.greenpeace.org)