

## **SUBMISSION BY THE CZECH REPUBLIC ON BEHALF OF THE EUROPEAN COMMUNITY AND ITS MEMBER STATES**

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**Subject: Other issues arising from the implementation of the work programme of the Ad Hoc Working Group on Further Commitments for Annex I Parties under the Kyoto Protocol - Land use, land-use change and forestry.**

As anticipated in footnote 3 of its submission to the UNFCCC dated 27 April 2009 and as a complement to its views on the revision of the Annex to Decision 16/CMP.1, the EU wishes to provide further input on data relevant to different accounting options for forest management assessed for illustrative purposes. The accounting options assessed are set out in Table 1 and the consequences of adopting them exemplified in Table 2. Table 3 shows relevant historical data.

**Table 1 : Accounting options assessed for forest management**

Option	
1	Emissions by sources and removals by sinks subject to the application of a X% discount factor
2	Bar approach. The Bar is based on a historical base year or base period.
2a	Bar only, no Band.
2b	Bar including a Band from Bar-X% to Bar+X% (values above Bar+X% are credited, values below Bar-X% are debited, and values between Bar-X% and Bar+X% are neither credited nor debited)
2c	Bar including a Band from 0 to Bar (only removals by sinks above Bar or net emissions are accounted for, values between 0 and Bar are neither credited nor debited, values below 0 are debited)
3	Bar only, no Band. The bar is based on projected emissions and removals

**Table 2: Accounted net emissions from forest management (FM), expressed as % compared to 1990 GHG emissions without LULUCF, using a hypothetical accounting period 2013-2020.**

Different *reference levels* were used to set the bar: not applicable for option 1; two different historical periods for options 2a, 2b, 2c; BAU projections for option 3.

Two different *scenarios* for 2013-2020 are considered: (A) “stable sink” assumes that the sink in 2013-2020 is equal to the sink of 2001-2005; (B) “BAU projections” uses data from official country’s documents (when available) or from two European forestry models (see Annex for further methodological information).

As information on FM projections for the non-EU Annex 1 countries is still incomplete, the cells “Other A1 Parties” and “Total A1” that need projections as input are empty. The contribution of the current FM cap is also shown for comparison (last column).

Accounted net emissions (+) and removals (-) from Forest Management (hypothetical accounting period 2013-2020) for different accounting options: % as compared to 1990 GHG emissions without LULUCF															Current FM cap (% of KP base yr. <sup>c</sup> )		
Reference level used to set the bar		1990			2001-2005			BAU projections 2013-2020									
Options	1 <sup>a</sup>	2a	2b <sup>b</sup>	2c	2a	2b <sup>b</sup>	2c	2a	2b <sup>b</sup>	2c	2a	2b <sup>b</sup>	2c	3			
Scenario for 2013-2020	A	B	A			B			A			B			A	B	
EU	-1.3	-1.0	-1.1	-1.0	-1.4	1.0	0.9	-0.4	0.0	0.0	0.0	2.1	1.7	0.3	-2.1	0.0	-0.7
Other A1 Parties	-1.8		-3.9	-3.6	-4.0				0.0	0.0	0.0					0.0	-2.8
Total A1	-1.7		-3.1	-2.8	-3.2				0.0	0.0	0.0					0.0	-1.8

<sup>a</sup> For illustrative purposes only, a discount factor of 85% is used.

<sup>b</sup> For option 2b X is set as 5%<sup>1</sup> of the BAR.

<sup>c</sup> The sum of caps of Parties having elected FM is compared to the sum of GHGs of KP base year (i.e. including provisions from Art. 3.7).

The accounted net emissions for the different options, scenarios and reference periods in table 2 range from -2.1% to 2.1% compared with 1990 GHG emissions without LULUCF for EU, and -3.2% to -1.7%<sup>2</sup> compared with 1990 GHG emissions without LULUCF for all Annex 1 countries. The current accounting approach for forest management (gross-net with a cap) is within these ranges.

<sup>1</sup> For illustrative purposes only, the BAND was set at ± 5% of the BAR. The eventual use of a symmetrical BAND will be subject to negotiations, taking account of the underlying uncertainties of this sector;

<sup>2</sup> It should be noted that it was currently not possible to conduct projections on forest management for all non-EU Annex 1 countries due to the lack of data. Thus, only some of the possible combinations in Table 2 were explored for “Other A1”.

**Table 3. Net Emissions (+) and Removals (-) from Forest Management (Mt CO<sub>2</sub> eq.), estimated<sup>3</sup> from latest available submissions to UNFCCC (29 April 2009)**

Total GHG 1990 without LULUCF	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Austria	79	-12	-17	-12	-16	-15	-14	-10	-19	-17	-22	-16	-19	-15	-17	-17	-17	-17
Belgium	143	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-5	-4	-3	-3	-2	-3
Bulgaria	118	-6	-8	-7	-7	-7	-8	-7	-7	-7	-7	-9	-9	-8	-7	-8	-7	-7
Czech Republic	194	-5	-10	-12	-10	-8	-8	-8	-7	-8	-8	-8	-8	-8	-6	-7	-7	-4
Denmark	69	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-1	-3	-4	-3	-3	-2	-3
Estonia	42	-8	-8	-10	-9	-7	-7	-7	-5	-5	-1	-1	-3	-2	-4	-7	-7	-8
Finland	71	-23	-38	-32	-30	-23	-23	-32	-25	-22	-25	-26	-30	-30	-30	-31	-36	-41
France	563	-48	-41	-47	-55	-57	-57	-60	-62	-62	-64	-49	-58	-65	-68	-69	-71	-69
Germany	1215	-74	-74	-74	-74	-74	-74	-74	-74	-74	-74	-74	-74	-74	-74	-74	-74	-74
Greece	106	-2	-2	-2	-2	-2	-3	-3	-3	-2	-3	-1	-4	-4	-4	-4	-4	-2
Hungary	99	-4	-4	-5	-7	-8	-8	-3	-3	-5	-2	-1	-3	-3	-5	-4	-5	-4
Ireland	55	-1	-1	-1	-1	-1	0	0	0	-1	-1	0	0	0	-1	-1	-1	-1
Italy	516	-52	-74	-70	-54	-71	-76	-78	-70	-68	-75	-69	-77	-83	-73	-79	-81	-82
Latvia	27	-19	-19	-19	-19	-18	-15	-16	-14	-13	-13	-12	-13	-12	-13	-13	-16	-33
Lithuania	49	-10	-9	-9	-8	-9	-7	-8	-8	-8	-8	-8	-8	-7	-7	-8	-8	-8
Luxembourg	13	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Netherlands	212	-3	-3	-3	-3	-3	-3	-3	-3	-3	-3	-2	-2	-3	-3	-2	-2	-2
Poland	454	-36	-42	-40	-34	-33	-33	-34	-36	-36	-36	-36	-35	-41	-42	-45	-46	-51
Portugal	59	1	0	-3	-3	-4	-5	-6	-7	-6	-7	-7	-7	-7	6	-2	-1	-3
Romania	243	-36	-37	-38	-39	-40	-39	-38	-38	-40	-39	-38	-39	-37	-36	-35	-37	-36
Slovakia	73	-4	-5	-6	-6	-5	-4	-4	-3	-3	-3	-4	-6	-6	-5	-4	0	-3
Slovenia	19	-3	-4	-4	-4	-4	-5	-5	-4	-5	-5	-5	-5	-5	-6	-5	-5	-6
Spain	288	-21	-21	-21	-21	-21	-21	-21	-21	-21	-21	-21	-21	-21	-21	-21	-21	-21
Sweden	72	-36	-39	-37	-34	-31	-29	-36	-40	-38	-38	-36	-37	-37	-37	-31	-28	-26
UK <sup>4</sup>	771	-12	-13	-13	-14	-14	-13	-12	-12	-11	-11	-11	-11	-12	-12	-12	-11	-10
<b>EU</b>	<b>5551</b>	<b>-420</b>	<b>-477</b>	<b>-471</b>	<b>-458</b>	<b>-460</b>	<b>-458</b>	<b>-473</b>	<b>-468</b>	<b>-465</b>	<b>-471</b>	<b>-441</b>	<b>-477</b>	<b>-489</b>	<b>-472</b>	<b>-486</b>	<b>-489</b>	<b>-498</b>
Australia	416	-31	-31	-32	-32	-29	-28	-29	-29	-29	-26	-23	-22	-21	-20	-18	-23	-24
Belarus	129	-25	-27	-26	-27	-28	-28	-28	-26	-27	-28	-28	-27	-25	-25	-26	-27	-26
Canada	592	-78	-57	-101	-24	-23	182	-64	-99	104	5	-92	-94	74	47	108	33	34
Croatia	33	-4	-9	-9	-8	-9	-9	-9	-8	-7	-8	-5	-8	-8	-6	-8	-8	-7
Iceland	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Japan	1272	-75	-75	-75	-76	-76	-80	-80	-80	-80	-81	-81	-81	-91	-91	-91	-86	-82
Liechtenstein	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Monaco	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
New Zealand	62	-6	-6	-5	-5	-7	-7	-9	-10	-10	-10	-12	-13	-14	-13	-12	-9	-6
Norway	50	-15	-14	-14	-14	-13	-14	-14	-14	-14	-16	-20	-21	-26	-29	-29	-31	-25
Russian Federation	3319	-216	-218	-219	-469	-470	-470	-466	-469	-30	-457	200	15	-689	-940	-728	-221	-86
Switzerland	53	-3	-3	-2	-4	-6	-6	-5	-3	-3	-2	0	-1	-1	-3	-1	0	-2
Turkey	170	-44	-45	-46	-46	-48	-47	-47	-49	-50	-51	-50	-52	-52	-53	-52	-49	-52
Ukraine	922	-54	-56	-56	-56	-55	-52	-49	-50	-52	-52	-51	-51	-50	-48	-47	-47	-47
US	6084	-524	-567	-558	-521	-552	-561	-524	-563	-495	-418	-377	-477	-734	-1016	-1038	-856	-757
<b>Other AI</b>	<b>13105</b>	<b>-1076</b>	<b>-1108</b>	<b>-1143</b>	<b>-1282</b>	<b>-1314</b>	<b>-1121</b>	<b>-1325</b>	<b>-1402</b>	<b>-694</b>	<b>-1145</b>	<b>-541</b>	<b>-833</b>	<b>-1638</b>	<b>-2197</b>	<b>-1941</b>	<b>-1323</b>	<b>-1080</b>
<b>Total AI</b>	<b>18656</b>	<b>-1496</b>	<b>-1585</b>	<b>-1613</b>	<b>-1740</b>	<b>-1775</b>	<b>-1579</b>	<b>-1798</b>	<b>-1869</b>	<b>-1159</b>	<b>-1616</b>	<b>-982</b>	<b>-1310</b>	<b>-2127</b>	<b>-2669</b>	<b>-2427</b>	<b>-1811</b>	<b>-1578</b>

<sup>3</sup> Emissions/removals from Forest Management (FM) for 1990-2007 are estimated as: CO<sub>2</sub> emissions/removals from Forest land remaining forest land (CRF table 5A1) + relevant GHG emissions from CRF tables 5(I), 5 (II) and 5(V). In many cases this approach may represent a good proxy for FM. Exceptions may occur where a large share of the total forest area is subject to land use changes: in this case, due the 20-year transition period used in UNFCCC vs the "since-1990" used in KP, the UNFCCC-based reporting format may be not a good proxy for FM. We also assumed that "managed forest" under UNFCCC = "forest management" under KP.

<sup>4</sup> For UK, emissions and removals from Land converted to Forest before 1990 (i.e. forest planted between 1921 and 1989, as indicated in UK's GHG inventory) were included in this analysis.

## Additional methodological information on projections for EU

The projections for Forest Management in the period 2013-2020 used in table 2 come from:

- Official country's documents when available (e.g. projections up to 2020 on forest remaining forest in National Communications, and EU Monitoring Mechanism).
- Two European forestry models for those countries (the majority) not having official projections up to 2020 on FM *or* on forest remaining forest.

The models used are EFISCEN<sup>5</sup> and FORMICA<sup>6</sup>. These models incorporate the available information of current forest age structure for EU countries; the scenarios selected are those closer to a BAU situation, and do not consider the effect of climate change. Both these models foresee a decreasing sink by 2020 as compared to both the current and the 1990 sink level. To make the results of these models comparable (in absolute levels) with historical data, these results were "calibrated" with data submitted to UNFCCC for the period 1996-2007 (not all models provided results before 1996)<sup>7</sup>. Then, for each country, the average of the two models was considered and summed up for the whole EU. Projections collected so far are not yet fully comparable among themselves, as they may differ in terms of definitions, C pools and scenario assumptions. Furthermore, uncertainties associated with projections in the forest sector should be recognised when interpreting the outputs of Table 2.

## References

### EFISCEN:

- Schelhaas, M.-J., Eggers-Meyer, J., Lindner, M., Nabuurs, G.-J., Päivinen, R., Schuck, A., Verkerk, P.J., Werf, D.C.v.d. and Zudin, S. (2007). Model documentation for the European Forest Information Scenario model (EFISCEN 3.1.3). Alterra report 1559 and EFI technical report 26, Alterra and European Forest Institute, Wageningen and Joensuu.
- Verkerk, P.J., Lindner, M., Zanchi, G. and Zudin, S. (2009) Assessing impacts of intensified biomass removal on deadwood in European forests. *Ecological Indicators*. In press
- Sallnäs O. (1990). A matrix model of the Swedish forest. *Studia Forestalia Suecica*, 183, 23.

### FORMICA:

- UBA (2006). Climate Change. Kyoto Protocol: Analysis of Options for Further Development of Commitments for the Second Commitment Period, part "Sinks in the Second Commitment Period". available at <http://www.umweltdaten.de/publikationen/fpdf-l/3190.pdf>, German Environmental Agency Report UB AFB Nr 000991
- Böttcher H., Freibauer A., Obersteiner M., Schulze E. (2008). Uncertainty analysis of climate change mitigation options in the forestry sector using a generic carbon budget model. *Ecological Modeling*, 213: 45-62.

<sup>5</sup> EFISCEN (European Forest Information Scenario) is a large-scale, forest resource projection, model. EFISCEN permits the incorporation of major management constraints and actual ecological and production characteristics typical for individual countries. The model, which uses forest inventory data as input, is especially suited for simulating managed, even aged forests at large scales.

<sup>6</sup> FORMICA, a dynamic inventory-based model, is part of the EU project CC-TAME. Within this project, a global forestry sector model (Global Forest Model, based on Kindermann et al. 2006, Carbon Balance and Management, 1:15) is currently set up for projections of emissions and removals from forest management. This economic model is calibrated by models like Formica and linked to a global land use sector model to represent economic constraints of mitigation options in forestry. First results are expected by summer 2009.

<sup>7</sup> The calibration of these models to historical data and the link to the different accounting options was carried out by the Joint Research Centre (JRC) of the European Commission.