Modified tables of the submission of information on forest management reference levels by France

Table 1. Value of proposed reference levels for the period 2013-2020.

Proposed Reference Level (1), (4) (GgCO2eq per year)	
applying first order decay function for HWP (2)	assuming instantaneous oxidation of HWP (3)
-67 042	-62 741

(1) The reported values are averages of the projected FM data series for the period 2013-2020, taking account of policies implemented before mid-2009.

Paragraph 4 : Description of construction of reference levels

(e) Harvested wood products

The contribution of HWP to the reference level of France amounts to **-4,301 Mt CO2.**
It was calculated using the C-HWP-Model, which estimates delayed emissions on the basis of the annual stock change of semi-finished wood products as outlined in the 2006 GL (Rüter, 2011). The estimation uses the product categories, half lives and methodologies as suggested in para 27, page 31 of FCCC/KP/AWG/2010/CRP.4/Rev.4.

The activity data (production and trade of sawnwood, wood based panels and paper and paperboard) is derived from the TIMBER database (UNECE 2011) (time series 1964-2009).
In order to achieve accurate results, the HWP numbers have been calculated applying the sub-categories of sawnwood, wood based panels and paper and paperboard as specified in Table 1. Sawnwood includes the Items 1632 and 1633, wood based panels comprising of Items 1634, 1640, 1646, 1647, 1648, 1649 and 1650, and paper and paperboard corresponds to Item 1876.

Following conversion factors have been used :

Table 13: Conversion factors of considered commodities*

Classification		Description of commodity	Air dry density	C conv. factor	Source
FAO	UNECE		[g/cm³]	[Gg C/1000m³]	
1866	1.2.C	Industrial roundwood, coniferous	0,450	2,250E-01	Kollmann (1982), (oak, beech)
1867	1.2.NC	Industrial roundwod, non-coniferous	0,670	3,350E-01	Kollmann (1982), (oak, beech)
1632	5.C	Sawnwood, coniferous	0,450	2,250E-01	Kollmann (1982), (oak, beech)
1633	5.NC	Sawnwood, non-coniferous	0,670	3,350E-01	Kollmann (1982), (oak, beech)
1634	6.1	Veneer sheets	0,590	2,950E-01	IPCC (2003)
1640	6.2	Plywood	0,480	2,402E-01	IPCC (2003)
1646	6.3	Particle board	0,630	2,898E-01	Hasch (2002), Barbu (2011)
1647	6.4.1	Hardboard	0,850	4,165E-01	Kollmann (1982), Barbu (2011)
1648	6.4.2	Medium density fibreboard	0,725	3,190E-01	Hasch (2002), Barbu (2011)
1649	6.4.x	Fibreboard, compressed	0,788	3,504E-01	(50 % hardboard / 50 % medium density fibreboard)
1650	6,4,3	Other board (insultating board)	0,270	1,148E-01	Kollmann (1982), Barbu (2011)
1876	10	Paper and paperboard	0,900**	4,500E-01**	IPCC (206)

*Items 1866 and 1867 are needed for methodological reasons only (see following section), **in [g/g] and [Gg C/1000t]

In order to only estimate emissions from HWP removed from forests which are accounted for by France under Article 3, in a first step, the annual share of carbon in HWP coming from domestic forests has been calculated.

Following equations were used as industrial roundwood is assumed to serve as raw material for the production of HWP.

(1) $$ratio_{INDRW\ consumption\ from\ dom\ harvest} = \frac{(Production_{INDRW} - Export_{INDRW})}{(Production_{INDRW} + Import_{INDRW} - Export_{INDRW})}$$

(2) $$Production_{HWP\ from\ dom\ harvest} = Production_{HWP} \bullet ratio_{INDRW\ consumption\ from\ domestic\ harvest}$$

The ratio (Equation 1) was calculated both for coniferous and non-coniferous industrial roundwood (*INDRW*, Items 1866 and 1867). For coniferous sawnwood and paper and paperboard, the ratio for coniferous industrial roundwood was applied. For non-coniferous sawnwood the ratio for non-coniferous industrial roundwood was applied. For the other HWP, the ratio of the annual mass weighted average of coniferous and non-coniferous industrial roundwood was applied.

As a result, this share of HWP produced from domestically harvested timber is presented as a percentage in Table 13.

The presented approach follows the initial assumption that all forests in France are managed, and in order to simplify matters, it is presumed that all harvest is allocated to forest management. This assumption is to be verified and corrected where necessary. The final allocation of carbon in HWP to forests which are accounted for under Article 3 shall be part of a technical correction as suggested in para 15 quater, page 27 of FCCC/KP/AWG/2010/CRP.4/Rev.4.

Table 14: Historic time series of amounts and share of accountable carbon Inflow to the HWP pool [in 1000t C and %]

1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	1977	1978	1979	1980
2933	3699	3893	3978	4125	4432	4560	4779	5165	5502	4188	3455	4869	5002	5195	5437	5401
90,0%	91,4%	91,2%	90,9%	91,0 %	89,8%	90,0%	91,6%	91,6%	91,8%	90,2%	91,3 %	90,9%	92,4%	93,2%	93,0%	92,9%
1981	**1982**	**1983**	**1984**	**1985**	**1986**	**1987**	**1988**	**1989**	**1990**	**1991**	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**
5233	5169	5290	5398	5190	5504	5604	6204	6553	6749	6750	6758	6836	7334	6989	7208	7455
94,0%	94,7%	95,8%	96,2%	95,7 %	96,4%	96,7%	97,2%	97,6%	96,0%	93,0%	93,7 %	96,2%	95,1%	94,4%	95,7%	95,6%
1998	**1999**	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**					
7837	8024	8429	8140	7954	7836	8172	8168	8081	7881	7606	6744					
95,3%	94,7%	95,7%	94,7%	94,0%	92,4%	92,5%	91,6%	90,7%	89,1%	91,4%	94,4%					

The annual carbon Inflow (= carbon in produced HWP) to the HWP pool prior to the year 1964 (first year for which activity data from TIMBER database (UNECE 2011) is available for France) has been calculated from the 5 years average from 1964 to 1968 and was assumed to be the constant carbon pool Inflow for the time period 1900-1963.
In order to provide a projection for the development of the HWP pool consistent with the assumptions on the future harvest, the rates of change of the Projected harvest (Model GLOBIOM) as compared to the last 5 years average of historic harvest, for which up-to-date data is available, was calculated (cf Table 14).
These projected growth rates as cp. to the average of the years 2003-2007 for France were applied to the same 5 years average of historic carbon Inflow to the HWP pool in order to receive the future Inflow to the HWP pool.

Table 15: Projection of carbon Inflow to the HWP pool											
Average of historic harvest (2003-2007) [in 1000m3]	57.498										
Average HWP pool Inflow* (2003-2007) [in 1000t C]	7927										
years	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Projected harvest rate [in 1000m3]	59424,9	59810,32	60195,74	60581,16	60966,58	61352	61737	62123	62508	62894	63279,1
Change as cp to historic harvest (2003-2007) [in %]	3,35%	4,02%	4,69%	5,36%	6,03%	6,70%	7,37%	8,04%	8,71%	9,38%	10,05%
Projected carbon Inflow to HWP pool [in 1000t C]	8296,56	8350,37	8404,18	8457,99	8511,8	8565,61	8619,42	8673,23	8727,04	8780,85	8834,66

*a similar approach was chosen by Kangas and Baudin (2003): ECE/TIM/DP/30

For calculating the pool of HWP in use, three half-lifes for application in the first order decay function have been used as suggested by para 7, page 31 of FCCC/KP/AWG/2010/CRP.4/Rev.4.

- Sawnwood: 35 years
- Wood based panels: 25 years
- Paper and paperboard: 2 years

The projected net-emissions are calculated from the annual stock change estimates following the calculation method provided in IPCC 2006, Vol 13, Ch.12 (Equation 12.1).

Table 16 : Historic (up to 2009) and projected net-emissions from HWP pool [in 1000t CO2]

1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006
-6154	-5620	-5145	-4855	-5964	-4131	-4559	-5016	-5886	-5997	-6847	-5325	-4381	-3738	-4739	-4475	-4060
2007	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**			
-3400	-2540	569	-5322	-4977	-4732	-4558	-4434	-4345	-4282	-4237	-4204	-4181	-4164			