se2009.eu

Swedish Presidency
of the European Union

INFORMAL SUBMISSION BY SWEDEN ON BEHALF OF THE EUROPEAN UNION AND ITS MEMBER STATES ON DATA ON FOREST MANAGEMENT.

Brussels, 14th of December 2009

The European Union is determined to find agreement in Copenhagen on arrangements for accounting for the LULUCF sector that ensure environmental integrity and maintain necessary incentives in line with the position set out in paragraph 33 by EU Ministers of Environment on the 21st of October 2009:

> *"RECOGNIZES that future accounting rules for forest management should provide an adequate balance between further incentives for sequestration, for use of wood products and for biomass energy; STRESSES the need for future accounting rules to secure that the environmental integrity of a Copenhagen agreement is preserved; ACKNOWLEDGES that there are still difficulties associated with methodologies for measuring and predicting LULUCF GHG flows with a high degree of accuracy; WELCOMES further discussions with other Parties on accounting rules for forest management where the EU is open to discuss schemes based on the use of a reference level (bar), which includes an environmentally robust interval (band) while being CONSCIOUS that national circumstances, such as age class legacy effects, may require some flexibility for countries regarding the choice of reference level including allowing for historic data or robust and transparent projections open to independent review and verification; the use of gross-net accounting with a discount could also be considered in these discussions; CONSIDERS that accounting rules need to deal with emissions and removals associated with extreme events (force majeure) to reduce the risk that Parties cannot comply with their mitigation*

objectives because of such events. CONSIDERS that subject to such flexibility being provided for, accounting for forest management should become mandatory for all Parties taking on quantified commitments in a Copenhagen agreement."

To facilitate the negotiations in Copenhagen, the EU is informally submitting data, based on the format proposed by co-chairs and made available on the UNFCCC website. Data is covering proposals for forest management accounting included in the co-chairs non-paper *(FCCC/KP/AWG/2009/10/Add.3/Rev.3).*

National reference levels (paragraph 11, option 3)

In relation to the proposal for national reference levels, the EU is informally submitting data, in addition to that previously submitted including on historical references, taken into account the criteria in paragraph 11, option 3:

11. For the second commitment period, accountable anthropogenic greenhouse gas emissions by sources and removals by sinks [resulting from forest management under Article 3, paragraph 4][from forest land] shall be relative to a reference level. The [forest management][forest land] reference levels [inscribed in the appendix below were set][will be set] transparently, taking into account:

(a) Removals or emissions from forest management as shown in GHG inventories and relevant historical data;

(b) Age–class structure;

[The following elements [where relevant] [could also be] taken transparently into account:]

(c) Forest management activities already undertaken;

(d) Projected forest management activities;

(e) Continuity with treatment of forest management in the first commitment period.

This submission shows how proposed reference levels for the EU and its Member States might be calculated using one of the options we would be willing to explore. This submission is, however, illustrative and without prejudice to the EU's full position which remains as set out above and does not rule out an agreement on other possible options. Should the final agreement provide for setting a reference level, the EU would expect that to be calculated in conformity with the rules that will ultimately be agreed.

When establishing national reference levels, the EU and its Member States have included policies and measures implemented up to mid 2009. Furthermore, age structure has been considered, the models for forecasting can also represent historical data, and all carbon pools reported to UNFCCC are included.

This submission includes updates, revisions of information and, when available, new estimates for previously missing data in comparison to the previous EU submission, and more specifically the 11 November 2009 EU informal submission, which was made available on the UNFCCC website during the Barcelona session.

All data, including forecasts, revisions and updates of historical data, is open for future review.

To facilitate the negotiations in Copenhagen, data are presented based on the format proposed by the co-chairs and made available on the UNFCCC website. In addition, detailed tables are provided to facilitate the understanding of the information presented in the format proposed by the co-chairs. The latter include assessment of the inclusion of harvested wood products in the proposed reference levels under the Production approach and the SCAD[1] approach. An assessment of other options is also included, namely gross-net with a discount factor, net-net based on 1990 and net-net based on 2008-2012. In addition, the EU has included an assessment of the different options for the reference interval.

To date, the most complete time series on emissions and removals from forest management in the European Union comes from the information submitted by the EU in its voluntary submission presented during the Climate Talks in Barcelona (available from the UNFCCC website http://unfccc.int/meetings/ad_hoc_working_groups/kp/items/4907.php).

The general methodology adopted in that submission was maintained, and the only changes in input data come from revisions in historical data from a few Member States and updates from the modelling exercise that the Joint Research centre is conducting or from Member State forecasting results, when those were available.

More details on the data and methodologies used are provided in Annex 1 and 2.

[1] Stock Change of Domestically produced and consumed harvested wood products.

Party	1990 emissions / removals (MtCO2e/yr)	Proposed reference level & reference interval (if any) (MtCO2e/yr)	Forecast for 1st CP2 (MtCO2e/yr)	Forecast for 2013-2020 (MtCO2e/yr)	Forecast based on 1990 (MtCO2e/yr) (E = D–A)	Forecast based on Reference Level (MtCO2eq./year) (F=D- B)	Forecast based on 1st CP (MtCO2eq./year) (G=D-C)	Forecast under Option B for 2013-2020 (MtCO2eq./year)
Austria	-11.51	-1.52	-3.78	-1.52	9.99	0	2.26	na
Belgium	-3.21	-3.15	-3.01	-3.15	0.06	0	-0.14	na
Bulgaria	-6.16	-6.49	-6.70	-6.49	-0.33	0	0.21	na
Cyprus	-0.12	-0.18	-0.17	-0.18	-0.07	0	-0.01	na
Czech Republic	-5.86	-3.99	-4.01	-3.99	1.87	0	0.02	na
Denmark	-0.93	0.32	0.42	0.32	1.26	0	-0.10	na
Estonia	-8.03	-0.74	-3.29	-0.74	7.29	0	2.55	na
Finland	-23.93	-13.70	-24.71	-13.70	10.23	0	11.01	na
France	-44.73	-50.98	-62.97	-50.98	-6.25	0	11.99	na
Germany	-79.97	0.85	-1.40	0.85	80.81	0	2.25	na
Greece	-1.99	-3.08	-3.45	-3.08	-1.09	0	0.37	na
Hungary	-3.91	-1.25	-2.30	-1.25	2.66	0	1.06	na
Ireland	-1.25	-0.08	-0.65	-0.08	1.17	0	0.57	na
Italy	-46.16	-53.45	-61.27	-53.45	-7.29	0	7.82	na
Latvia	-21.64	-26.03	-27.95	-26.03	-4.39	0	1.92	na
Lithuania	-11.43	-6.34	-7.26	-6.34	5.10	0	0.92	na
Luxembourg	0.21	-0.26	-0.38	-0.26	-0.47	0	0.12	na
Malta	-0.05	-0.05	-0.05	-0.05	0.00	0	0.00	na
Netherlands	-2.53	-1.84	-2.10	-1.84	0.69	0	0.26	na
Poland	-38.63	-34.01	-36.04	-34.01	4.62	0	2.03	na
Portugal	3.35	-0.27	-0.99	-0.27	-3.63	0	0.72	na
Romania	-35.58	-30.25	-33.44	-30.25	5.34	0	3.20	na
Slovakia	-4.44	-2.15	-2.63	-2.15	2.29	0	0.48	na
Slovenia	-3.19	-2.71	-4.89	-2.71	0.47	0	2.18	na
Spain	-19.73	-19.37	-19.81	-19.37	0.36	0	0.44	na
Sweden	-35.57	-21.84	-20.78	-21.84	13.73	0	-1.07	na
UK	-12.18	-3.44	-8.33	-3.44	8.74	0	4.89	na
EU-27	**-419.16**	**-286.00**	**-341.93**	**-286.00**	**133.16**	**0**	**55.93**	**na**

	Entry data Net Removals (-) or Net Emissions (+) (1 000 tCO_2eq)																Sources	
	1990					Average 1990-2007 (2)				Forecast 2008-2012 (2)				Forecast 2013-2020 (2)					
	FM net-removals / net emissions	Emissions from natural disturbances in the year(3)	HWP (1)			FM net-removals / net emissions	Emissions from natural disturbances in the period	HWP		FM net-removals / net emissions	Emissions from natural disturbances in the period	HWP		FM net-removals / net emissions	Emissions from natural disturbances in the period	HWP		Historical data (1990-2007)	Projections (2008-2012) (2013-2020)
			half lives	SCAD value	PA value			SCAD value	PA value			SCAD value	PA value			SCAD value	PA value		
Austria	-11 511	nsq	15Y/1Y	-438	-1 980	-14 061	nsq	-319	-1 640	-3 780	nsq	-392	-2 436	-1 521	nsq	-213	-1 634	Country data (FM) Rueter (HWP)	Country data (FM) Rueter, sce A (HWP)
Belgium	-3 205	nsq	-	-	-	-3 168	nsq	-	-	-3 010	nsq	-	-	-3 150	nsq	-	-	UNFCCC	Models
Bulgaria	-6 157	nsq	15Y/1Y	432	44	-7 429	nsq	750	519	-6 703	nsq	358	127	-6 490	nsq	395	141	UNFCCC (FM) Rueter (HWP)	Models (FM) Rueter, sce A (HWP)
Cyprus	-116	nsq	15Y/1Y	6	6	-147	nsq	14	14	-172	nsq	17	18	-185	nsq	14	14	EU Monitoring Mechanism (FM), Rueter (HWP)	Linear extrapolation (FM), Rueter, sce A (HWP)
Czech Republic	-5 860	nsq	15Y/1Y	-38	-66	-7 696	nsq	-183	-407	-4 006	nsq	-454	-606	-3 986	nsq	-358	-877	UNFCCC modified /KP reporting	Models
Denmark	-932	nsq	15Y/1Y	-32	-1	-683	nsq	315	299	420	nsq	318	226	323	nsq	255	209	Country data on FM	Country data
Estonia	-8 032	nsq	15Y/1Y	-3	-14	-5 880	nsq	-90	-81	-3 291	nsq	-138	-119	-744	nsq	-157	-148	UNFCCC (FM) Rueter (HWP)	Models (FM) Rueter, sce A (HWP)
Finland	-23 933	nsq	15Y/1Y	-611	-711	-30 530	nsq	-654	-2 677	-24 712	nsq	-525	-1 083	-13 700	nsq	-478	-1 168	Country data	Country data
France	-44 729	nsq	15Y/1Y	-1 466	-2 625	-59 196	nsq	-521	-2 469	-62 970	nsq	-123	-1 914	-50 982	nsq	-24	-1 421	Country data (FM) Rueter (HWP)	Models
Germany	-79 967	13	24Y/2Y	-6 160	-8 697	-54 842	8	-4 171	-10 863	-1 399	nsq	-4 427	-14 462	848	nsq	-3 655	-10 787	Country data	Country data
Greece	-1 990	nsq	15Y/1Y	-193	-25	-2 837	nsq	-129	-149	-3 449	nsq	-193	-215	-3 077	nsq	-24	-1 421	UNFCCC (FM) Rueter (HWP)	linear extrapolation (FM) Rueter, sce A (HWP)
Hungary	-3 913	nsq	15Y/1Y	142	153	-4 012	nsq	441	329	-2 303	nsq	318	174	-1 248	nsq	263	153	Country data (FM) Rueter (HWP)	linear extrapolation (FM) Rueter, sce A (HWP)
Ireland	-1 251	19	15Y/1Y	-281	-470	-974	18	-309	-754	-652	20	-151	-627	-85	20	-150	-530	Country data on FM	Country data
Italy	-46 157	nsq	15Y/1Y	-1 564	-1 854	-65 258	nsq	-816	-1 292	-61 272	nsq	-86	-671	-53 449	nsq	-280	-608	Country data (FM) Rueter (HWP)	Models (FM) Rueter, sce A (HWP)
Latvia	-21 638	nsq	15Y/1Y	-9	-35	-25 648	nsq	-94	-368	-27 945	nsq	-283	-437	-26 029	nsq	-270	-496	UNFCCC modified (FM) Rueter (HWP)	Models (FM) Rueter, sce A (HWP)
Lithuania	-11 432	nsq	15Y/1Y	-6	-18	-9 036	nsq	-57	-108	-7 256	nsq	-245	-296	-6 336	nsq	-225	-277	UNFCCC modified (FM) Rueter (HWP)	Models (FM) Rueter, sce A (HWP)
Luxembourg	205	nsq	-	-	-	-399	nsq	-	-	-376	nsq	-	-	-260	nsq	-	-	EU Monitoring Mechanism (FM),	Linear extrapolation (FM),
Malta	-49	nsq	-	-	-	-49	nsq	-	-	-49	nsq	-	-	-49	nsq	-	-	EU Monitoring Mechanism (FM),	Linear extrapolation (FM),
Netherlands	-2 529	nsq	15Y/1Y	12	-197	-2 445	nsq	105	35	-2 103	nsq	20	159	-1 840	nsq	48	82	UNFCCC (FM) Rueter (HWP)	Models (FM) Rueter, sce A (HWP)
Poland	-38 630	nsq	15Y/1Y	2 253	2 189	-40 595	nsq	178	-305	-36 038	nsq	-1 967	-1 561	-34 008	nsq	-1 305	-2 154	UNFCCC modified (FM) Rueter (HWP)	Models (FM) Rueter, sce A (HWP)
Portugal	3 351	1 755	15Y/1Y	-257	-1 478	92	2 847	38	-414	-994	1 449	240	104	-275	1 892	415	176	Country data (FM) Rueter (HWP)	Country data (FM) Rueter, sce B (HWP)
Romania	-35 583	nsq	15Y/1Y	460	1 836	-37 790	nsq	1 222	991	-33 443	nsq	523	-451	-30 247	nsq	465	-349	UNFCCC (FM) Rueter (HWP)	Models (FM) Rueter, sce A (HWP)
Slovakia	-4 436	nsq	15Y/1Y	-7	-18	-4 098	nsq	-165	-336	-2 626	nsq	-786	-684	-2 146	nsq	-774	-988	UNFCCC (FM) Rueter (HWP)	Models (FM) Rueter, sce A (HWP)
Slovenia	-3 186	878	-	-	-	-4 810	942	-	-	-4 891	1 128	-	-	-2 713	1 382	-	-	UNFCCC (FM)	Country data (FM)
Spain	-19 733	nsq	30Y/2Y	-2 703	-3 318	-19 739	nsq	-2 780	-3 892	-19 809	nsq	-2 170	-3 626	-19 374	nsq	-2 829	-4 727	Country data	Models
Sweden	-35 569	18	15Y/1Y	-1 670	-2 620	-33 835	143	-94	-2 604	-20 778	348	-748	-2 395	-21 844	55	-326	-1 819	Country data	Country data
UK	-12 178	nsq	21Y/15Y	-1 165	-1 456	-12 907	nsq	-557	-696	-8 326	nsq	-2 290	-2 862	-3 438	nsq	-3 010	-3 763	Country data on FM	Country data
EU-27	-419 159			-13 298	-21 355	-447 969			-26 868	-341 934		-13 183	-33 636	-286 003		-12 223	-32 392		

(1) PA: Production approach; SCAD: Stock Change Approach on Domestically produced and consumed wood; Default: Instant oxydation approach. Half lives eg 30y/2y for 30 years for solidwood products and 2 years for paper

(2) All intervals are inclusive of start and end years

(3) Natural Disturbances: nsq = non separately quantified

	Assessment of accounting options for the period 2013 -2020 (1 000 tCO2eq)									
	Proposed Reference Level (3)		using the proposed Reference Level				Gross-Net w/ D. Factor		Reference level based on	
					RL + symetrical interv.					
	value (1 000 tCO2eq)	HWP	RL no interval	RL + assymetrical interv.	proposed interval	value	proposed discount factor	value	1990	average 2008-2012
Austria	-1 521	inst.oxidation	0	0	±5%	0	85%	-228	9 990	2 259
Belgium	-3 150	inst.oxidation	0	0	±5%	0	85%	-473	55	-140
Bulgaria	-6 490	inst.oxidation	0	0	±5%	0	85%	-974	-333	213
Cyprus	-185	inst.oxidation	0	0	±5%	0	85%	-28	-69	-12
Czech Republic	-3 986	inst.oxidation	0	0	±5%	0	85%	-598	1 874	20
Denmark	323	inst.oxidation	0	0	±5%	0	85%	48	1 255	-97
Estonia	-744	inst.oxidation	0	0	±5%	0	85%	-112	7 288	2 547
Finland	-13 700	inst.oxidation	0	0	±30%	0	85%	-2 055	10 233	11 012
France	-50 982	inst.oxidation	0	0	0%	0	85%	-7 647	-6 253	11 988
Germany	848	inst.oxidation	0	0	±5%	0	85%	127	80 815	2 247
Greece	-3 077	inst.oxidation	0	0	±5%	0	85%	-462	-1 087	372
Hungary	-1 248	inst.oxidation	0	0	±5%	0	85%	-187	2 665	1 055
Ireland	-85	inst.oxidation	0	0	±5%	0	85%	-13	1 166	567
Italy	-53 449	inst.oxidation	0	0	±5%	0	85%	-8 017	-7 292	7 823
Latvia	-26 029	inst.oxidation	0	0	±5%	0	85%	-3 904	-4 391	1 916
Lithuania	-6 336	inst.oxidation	0	0	±5%	0	85%	-950	5 096	920
Luxembourg	-260	inst.oxidation	0	0	±5%	0	85%	-39	-465	116
Malta	-49	inst.oxidation	0	0	±5%	0	85%	-7	0	0
Netherlands	-1 840	inst.oxidation	0	0	±5%	0	85%	-276	689	263
Poland	-34 008	inst.oxidation	0	0	±5%	0	85%	-5 101	4 622	2 030
Portugal	-275	inst.oxidation	0	0	±5%	0	85%	-41	-3 626	719
Romania	-30 247	inst.oxidation	0	0	±5%	0	85%	-4 537	5 336	3 196
Slovakia	-2 146	inst.oxidation	0	0	±5%	0	85%	-322	2 290	480
Slovenia	-2 713	inst.oxidation	0	0	±5%	0	85%	-407	473	2 178
Spain	-19 374	inst.oxidation	0	0	±5%	0	85%	-2 906	359	435
Sweden	-21 844	inst.oxidation	0	0	±18%	0	85%	-3 277	13 725	-1 066
UK	-3 438	inst.oxidation	0	0	±5%	0	85%	-516	8 740	4 889
EU-27	**-286 003**		**0**	**0**		**0**		**-42 900**	**133 156**	**55 930**

(3) Proposed reference levels exclude harvested wood products

	Assessment of accounting options for the period 2013 -2020 (1 000 tCO2eq)									
	Proposed Reference Level (3)		using the proposed Reference Level				Gross-Net w/ D. Factor		Reference level based on	
					RL + symetrical interv.					
	value (1 000 tCO2eq)	HWP	RL no interval	RL + assymetrical interv.	proposed interval	value	proposed discount factor	value	1990	average 2008-2012
Austria	-3 155	Production App.	0	0	±5%	0	85%	-473	10 336	3 061
Belgium										
Bulgaria	-6 349	Production App.	0	0	±5%	0	85%	-952	-236	227
Cyprus	-171	Production App.	0	0	±5%	0	85%	-26	-61	-16
Czech Republic	-4 863	Production App.	0	0	±5%	0	85%	-729	1 063	-251
Denmark	532	Production App.	0	0	±5%	0	85%	80	1 465	-114
Estonia	-892	Production App.	0	0	±5%	0	85%	-134	7 154	2 518
Finland	-14 868	Production App.	0	0	±30%	0	85%	-2 230	9 776	10 927
France	-52 403	Production App.	0	0	0	0	85%	-7 860	-5 049	12 481
Germany	-9 939	Production App.	0	0	±5%	0	85%	-1 491	78 725	5 922
Greece	-4 498	Production App.	0	0	±5%	0	85%	-675	-2 483	-834
Hungary	-1 095	Production App.	0	0	±5%	0	85%	-164	2 665	1 034
Ireland	-615	Production App.	0	0	±5%	0	85%	-92	1 106	664
Italy	-54 057	Production App.	0	0	±5%	0	85%	-8 109	-6 046	7 886
Latvia	-26 525	Production App.	0	0	±5%	0	85%	-3 979	-4 852	1 857
Lithuania	-6 613	Production App.	0	0	±5%	0	85%	-992	4 837	939
Luxembourg										
Malta										
Netherlands	-1 758	Production App.	0	0	±5%	-88	85%	-264	968	186
Poland	-36 162	Production App.	0	0	±5%	0	85%	-5 424	279	1 437
Portugal	-99	Production App.	0	0	±5%	0	85%	-15	-1 972	791
Romania	-30 596	Production App.	0	0	±5%	0	85%	-4 589	3 151	3 298
Slovakia	-3 134	Production App.	0	0	±5%	0	85%	-470	1 320	176
Slovenia										
Spain	-24 101	Production App.	0	0	±5%	0	85%	-3 615	-1 050	-667
Sweden	-23 663	Production App.	0	0	±18%	0	85%	-3 549	14 526	-490
UK	-7 201	Production App.	0	0	±5%	0	85%	-1 080	6 433	3 988
EU-27	**-312 224**		**0**	**0**		**-88**		**-46 834**	**122 056**	**55 021**

(3) Proposed reference levels include harvested wood products

	Assessment of accounting options for the period 2013 -2020 (1 000 tCO2eq)									
	Proposed Reference Level (3)		using the proposed Reference Level				Gross-Net w/ D. Factor		Reference level based on	
					RL + symetrical interv.					
	value (1 000 tCO2eq)	HWP	RL no interval	RL + assymetrical interv.	proposed interval	value	proposed discount factor	value	1990	average 2008-2012
Austria	-1 734	SCAD App.	0	0	±5%	0	85%	-260	10 215	2 438
Belgium										
Bulgaria	-6 095	SCAD App.	0	0	±5%	0	85%	-914	-370	250
Cyprus	-171	SCAD App.	0	0	±5%	0	85%	-26	-61	-15
Czech Republic	-4 344	SCAD App.	0	0	±5%	0	85%	-652	1 554	116
Denmark	578	SCAD App.	0	0	±5%	0	85%	87	1 542	-160
Estonia	-901	SCAD App.	0	0	±5%	0	85%	-135	7 134	2 528
Finland	-14 178	SCAD App.	0	0	±30%	0	85%	-2 127	10 366	11 059
France	-51 006	SCAD App.	0	0	0%	0	85%	-7 651	-4 811	12 087
Germany	-2 807	SCAD App.	0	0	±5%	0	85%	-421	83 320	3 019
Greece	-3 101	SCAD App.	0	0	±5%	0	85%	-465	-918	541
Hungary	-985	SCAD App.	0	0	±5%	0	85%	-148	2 786	1 000
Ireland	-235	SCAD App.	0	0	±5%	0	85%	-35	1 297	568
Italy	-53 729	SCAD App.	0	0	±5%	0	85%	-8 059	-6 008	7 629
Latvia	-26 299	SCAD App.	0	0	±5%	0	85%	-3 945	-4 652	1 929
Lithuania	-6 561	SCAD App.	0	0	±5%	0	85%	-984	4 877	940
Luxembourg										
Malta										
Netherlands	-1 792	SCAD App.	0	0	±5%	0	85%	-269	725	291
Poland	-35 313	SCAD App.	0	0	±5%	0	85%	-5 297	1 064	2 692
Portugal	140	SCAD App.	0	0	±5%	0	85%	21	-2 954	894
Romania	-29 782	SCAD App.	0	0	±5%	0	85%	-4 467	5 341	3 138
Slovakia	-2 920	SCAD App.	0	0	±5%	0	85%	-438	1 523	492
Slovenia										
Spain	-22 203	SCAD App.	0	0	±5%	0	85%	-3 330	234	-224
Sweden	-22 170	SCAD App.	0	0	±18%	0	85%	-3 326	15 069	-644
UK	-6 448	SCAD App.	0	0	±5%	0	85%	-967	6 895	4 168
EU-27	**The EU totals are not presented, since it would require additional calculations**									

(3) Proposed reference levels include harvested wood products

ANNEX – COUNTRY NOTES

Austria:

Background Information on the Co-facilitators Table:

Column A: Source: UNFCCC

Column B:

Austria proposes a reference level for the commitment period 2013-2020 of -1.521 Mt CO2/year.

In previous EU submissions it has been reported in detail on researches carried out with the aim of modelling Austrian forest carbon stock changes in the years 2010, 2015 and 2020 (see last EU submission on forest management for more information and literature). Among the parameters considered in this model are silvicultural activities, ecological and economic aspects and four different timber price scenarios (as price reference Norway Spruce *Picea abies* timber was used). As reference level Austria proposes the CO_2 balance of the period 2013-2020. This balance was assessed for every year between 2013 and 2020 through interpolation of the data provided by the mentioned model for the years 2010, 2015 and 2020. For every year the average of the four price categories addressed by the model was used.

Forest policies: Austria is a signatory country to the Ministerial Conference on the Protection of Forests in Europe (MCPFE). Multi-purpose Forest management takes place in Austria within the frame of sustainability as defined by MCPFE promoting the maintenance of biodiversity, productivity and the regeneration capacity of forest ecosystems and simultaneously providing for relevant ecological, economic and social functions. The use of wood as a renewable energy source is one of the different components of multifunctional forestry and its importance has been highlighted by the Austrian Energy Strategy. Furthermore the Austrian Minister of Agriculture, Forestry, Environment and Water Management has explicitly emphasized the considerable contribution that wood can make to replace fossil fuels. Additionally, since several years the use of over-aged mountain forests is being incentivated aiming at favouring their natural regeneration and the maintenance of their protective function. This and other initiatives and policies are leading to increasing harvest rates (always maintained within annual yields).

Column C: Data used in order to assess the CO_2 balance for the first commitment period:

a) carbon flux of the year 2008 using the information provided by the Timber Harvest Reports. In Austria the last National Forest Inventory was carried out in the years 2000-2002. The data used for the year 2008 derive from the Timber Harvest Reports annually published by the Federal Ministry of Agriculture, Forestry, Environment and Water Management. Forest owners' estimations on harvested wood constitute the basis of this statistic. These data provide for an appropriate representation of C-fluxes on "forest land remaining forest land" on a conservative basis, as total harvest rates are underestimated in the Timber Harvest Reports as exemplified by following table for the years 2000 – 2002 (see the background information provided by Austria in previous EU submissions for more details):

	CO_2 balance (1000 ton CO2 eq)		
	2000	2001	2002
Nat. Forest Inventory	-16.240	-19.040	-15.350
Timber Harvest Report	-20.230	-19.960	-17.950

Source:

BFW 2009: National Forest Inventory. Federal Research Centre for Forests, Vienna, information on the last NFIs can be downloaded at the website: http://bfw.ac.at/rz/bfwcms.web?dok=788

BMLFUW 2009: Holzeinschlagsmeldungen. Timber harvest reports by the Federal Ministry of Agriculture, Forestry, Environment and Water Management, Vienna, the reports of the last years can be downloaded at the website: http://gpool.lfrz.at/dev/cgi-bin/bizzzhoo2/main.cgi?catid=13733&rq=cat&tfqs=catt&catt=default

b) data for the years 2009 to 2012 provided by the model mentioned in the background information of column B and already described in detail in previous EU submissions (except for the year 2008 data were obtained through extrapolation between the years 2009 to 2020, taking into account that data for the years 2010, 2015 and 2020 are provided by the model). For every year the average of the four price categories addressed by the model was used.

Column D: See above the background information regarding column B.

Column H: The forest area is the same within the Convention and the Kyoto Protocol.

Belgium:

Historical data come from data provided to the UNFCCC.

Due to complexities and a high level of inaccuracy related to data for Belgium from FAOSTAT, Belgium is not able to present any data on HWP in this submission. Data from FAOSTAT is used by Reuter (2009).

Forecasts for 2008-2012 and 2013-2020 calculated by JRC (2009).

Bulgaria:

Historical data come from data provided to the UNFCCC.

HWP data calculated by Rueter (2009), using scenario A *business as usual* (harvesting intensity = average of the last five years) and average half-lives of 15 years for solid wood products and 1 year for paper products.

Forecasts for 2008-2012 and 2013-2020 calculated by JRC (2009).

Czech Republic:

Historical data come from data provided to the UNFCCC.

HWP data calculated by Rueter (2009), using scenario A *business as usual* (harvesting intensity = average of the last five years) and average half-lives of 15 years for solid wood products and 1 year for paper products.

Forecasts for 2008-2012 and 2013-2020 calculated by JRC (2009).

Denmark:

Denmark's proposed reference level is using the prognosis for carbon stock during the period 2013 - 2020. This is based on the National Forest Inventory data on carbon stock in management classes - species and age classes. The data and the method are described in EU's voluntary submission on forest data presented during the Climate Talks in Bangkok.

Uncertainties in the projection are linked to possible changes in forest management, which may affect the development of forests. Thus, the postponement of cutting old trees will postpone the decline in carbon storage. Conversely, increased harvesting (e.g. due to increased demand, increased price or similar) may lead to a sharper decline in carbon stock.

The proposed reference level includes only policies and measures already in place. Models used for forecasts are based on area allocation to age classes based on probabilities for rejuvenation of each management class. It assumes a constant distribution of species (no species change), but a calculation of percentage of area rejuvenated each year with the same species. For each year, these calculations are combined with NFI data for carbon stocks in each management class. The forecast comprise all carbon pools (living biomass, dead organic matter and soil organic carbon) currently reported to the UNFCCC and use the most recent national data 2002-2007 (FM).
The method used is open for future review. Historical data as well as the projections are presented in the final report of a recent government report.
http://www.sl.life.ku.dk/Publikationer/Udgivelser/AndreVidenskabelige/FLWP44.aspx?katid=%7bC6BFAD94-B8EE-49D4-9419-85C702419AFC

Estonia:

Historical data come from data provided to the UNFCCC.

HWP data calculated by Rueter (2009), using scenario A *business as usual* (harvesting intensity = average of the last five years) and average half-lives of 15 years for solid wood products and 1 year for paper products.

Forecasts for 2008-2012 and 2013-2020 calculated by JRC (2009).

Finland:

The information including the proposed reference level provided in this informal submission is aimed at facilitating negotiations and does not constitute a negotiation position.

Reference level

The proposed reference level for 2013-2020 is 13.7 Mt CO2eq. The projection for the sink is 10 Mt CO2 eq. in 2015 and 17 Mt CO2 eq. in 2020. This projection is based on Finland's present national climate and energy strategy. It takes into account removals and emissions from forest management, relevant historical data, age-class structure, forest management activities already undertaken, projected forest management activities and continuity with treatment for forest management in the first commitment period. The forest sink has been between -23 and -41 Mt CO2 eq. in 1990-2007. The reasons to projections at lower level compared to historical data are:

- The projection includes estimates for CO2 and N2O emissions from drained organic soils. These emissions are expected to increase in the future as the weather is warming.
- Mineral soils have been a sink in Finland but, according to the model used, they seem to turn to a source as the weather is warming. The emission from mineral soils may be as high as 10 Mt CO2/yr. Uncertainties in this regard are very high.

Reference level with asymmetrical interval

Proposed asymmetrical interval of the reference level is 100% which is from 0 to -13,700 Gg CO2 eq. (0; - 13.7 Mt CO2e)

Reference level with symmetrical interval

Proposed interval is 30% of the reference level which is from -9,600 Gg CO2 to -17,800 Gg CO2eq. (-9.6 ; - 17.8 Mt CO2e). The LULUCF estimates have high uncertainties because they are not as easy to measure as emissions from other sectors. Methods to estimate carbon stock changes in soils, both mineral and organic soils, give very uncertain estimates. Practically, there is no difference whether the results are modeled or based on measurements.

France:

Historical data come from data provided to the UNFCCC.

HWP data calculated by Rueter (2009), using scenario A business as usual (harvesting intensity = average of the last five years) and average half-lives of 15 years for solid wood products and 1 year for paper products.

Forecasts for 2008-2012 and 2013-2020 calculated by JRC (2009).

According to paragraph 33 of the European Environment Council conclusions 21 October, the EU is considering a reference level including allowing for historic data or robust and transparent projections open to independent review and verification. Since the French forests are rather young, an adjustment to take into account age-class legacy effect is needed: the proposed reference level is therefore set equal to the 2013-2020 forecast (-50.982 MteCO2/yr).

Germany:

Historical data

The historical data are based on the National Inventory Report (NIR, data reported to the United Nations Framework Convention on Climate Change, UNFCCC): the NIR data assume a constant extrapolation based on two national forest inventories (NFI 1987 and NFI 2002) and the data from the national forest inventory study 2008 (IS 08).

Forecast data

The forecast is based on the WEHAM baseline model. WEHAM estimates the potential roundwood availability and related potential forest development, especially the growing stock over the next 40 years. WEHAM is a single tree model consisting of three sub-models for tree growth, for exploitation / harvest, and for timber assortments, respectively. The growth sub-model is based on data from the two German National Forest Inventories providing data for 1987 and 2002 and the Inventory Study data from 2008. It is used for extrapolating tree increment on a regional and species' related scale. The exploitation sub-model implements assumptions about parameters such as thinning intensity and frequency, age and the minimum threshold diameter of the final harvest cut. Additionally, WEHAM provides an estimate for the growing stock volume of the dominant crop only, but not of the subsidiary stand. General conditions like

climate, selection of tree species, or the forest area with legal restrictions on exploitation cannot be parameterised. The WEHAM-model excludes economic parameters, technical conditions for logging (e.g., slope, forest road density) and tree mortality.

The presented data represent the WEHAM A baseline scenario only: it refers to business as usual (BAU) assumptions about forest usage which have been developed in accordance with the management objectives of the state forestry administrations. For the next four decades, these are:

1.) a high and nearly constant level of growing stock in private forests,

2.) a growing stock in the state forests comparable to the level of private forests,

3.) a further increase of growing stocks for coniferous tree species (as current stem diameters for spruce and pine in the dominant age classes are below the threshold values for harvesting), and

4.) a decrease of growing stocks for deciduous tree species (as the current diameter stem diameters for beech and oak in the dominant age classes have reached the threshold values for harvesting).

Harvested wood products

In order to set a reference level for HWP, the same projection type A as in Barcelona submission has been used. The data presented now differs from the data presented in the EU's Barcelona submission, because country specific information for half-life of HWP in Germany was used. That means a mass weighted average half-life of 24 yrs for all solid wood products and 2 yrs for paper products. (For further explanation, please see: http://www.holzundklima.de/de-lulucf)

The projection (type A) for net-emissions from HWP assumes stable *Inflow* of domestically produced (PA) or domestically produced and consumed (SCAD) HWP to the pool until 2020. In addition, 2 scenarios (b and c) are calculated in order to show possible deviations from proposed reference level for HWP (= BAU projection) (cf. UNFCCC Table 'data on forest management', column F for HWP)

Projection period (2008-2020) is calculated with:

a) BAU: constant *Inflow* until 2020 (growth = 0,00%) based on average of last 5 years of *Inflow*, starting from 2009
b) Scenario 1 (2013-2020) with annual growth of *Inflow* = -1,00 %
c) Scenario 2 (2013-2020) with annual growth of *Inflow* = +1,00 %

Approach		unit	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Germany																																	
SCAD	BAU	1.000t CO2eq	-6160	-3237	-3019	-2834	-4601	-3651	-3663	-4265	-3537	-4679	-4138	-1679	-1352	-3335	-4676	-5107	-9271	-5870	-3848	-4870	-4659	-4466	-4290	-4126	-3975	-3833	-3699	-3574	-3455	-3342	-3235
SCAD	Scen 1	1.000t CO2eq																								-4126	-3662	-3239	-2852	-2494	-2162	-1853	-1564
SCAD	Scen 2	1.000t CO2eq																								-4126	-4287	-4432	-4565	-4689	-4805	-4915	-5020
PA	BAU	1.000t CO2eq	-8697	-5013	-5133	-5152	-8875	-8298	-8352	-9280	-8461	-9003	-12159	-8389	-10736	-13147	-17262	-18720	-20227	-18635	-17219	-14801	-14064	-13408	-12817	-12280	-11789	-11336	-10916	-10524	-10156	-9810	-9482
PA	Scen 1	1.000t CO2eq																								-12280	-11211	-10248	-9372	-8570	-7832	-7147	-6509
PA	Scen 2	1.000t CO2eq																								-12280	-12367	-12437	-12494	-12543	-12585	-12624	-12661

Please note: The results for the projected time period (2009-2020) should NOT be assumed to be final assumptions on the impact of HWP inclusion in a reference level. For this purpose, projections undertaken close to a commitment period would decrease uncertainties about future consumption patterns (2009-2012) and the development of Inflow to the HWP carbon pool respectively. The projections rely only on historic values on production and trade of wood product commodities that have been submitted by Germany to UNECE Timber Section, Geneva, Switzerland (Timber Database 2008, though data on net-emissions and the proposed reference level for HWP includes both approaches, SCAD and PA).

Greece:

Historical data from data provided to the UNFCCC.

HWP data calculated by Rueter (2009), using scenario A *business as usual* (harvesting intensity = average of the last five years) and average half-lives of 15 years for solid wood products and 1 year for paper products.

Forecasts for 2008-2012 and 2013-2020 calculated by JRC (2009).

Hungary:

Historical data from data provided to the UNFCCC.

HWP data calculated by Rueter (2009), using scenario A *business as usual* (harvesting intensity = average of the last five years) and average half-lives of 15 years for solid wood products and 1 year for paper products.

Forecasts for 2008-2012 and 2013-2020 are obtained by linear extrapolation of historical data.

Ireland:

Proposed reference level for forest management for pre-1990 Article 3.4 forest in Ireland:

The proposed reference level for forest management under Article 3.4 of the Kyoto Protocol for Ireland over the period 2013-2020 is -85 G g CO2 per year assuming instant oxidation.

1. Factors taken into account in setting the proposed reference level.

a. Ireland's forest cover at the beginning of the 20th century was 1.4% of the area of the country[2]. From the 1920s afforestation programmes have increased forest cover to the present level of over 10%[3].

Table 1: *Historic and projected roundwood harvest (overbark volume to 7 cm top diameter) in pre 1990 forests in Ireland*.

UNECE/FAO reported harvest		***Forecast harvest in pre 1990 forests***	
	M m^3		**M m^3**
1990	1.787	*2009*	2.209
1991	1.837	*2010*	1.883
1992	2.156	*2011*	2.061
1993	2.003	*2012*	2.314

[2] OCarroll, N. 2004. *Forestry in Ireland – A Concise History*. COFORD, Dublin.

[3] NFI. 2007. *The National Forest Inventory of Ireland*. Forest Service, Dublin.

1994	2.220	*2013*	2.390
1995	2.424	*2014*	2.109
1996	2.520	*2015*	2.402
1997	2.398	*2016*	2.558
1998	2.493	*2017*	2.704
1999	2.842	*2018*	2.870
2000	2.940	*2019*	3.026
2001	2.700	*2020*	3.182
2002	2.911		
2003	2.951		
2004	2.818		
2005	2.913		
2006	2.938		
2007	2.981		
2008	2.213		

Historic levels of harvest in pre-1990 forests (as reported to UNECE/EUROSTAT/FAO – see Table 1) and a consistent national net emissions time series from 1990 to 2020 for pre-1990 forest (see EU forest data submission 3 November 2009 and http://www.coford.ie/iopen24/climit-t-420_395.html).

Projected harvest is based on bottom-up silvicultural management prescriptions with respect to thinning and final harvest, in accordance with sustainable forest management. These are carried out for all properties managed by the state forestry company Coillte, which covers 89% of the pre-1990 forest estate (see for example http://www.coillte.ie/fileadmin/user_upload/pdfs/Forecast_web_final_2006.pdf). The projected emissions and removals to 2020 come from a sample of the Coillte managed forest (see http://www.coford.ie/iopen24/climit-t-420_395.html). The projections are scaled to the full managed pre-1990 forest.

b. Age class structure development in pre-1990 forests is outlined at http://www.coford.ie/iopen24/climit-t-420_395.html. Virtually all of the managed pre-1990 forest dates from the 20th century (Figure 1). Annual rates of afforestation showed a steady increase from the mid 1940s to the early 1960s, after which they fell off before accelerating rapidly from the mid 1980s. There is a clear age-class legacy effect which impacts on harvest levels over a given period, as well as net emissions. Given the 40-60 rotation length (plant/final harvest cycle) that operates in Ireland most of the plantations established over the period from 1960 to 1980 have been clearfelled and regenerated. The younger age profile of the regenerated forest lessens the average sequestration rate and increases emissions from harvest residue, which continue for an estimated 30 years after harvest. A reference level based on projected emissions and removals in the commitment period takes into account the net impact of age-class structure on emissions and removals.

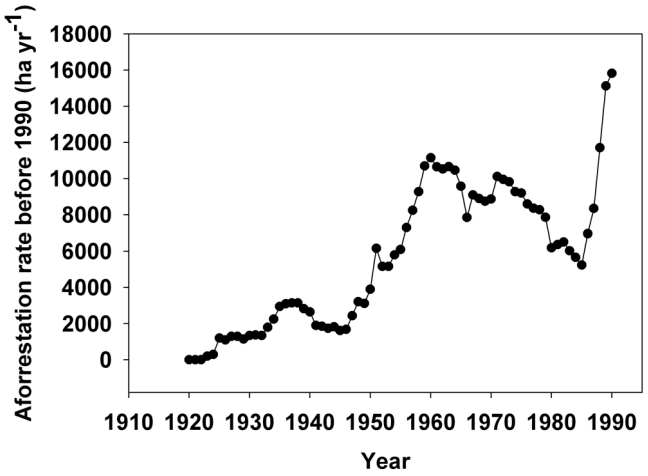

Figure 1: Afforestation rate in Ireland, 1920 to 1990 (source Forest Service).

c. Forest management activities already undertaken, as outlined in b, will impact on net emission in the pre-1990 forest over the period 2013-2020. As also outlined, those activities were based on bottom-up silvicultural prescriptions for a plantation-based forest estate.

d. Projected forest management activities are referred to in *a* – and are based on forecasted harvest and removals using forest management data for the pre-1990 forest. The projection assumes that the pre-1990 privately-owned forest estate (11% of the total area) is managed in the same manner as the state forest. This introduces some uncertainty, which may result in an over- or under-estimate of net emissions, which is addressed by the proposed symmetrical band.

e. Activities in pre-1990 forests over the periods 2008-2012 and 2013-2020 are part of a continuous updating of forest management prescriptions based on harvest and felling. Silvicultural policies are assumed to be consistent between the two periods.

2. Uncertainty in data used to set the reference level for forest management

Nationally-based models and Tier 3 approaches have been developed to minimise bias and reduce the level of uncertainty in carbon stock changes (see paper at http://www.coford.ie/iopen24/climit-t-420_395.html). The major sources of uncertainty of projected changes in carbon stocks in pre-1990 forests are related to a) sampling error, b) model error, c) uncertainty of the level of forecasted harvest, as well as, d) the allocation and half life assumptions for harvested wood products.

a. *Sampling error*: The underlying activity data used as inputs into CARBWARE model, come from Coillte sub-compartment mensuration data, forecast data on the level of clearfelling and thinning, as well as national forest inventory (NFI) permanent sample plot data. The adopted random systematic sampling approach on a 2 x 2 km grid introduces a sampling error of ca. 7 % at $p<0.05$.

b. *Modelling uncertainties*. Validation of CARBWARE v.5 model with experimental data suggests an overall uncertainty of 30 % for biomass, stock changes. This includes uncertainty introduced in the growth, allocation and mortality imputations of the model as well as the biomass algorithms used to derive different C pools.

c. *Uncertainties in respect of projected harvest levels* are judged to be relatively small (9 to 18 %, based on felling licence data), as the projection is complied on a bottom-up basis which aggregates levels of thinnings and clearfelling based on silvicultural assumptions.

d. *Harvested wood products* have been included in the proposed reference level for forest management over the period 1990-2013 for Ireland. Uncertainties exist as to the allocation of roundwood harvest to different end-uses and markets, and of the service life of products. For these reasons the proposed reference level was confined to domestically produced and consumed products (the SCAD approach) using conservative assumptions with respect to product service life.

Italy:

Historical data come from data provided to the UNFCCC and revised in 2009 with updated forest land areas (only considering the forest area eligible under the Italian's forest definition for the Kyoto Protocol).

HWP data calculated by Rueter (2009), using scenario A "*business as usual"* (harvesting intensity = average of the last five years) and average half-lives of 15 years for solid wood products and 1 year for paper products.

Forecast for 2008-2012 and 2013-2020 calculated by JRC (2009).

The reference level showed in the table includes all the five carbon pools. Excluding the most uncertain pools - soil organic carbon and dead organic matter -, the projected (2013-2020) reference level would be -19.284 $MtCO_2$.

Italy's forest management data are currently under revision within the implementation of the National Registry under Kyoto Protocol reporting, and hence all the information provided in the table and related elaboration and projections are provisional and subject to further revision.

Latvia:

The Latvian reference level and related data and information are provided in this informal submission on a facilitative basis and do not constitute a negotiating position or final choices.

Historical data come from data submitted to the UNFCCC. A revision of this information is ongoing and may lead to updates and improvement in the future.

HWP data calculated by Rueter (2009), using scenario A *business as usual* (harvesting intensity = average of the last five years) and average half-lives of 15 years for solid wood products and 1 year for paper products.

Forecast for 2008-2012 and 2013-2020 were calculated by the JRC based on the data submitted to the UNFCCC.

The level of uncertainty of both historical data and forecast is currently high.

Lithuania:

Historical data come from data provided to the UNFCCC.

HWP data calculated by Rueter (2009), using scenario A *business as usual* (harvesting intensity = average of the last five years) and average half-lives of 15 years for solid wood products and 1 year for paper products.

Forecasts for 2008-2012 and 2013-2020 calculated by JRC (2009).

Luxembourg:

Forecasts are based on linear extrapolation from historical data on forest management based on the period 2000 to 2007.

Netherlands:

Historical data come from data provided to the UNFCCC.

HWP data calculated by Rueter (2009), using scenario A *business as usual* (harvesting intensity = average of the last five years) and average half-lives of 15 years for solid wood products and 1 year for paper products.

Forecasts for 2008-2012 and 2013-2020 calculated by JRC (2009).

Poland:

Historical data come from data provided to the UNFCCC.

HWP data calculated by Rueter (2009), using scenario A *business as usual* (harvesting intensity = average of the last five years) and average half-lives of 15 years for solid wood products and 1 year for paper products.

Forecasts for 2008-2012 and 2013-2020 calculated by JRC (2009).

Portugal:

For data sources for FM, including forecasts: No changes made; same as provided in the LULUCF Informal Submission from the EU made in the Barcelona Climate Talks.

HWP data calculated by Rueter (2009), using scenario B *business as usual* (harvesting intensity = trend in the last five years) and average half-lives of 15 years for solid wood products and 1 year for paper products.

Romania:

Historical data come from data provided to the UNFCCC.

HWP data calculated by Rueter (2009), using scenario A *business as usual* (harvesting intensity = average of the last five years) and average half-lives of 15 years for solid wood products and 1 year for paper products.

Forecasts for 2008-2012 and 2013-2020 calculated by JRC (2009).

Slovakia:

Historical data come from data provided to the UNFCCC.

HWP data calculated by Rueter (2009), using scenario A *business as usual* (harvesting intensity = average of the last five years) and average half-lives of 15 years for solid wood products and 1 year for paper products.

Forecasts for 2008-2012 and 2013-2020 calculated by JRC (2009).

Slovenia:

Slovenia proposes national reference level for Forest management for the commitment period 2013-2020 of - 2,713 M ton CO_2 per year using instant oxidation approach for harvested wood products. The proposed reference level is based on the National forest programme (http://www.mkgp.gov.si/fileadmin/mkgp.gov.si/pageuploads/GOZD/NFP_RS.pdf), adopted in the Parliament in 2007, which stipulates that 75% of increment should be harvested in the next middle term period (until 2020). The proposed reference level corresponds to a net sequestration of 2,2 ton CO_2 per hectare annually or one quarter of annual gross increment of the Slovenian forest.

The proposed reference level is based on goals set in forest management plans, which are made for all forests regardless of ownership and which take into account all forest functions, including biodiversity. The latter is especially important because half of the forests are inside Natura 2000 ecological network and should be managed accordingly. Goals and measures in management plans are set following the principle of sustainability. They take due account of

distribution of developmental stages (young growth, pole stands and mature stands) as well as distribution of diameters, which is assessed every ten years on permanent sample plots on the grid of 250 by 250 metres.

Age class structure as one of the basic criteria mentioned in negotiations and basic parameter for forest management modelling is not directly applicable for forest management in Slovenia because it assumes clear-cutting management system, which is prohibited by the Forest Act of 1993.

The projected reference level proposed takes into account the same pools (living biomass, dead wood and litter) and factors as are used for the national accounting and reporting to the Secretariat. Slovenia reports net removals using the stock change method using permanent sample plots and the resulting uncertainty for net removals is within a range of 5% (the last measurement in 2007 for the growing stock was within the range 312-340 cubic metres per hectare, average 326 cubic metres).

The proposed reference level assumes default instant oxidation approach. Slovenia does not dispose of estimates for production and SCAD approach for the moment but will develop these estimates and will make any technical adjustments necessary for consistency.

Natural disturbances, such as windthrow, ice and snow break, bark-beetle attacks, fire and others are regularly monitored and reported and have in the past represented 20 to 30 percent of harvest annually. Their effects are mostly included in harvest rates, while the other part is included in the dead wood pool.

Spain:

Entry data:

- For data sources for FM: see previous submissions from the EU.

- Natural Disturbances: From preliminary estimations, natural disturbances would account for 4% in surface, but data on emissions for those areas are still being analyzed, this means that we can't distinguish anthropogenic from non-anthropogenic emissions at this stage. As a conservative approach all emissions are considered anthropogenic

Forecast for 2008-2012 and 2013-2020 calculated by JRC (2009).

HWP data calculated by Rueter (2009), using scenario B *business as usual* (harvesting intensity based on the long term trend for increase/decrease of pool inflow over the period of 1990-2008) and average half-lives of 30 years for solid wood products and 2 year for paper products.

The application of a 5% symmetrical band to the proposed reference level results in a reference interval of –20 343 Gg CO2eq to –18 405 Gg CO2eq.

The application of an asymmetrical band results in a reference interval from 0 to -19 374 Gg CO2eq.

Sweden:

PROPOSED REFERENCE LEVELS

Sweden proposes national reference levels for Forest management for the commitment period 2013-2020 of:

- 23.663 M ton CO_2 per year in case of Production approach (PA) for harvested wood products,

- 22.170 M ton CO_2 per year in case of SCAD approach, and

- 21.844 M ton CO_2 per year in case of instant oxidation approach, respectively.

Minor changes have been made to the underlying data set as compared to the Barcelona submission earlier in November 2009. This is mainly due to the upcoming possibility to use Forest management data for the period 1990-2008 as prepared for the coming UNFCCC NIR-report. However, this does not result in any major differences compared to earlier reported removal levels for FM.

COMMENTS ON THE PROPOSED REFERENCE LEVELS

The proposed reference levels are the expected average annual net removals in 2013-2020 based on business-as-usual scenarios for 2015 and 2020. In the scenarios present forest management practices are assumed, including environmental measures in forestry and environmental policy aimed at preserving biological diversity. In addition, the recent trend of increased removal of forest residues has been included.

Projected net removals for 2015 and 2020 have been estimated using the HUGIN modelling tool, which simulates the future development of the forests on the basis of assumptions on how they are managed and harvested over a hundred-year period, also taking into account the age class distribution. Detailed assumptions for growth and harvest are the same as in the reference scenario for the long term forest state calculations made by the Swedish forest agency in 2008 (SKA-VB 08)[4]. The calculations encompass living trees on forest soil. Production forests as well as forests in national parks, nature reserves and habitat

[4] http://www.skogsstyrelsen.se/episerver4/templates/SFileListing.aspx?id=41399, (SKA-VB 08 Resultat - Referens.xls in Swedish)

protection areas are included in the results. The structure of the standing stock at the start of the model simulation is based on the Swedish NFI which also form the base for the annual reporting to the convention.

Annual felling is assumed to be at the level of what is regarded as sustainable in the long term i.e. a level that will maintain the standing stock in the production forests, also taken into account present nature conservation measures.

The projection for dead organic matter is based on the pool at the start of the simulation (from NFI) and the simulated harvest rate. The soil organic carbon pool is based on the mean value between 1990 and 2007 and calculations of the future effect on the soil of the sustained trend of increased use of forest residues, using the Q-model[5]. Other emissions, such as biomass burning, are based on the mean values for 2003-2007.

In summary, the following approach has been used:

- The proposed reference levels includes only policies and measures already in place.
- Age structure is considered in the model used to calculate the projection for 2015 and 2020.
- The forecasts comprise all carbon pools (living biomass, dead organic matter and soil organic carbon) currently reported to the UNFCCC .
- Models used for forecasts can be used to simulate historical data based on the state of the forest in 1990 and observed harvest levels. The structure of the standing stock at the start of the model simulation is based on the Swedish NFI, which also form the base for the annual reporting to the convention.
- Forecast for 2008-2012 use most recent national data 1990-2008 (FM) and the projections for 2015 and 2020 are based on available forest statistics at the time of the simulation.
- The methods used are open for future review. Historical data as well as the projections are presented in the final report of a recent government comission.[6]

UNCERTAINTIES

The uncertainty range for FM, in case of instant oxidation approach for harvested wood products, is -26 to -18 M ton CO_2 per year. Additional information on uncertainty for historical data is given in national Annexes in EU data submissions during 2009[7]. The overall uncertainty in the projection originates from the

[5] Agren,G.I., Hyvonen,R., Nilsson,T., 2007. Are Swedish forest soils sinks or sources for CO2 - model analyses based on forest inventory data. Biogeochemistry 82, 217-227.

[6] http://www2.slu.se/foma/Prognoser/SLU_rapport_dec2009.pdf

uncertainty in relation to historical data, as well as from uncertainty related to the simulation. Important uncertainties related to the simulation arise from the applied climate effect that in turn affects several factors that are of major importance for the development of the forest (increment, disturbances, increased forest area etc.).

THE PROPOSED WIDTH OF A SYMMETRICAL BAND

The band reflects uncertainties in gross removals as well as in emissions due to harvest and natural losses. Sweden reports net removals using the stock change method and the resulting uncertainty for net removals can be used as the combined uncertainty in gross removals and gross emissions from harvest. Based on the estimated uncertainty of +/- 4 M ton CO_2 for FM, Sweden proposes a symmetrical band width of +/- 18 % per year.

NATURAL DISTURBANCES

In the table, natural disturbances by fire and by storms are included. In the reporting to the UNFCCC only forest fire is explicitly reported.

The net effect of two large storms (2005 and 2007), was an increased harvest by approximately 50 % of an annual harvest thus increasing emissions due to natural disturbances. These emissions are not explicitly displayed in the reported figures since the Swedish system for reporting to UNFCCC includes, but also levels out the effect of storms of this magnitude.

SENSITIVITY ANALYSIS -2020

The projected removals are based on the assumption that the available annual growth in the production forests is harvested. This harvesting level constitutes the result of investments made by forest owners available for harvest until 2020 given present forest management practices, while maintaining the standing stock.

However, since it is foreseen that the demand for bioenergy (also from other countries) will increase due to the introduction of climate change policies in the energy sector, the harvest rate may increase above this level during the coming decade. A sensitivity analysis assuming an increased harvest rate by 10 % to 2030, everything else unchanged, indicated a decrease in annual net removals by 17 M ton CO_2 whereas a long term increase of the use of forest residues by an additional 10 TWh will have a minor effect (0,6 M ton CO_2). This in turn would call for reinforced silvicultural investments to increase the yield, or restrictions limiting the fellings, to maintain the standing stock in the production forests.

[7] http://unfccc.int/files/kyoto_protocol/application/pdf/awgkplulucfdataeu051109.pdf and http://unfccc.int/files/kyoto_protocol/application/pdf/eululucf300909.pdf

United Kingdom:

UK reference level and related data and information are provided in this informal submission on a facilitative basis and do not constitute a negotiating position or final choices.

Projections are made assuming that the historical pattern of land-use continues and using the same assumptions as the greenhouse gas inventory. A description of the inventory and projections methodology can be found at http://www.edinburgh.ceh.ac.uk/ukcarbon. The projections take account of the inventory data, age class structure and current management practice in accordance with the UK forestry standard and its supporting guidelines. These can be accessed via www.forestry.gov.uk. The projections are consistent with those published in the UK's 4th and 5th National Communications. No additional allowance is made for additional use of bioenergy. Afforestation, reforestation and deforestation since 1990 are estimated on a consistent basis but are not included in these estimates. A reference level for the period 2013 to 2020 would correspond to an average removal of 7.2 $MtCO_2$/yr with HWP estimated using the production approach, an estimated 6.4 $MtCO_2$/yr on the SCAD approach and an average removal of 3.4 $MtCO_2$/yr without HWP. The HWP lifetimes quoted are for hardwood and softwood products respectively. The SCAD approach estimates have been made by assuming the stock changes are 80% of the UK national estimates made for the production approach. The ratio was derived by consideration of JRC data, because UK does not currently have separate national estimates made using the SCAD approach. The UK plans to develop these estimates and will make any technical adjustments necessary for consistency. Typical uncertainty in projections to 2020 is currently estimated ± 20%. Application of a 5% symmetrical band makes no difference with these data if accounting is done on averages over the period; annual accounting with a 5% band results in small debits.

ANNEX – METHODOLOGICAL INFORMATION RELATED TO JRC PROJECTIONS:

Projections provided by the JRC incorporate the latest results of a project involving independent EU modelling groups (including IIASA and EFI), coordinated by the JRC and the European Commission Directorate General of Environment (DG ENV).

The models for forest management projections (G4M and EFISCEN) use the latest forest data available from countries, and in particular:

- Areas under forest management are estimated by the JRC from the latest country' submissions to UNFCCC (including voluntary KP LULUCF submissions when available). Given that UNFCCC reporting differs from KP reporting, a number of assumptions are applied (see Barcelona submission). These values are used as input to the models for the period 1990 to 2007.
- Other forest inventory data (age structure, species composition, increment, etc.) come from latest available national forest inventories when provided, including any additional information provided by the country.
- Harvest rates up to 2007 come from country statistics or submissions to UNFCCC.

The evolution of the EU forest management sink is estimated considering the EU business as usual (BAU) harvest demand in 2020, derived from key drivers (GDP, population, EU bio-energy demand) modelled based only on policies and measures enacted up to July 2009. For the period 2013-2020, the models use a BAU harvest rate which at the EU level is about 20% higher than the 2000 value (taken as average of 1998-2002).

To ensure consistency with the coverage of carbon pools in country reports, JRC projections include only the pools also reported by the country. Furthermore, to make the results of these models comparable (in absolute levels) with historical data, the net emissions estimated by the models for the entire time series (up to 2020) are "calibrated" with historical data submitted by countries to UNFCCC.

A sensitivity analysis was performed for the period 2013-2020. Preliminary results indicate that a 20% increase of the EU's harvest would lead to a reduction of the EU's sink by 28% in comparison to business as usual. A 20% decrease of the EU's harvest would lead to an increase by 27% of the EU's sink in comparison to business as usual.

Modelled projections presented in this submission are the best possible estimates to date using currently available information. Further details on the modelling work carried out are provided in the EU 3 November informal submission presented in Barcelona (available from the UNFCCC website http://unfccc.int/meetings/ad_hoc_working_groups/kp/items/4907.php).