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## Projection of Net-Emissions from Harvested Wood Products in European Countries

For the period 2013-2020

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**Title**

Projections of Net-Emissions from Harvested Wood Products in European Countries

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Hamburg, August 2011

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## Foreword

This work report is intended to estimate the potential contribution of harvested wood products (HWP) to a forest management reference level (FMRL) as requested by the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (CMP) at its sixth session in its decision 2/CMP.6 on Land use, land-use change and forestry (Cancún decisions).

The data presented in this report were calculated using the most up-to-date information available, such as countries' projected harvest. The latter has been used as input parameter in order to calculate countries' future production of HWP consistent with the assumptions on future harvest amounts. However, the projections for the period 2013 to 2020 solely represent proposals of estimates on future net-emissions from the countries' harvested wood products pool.

Some countries used the data presented in this report for submission to the UNFCCC in the course of providing information on a reference level as requested by the Cancún decisions. Hence, the methods used to calculate the contribution of HWP to the FMRL as outlined in this report have been subject to a technical assessment in accordance with decision 2/CMP.6. It took place from 23 May to 03 June 2011 in Bonn, Germany, was conducted by several teams of nominated LULUCF experts from the UNFCCC roster of experts, and was coordinated by the UNFCCC secretariat.

Hamburg, 05. August 2011

## Methodology

The data presented constitutes estimates of net-emissions from wood products due to changes in the HWP carbon pool. The estimation uses the product categories, half-lives and methodologies as suggested of the “Integrated version” of the text in paragraph 27, page 31 of FCCC/KP/AWG/2010/CRP.4/Rev.4. The data was calculated using the C-HWP-Model which estimates delayed emissions from the HWP pool on the basis of the annual stock change of semi-finished wood products as outlined in the 2006 IPCC Guidelines.

### Estimation of stock-changes

As suggested by document FCCC/KP/AWG/2010/CRP.4/Rev.4, the estimation calculates delayed emissions on the basis of the annual stock change of semi-finished wood products using the first order decay function (Equation 12.1) as outlined in the 2006 IPCC Guidelines (IPCC 2006, Vol.4, Ch. 12):

$$(1) \quad C(i + 1) = e^{-k} \cdot C(i) + \left[ \frac{(1 - e^{-k})}{k} \right] \cdot Inflow(i) \quad \text{with } C(1900) = 0.0$$

$$(2) \quad \Delta C(i) = C(i + 1) - C(i)$$

Where:

$i$  = year (starting with 1900)

$C(i)$  = the carbon stock of the HWP pool from the beginning of year  $i$ , Gg C

$k$  = decay constant of first-order decay given in units,  $\text{yr}^{-1}$  ( $k = \ln(2) / \text{HL}$ , where HL is the half-life of the HWP pool in years. A half-life is the number of years it takes to lose one-half of the material currently in the pool.)

$Inflow(i)$  = the inflow to the HWP pool during year  $i$ , Gg C  $\text{yr}^{-1}$

$\Delta C(i)$  = carbon stock change of HWP pool during year  $i$ , Gg C  $\text{yr}^{-1}$

Further explanation of this flux data method is provided in PINGOUD and WAGNER (2006).

In calculating the pool of HWP in use, three half-lives were used in equation 1 as suggested by paragraph 27, page 31 of FCCC/KP/AWG/2010/CRP.4/Rev.4: 35 years for sawnwood, 25 years for wood based panels, and 2 years for paper and paperboard respectively. Alternatively, for domestically produced and consumed HWP, a country may use country-specific data to replace the default half-lives. In the absence of detailed information for all countries, this possi-

bility was not used for the data presented in this report. The country-specific results of the calculations are illustrated in **Tables type D** in the country chapters.

## Activity data and conversion factors

The activity data (production and trade of sawnwood, wood based panels and paper and paperboard) are derived from the TIMBER database of the United Nations Economic Commission for Europe (UNECE) which provides for most of the countries time series from 1964 to 2009 (UNECE, 2011).

In order to achieve accurate results, the HWP numbers were calculated applying the sub-categories of sawnwood, wood-based panels and paper and paperboard. Sawnwood includes Items 1632 and 1633, wood-based panels consist of Items 1634, 1640, 1646, 1647, 1648, 1649 and 1650, and paper and paperboard corresponds to Item 1876. The annual carbon inflow (cf. Equation 1) to the HWP pool was calculated using the conversion factors as specified in Table 1.

**Table 1: Conversion factors of considered commodities\***

Classification		Description of commodity	Air dry density [g/cm <sup>3</sup> ]	C conversion factor [Gg C/1000m <sup>3</sup> ]	Source
FAO	UNECE				
1866	1.2.C	Industrial roundwood, coniferous	0,450	2,250E-01	Kollmann, 1951**
1867	1.2.NC	Industrial roundwood, non-coniferous	0,670	3,350E-01	Kollmann, 1951***
1632	5.C	Sawnwood, coniferous	0,450	2,250E-01	Kollmann, 1951**
1633	5.NC	Sawnwood, non-coniferous	0,670	3,350E-01	Kollmann, 1951***
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, 1951; 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% of Item 1647 and 50% of Item 1648
1650	6.4.3	Other board (Insulating board)	0,270	1,148E-01	Kollmann, 1951; Barbu, 2011
1876	10	Paper and paperboard****	0,900	4,500E-01	IPCC, 2006

\* Items 1866 and 1867 are needed due to methodological reasons only (see following section)

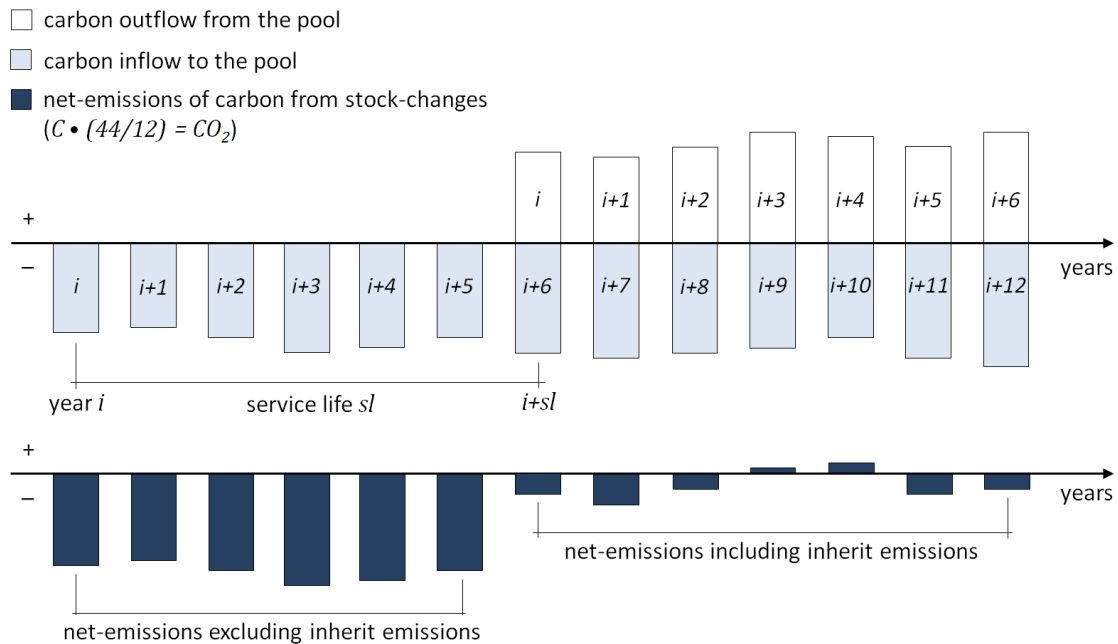
\*\* derived from a density of 60 % *fagus sylvatica* , 20 % *quercus robur* and 20 % other *hardwood sp* [0,640 g/cm<sup>3</sup>]

\*\*\* derived from a density of 80 % *picea abies*, 20 % *pinus sylvestris*

\*\*\*\* in [g/g] and [Gg C/1000t]

Items 1646 to 1650: it is assumed that activity data given in m<sup>3</sup> contain about 10 % of moisture content.

In order to ensure unbiased results in the calculation of the current HWP carbon stock level and the net-emissions based on the annual carbon stock-changes subsequently, ‘inherit’ emissions must be taken into account. These emissions from the existing pool originate from carbon that has entered the pool (i.e. carbon inflow) in the past. Neglecting these inherit emissions would result in a systematic overestimation of the storage effect and an underestimation of the emissions from the HWP pool (cf. Figure 1).



**Figure 1: Scheme of flux data method for calculating the HWP stock based on service life information and the effect of inherit emissions from the existing pool on the estimated net-emission level**

Due to this known effect, the first order decay function, as described by IPCC (cf. Equation 1, p. 5), includes carbon inflow to the HWP pool since the year 1900. But, since for most of the countries activity data from the UNECE TIMBER database are only available from 1964 onwards, the annual carbon inflow (i.e. carbon in produced HWP) to the HWP pool, prior to the first year for which activity data are available, had to be estimated.

For this purpose, the IPCC 2006 Guidelines propose estimated annual rates of increase for industrial roundwood production that are based, inter alia, on the annual percent change of population growth (e.g. 0,0151 for Europe). Furthermore, the Guidelines provide a method for calculating the carbon inflow back to the year 1900 using those rates of change variables. Using a different approach, in this report missing data on carbon HWP pool inflow have been calculated from the average of the first five years for which activity data are given for the specific country. As a simplifying assumption, this five year average is extrapolated backward to 1900 and assumed to be the constant carbon pool inflow. In case HWP are considered as an addi-

tional carbon pool under a FMRL, as suggested by the Cancún decisions as an option for accounting, the same method is to be applied both for calculating the reference level as well as for the calculation of the net-emissions during the commitment period. Therefore, this simplifying assumption will have no influence on final accounting results (cf. FCCC/KP/AWG/2010/CRP.4/Rev.4, 15 quater, p. 27).

FCCC/KP/AWG/2010/CRP.4/Rev.4 proposes to only estimate emissions from HWP removed from forests which are accounted for by the particular country under Article 3 (cf. paragraph 27). To comply with this requirement, in a first step, the annual share of carbon in HWP coming from domestic forests was calculated by means of Equation 3. The consumption of industrial roundwood ( $IRW_{CONS}$ ) is assumed to be equal to the raw material being used for the production of HWP.

$$(3) \quad Inflow_{DP} = P_{HWP} \cdot \left[ \frac{(IRW_P - IRW_{EXP})}{(IRW_P + IRW_{IMP} - IRW_{EXP})} \right]$$

Where:

$Inflow_{DP}$  = carbon in the annual production of HWP of a country that came from forests of that country, Gg C yr<sup>-1</sup>

$P_{HWP}$  = carbon in the annual production of HWP, Gg C yr<sup>-1</sup>

$IRW_P, IRW_{IMP}, IRW_{EXP}$  = industrial roundwood production, imports and exports respectively, Gg C yr<sup>-1</sup>

For the calculation of carbon in the annual production of HWP that came from wood harvested in the reporting country, the IPCC suggests using Equation 12.3 (IPCC, 2006). It assumes that industrial roundwood exports are being used in the same proportion for the subsequent production of solid wood and paper products in importing countries as domestically. Depending on the countries' trade balance of industrial roundwood, however, this simplifying assumption can result in an overestimate of carbon in the HWP pool inflow (RÜTER, 2010). Furthermore, the equation considers trade data of wood chips and wood residues, the assumption being that those commodities are used for the production of HWP only. Wood chips and wood residues, however, may be used as a biomass solid fuel as well. Due to these reasons, IPCC Equation 12.3 was not applied.

The share of carbon in the annual production of HWP of a country that came from forests of that country, that is represented by the second term of Equation 3, was calculated both for coniferous and non-coniferous industrial roundwood (Items 1866 and 1867). The ratio for coniferous industrial roundwood was applied for coniferous sawnwood, and paper and paperboard. 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 being consumed domestically was applied. As a result,



the share of HWP produced from domestically harvested timber and the historic time series of carbon inflow to the HWP pool is presented in the specific **Tables type A** for each country.

The presented approach follows the initial assumption that all forests in the specific country 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. This also includes assumptions, for example on carbon from domestic harvest being subject to provisions for addressing force majeure. 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 paragraph 15 quater, page 27 of FCCC/KP/AWG/2010/CRP.4/Rev.4.

## Projections of net-emissions from HWP

In order to determine the future development of the HWP pool inflow consistent with the assumptions regarding the future harvest for each year of the projection period 2010 to 2020, the rates of change of the projected harvest as compared to the last five years' average of the historic harvest, for which up-to-date data were available have been calculated for each country (**Tables type B**). In a second step, these annual change rates were applied to the same five year average of historic carbon inflow to the HWP pool in order to calculate the future inflow (**Tables type C**). As a result, the same average proportion of harvested wood being used for the production of HWP in the chosen historic five year period is used to calculate the future HWP product pool inflow from the projected amounts of harvested wood.

A five year average was chosen, because the proportions of harvested wood amounts to the HWP production can vary considerably from year to year. A similar approach had been proposed by KANGAS and BAUDIN (2003). In case of substantially varying time series, they suggest to use a 'fixed constant' as the projection, that is an average over the last five years.

More information on countries' harvest projections that have been used for calculating can be found in the references given in the country chapters and the respective submissions of Parties to the secretariat of the UNFCCC<sup>1</sup>.

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<sup>1</sup> [http://unfccc.int/meetings/ad\\_hoc\\_working\\_groups/kp/items/5896.php](http://unfccc.int/meetings/ad_hoc_working_groups/kp/items/5896.php)

## Austria

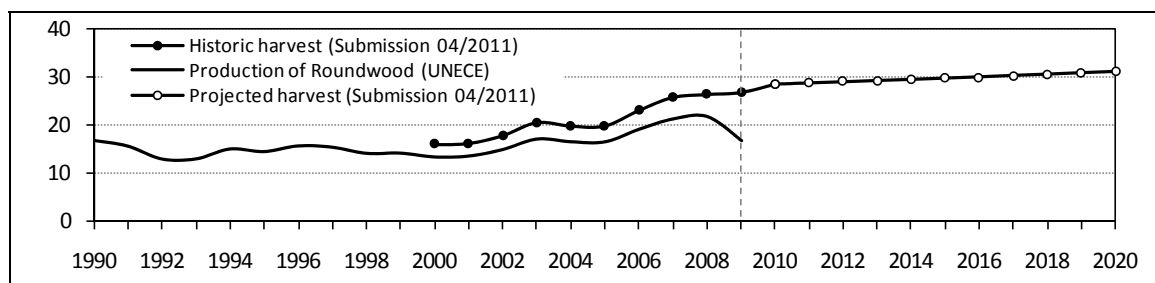
For Austria, the activity data from the TIMBER database (UNECE, 2011) are available for the years 1964 to 2009 (Table A).

**Table A: Historic time series of amounts and share of accountable carbon inflow to the HWP pool [in 1000t and %]**

1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
1 281	1 264	1 499	1 479	1 489	1 675	1 662	1 797	1 892	1 859	1 761	1 683
93,3%	92,2%	94,4%	92,8%	91,7%	92,8%	87,6%	89,8%	90,4%	82,4%	77,9%	84,6%
1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
2 042	2 150	2 073	2 191	2 199	2 180	2 004	2 167	2 266	2 106	2 219	2 254
85,8%	87,4%	86,6%	84,1%	80,6%	83,1%	80,6%	82,9%	84,0%	77,1%	81,2%	79,8%
1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
2 498	2 704	2 866	2 612	2 494	2 487	2 803	2 905	3 021	2 998	3 052	2 855
79,2%	81,5%	80,2%	72,0%	69,0%	69,1%	70,9%	72,9%	73,5%	70,5%	69,6%	61,4%
2000	2001	2002	2003	2004	2005	2006	2007	2008	2009		
2 799	3 019	3 342	3 528	3 370	3 409	3 608	4 062	4 015	2 943		
55,7%	59,1%	62,4%	65,0%	59,1%	59,4%	61,7%	66,2%	69,1%	60,1%		

The annual carbon inflow (= carbon in produced HWP from domestic harvest) to the HWP pool prior to the year 1964 has been calculated from the five year average from 1964 to 1968 and was assumed to be the constant carbon pool inflow for the time period 1900-1963.

The projected HWP pool inflow (Table C and Figure B) was calculated by means of the annual growth rates of the projected harvest (Submission 04/2011) of Austria as compared to the average of the years 2004-2008 which amounts to 23,020 Mm<sup>3</sup> (Figure A). These change rates (Table B) were applied for the same years' average (2004-2008) of the historic HWP pool inflow, which amounts to 3,693 Mt C for Austria.



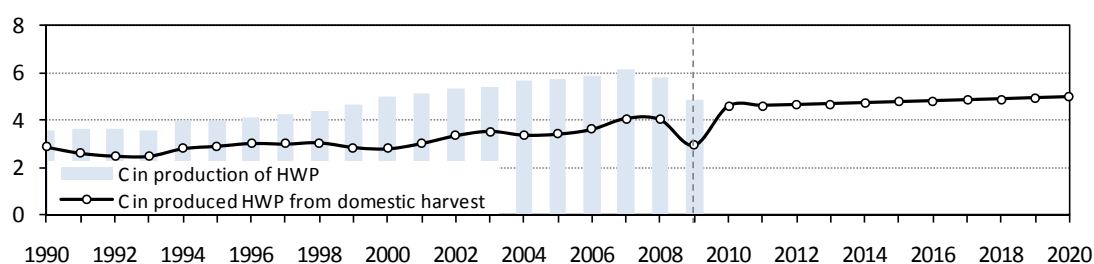
**Figure A: Historic and projected harvest and roundwood production [in Mm<sup>3</sup>]**

**Table B: Projected harvest and change as cp. to five year average of historic harvest [in 1000m<sup>3</sup> and %]**

2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
28 550	28 780	29 010	29 240	29 470	29 700	29 960	30 220	30 480	30 740	31 000
24,0%	25,0%	26,0%	27,0%	28,0%	29,0%	30,1%	31,3%	32,4%	33,5%	34,7%

**Table C: Projected carbon inflow to the HWP pool [in 1000t C]**

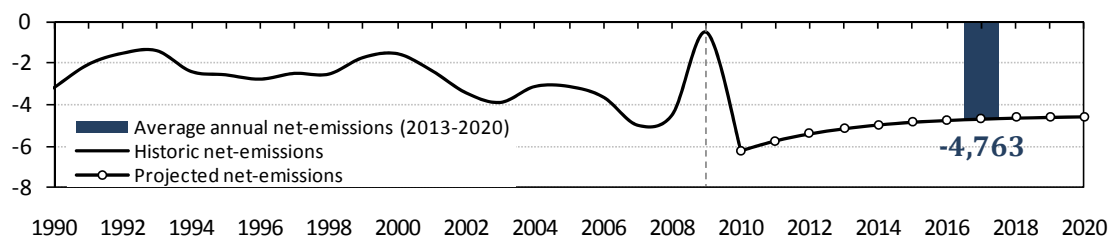
2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
4 580	4 617	4 654	4 691	4 728	4 765	4 806	4 848	4 890	4 931	4 973

**Figure B: Carbon in production of HWP and accounted pool inflow [in Mt C]**

By means of the methods as described on page 5 ff, the historic and projected net-emissions from the HWP pool in Austria were subsequently calculated (Table D). The annual average net-emissions in the time period 2013 to 2020 amount to -4,763 Mt CO<sub>2</sub> (Figure C).

**Table D: Historic (up to 2009) and projected net-emissions from HWP pool [in 1000t CO<sub>2</sub>]**

1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
-3 194	-2 067	-1 523	-1 400	-2 403	-2 562	-2 773	-2 496	-2 531	-1 731	-1 546
2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
-2 356	-3 433	-3 896	-3 128	-3 128	-3 642	-4 998	-4 493	-510	-6 231	-5 748
2012	2013	2014	2015	2016	2017	2018	2019	2020		
-5 399	-5 146	-4 961	-4 823	-4 737	-4 672	-4 623	-4 585	-4 556		

**Figure C: Historic and projected net-emissions from the HWP pool [in Mt CO<sub>2</sub>]**

## Belgium

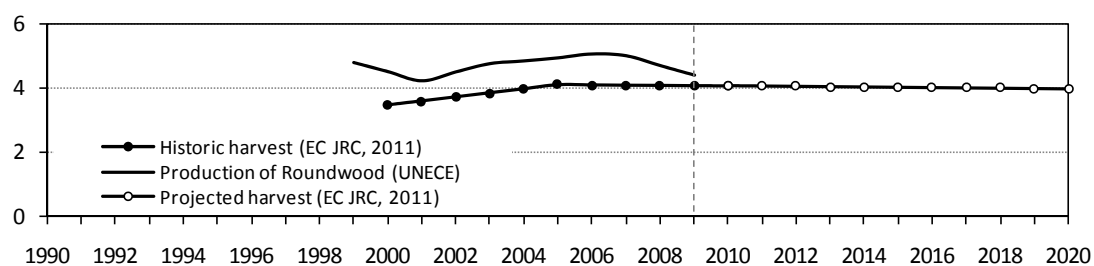
For Belgium, activity data from the TIMBER database (UNECE 2011) are available for the years 1999 to 2009 (Table A).

**Table A: Historic time series of amounts and share of accountable carbon inflow to the HWP pool [in 1000t and %]**

1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
1 166	881	773	1 167	1 237	1 204	1 265	1 202	989	1 071	1 058
59,3%	47,3%	42,6%	61,8%	64,1%	62,3%	64,3%	60,8%	49,7%	56,0%	58,0%

The annual carbon inflow (= carbon in produced HWP from domestic harvest) to the HWP pool prior to the year 1999 has been calculated from the five year average from 1999 to 2003 and was assumed to be the constant carbon pool inflow for the time period 1900-1998.

The projected HWP pool inflow (Table C and Figure B) was calculated by means of the annual growth rates of the projected harvest (EC JRC, 2011) of Belgium as compared to the average of the years 2003-2007 which amounts to 4,104 Mm<sup>3</sup> (Figure A). These change rates (Table B) were applied for the same years' average (2003-2007) of the historic HWP pool inflow, which amounts to 1,179 Mt C for Belgium.



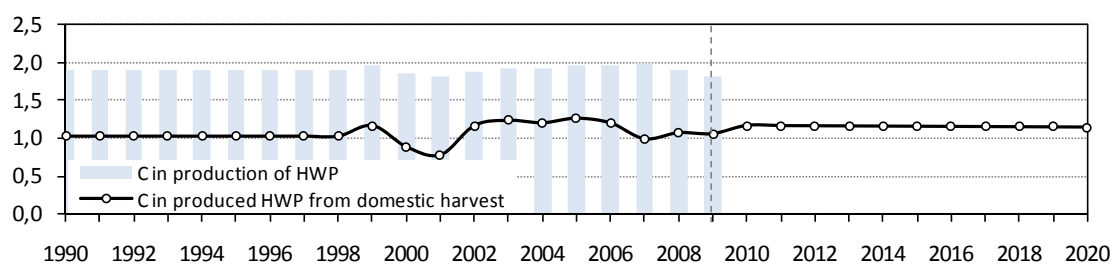
**Figure A: Historic and projected harvest and roundwood production [in Mm<sup>3</sup>]**

**Table B: Projected harvest and change as cp. to five year average of historic harvest [in 1000m<sup>3</sup> and %]**

2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
4 066	4 058	4 051	4 043	4 035	4 028	4 020	4 013	4 005	3 997	3 990
-0,9%	-1,1%	-1,3%	-1,5%	-1,7%	-1,9%	-2,0%	-2,2%	-2,4%	-2,6%	-2,8%

**Table C: Projected carbon inflow to the HWP pool [in 1000t C]**

2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
1 168	1 166	1 164	1 162	1 160	1 157	1 155	1 153	1 151	1 149	1 146

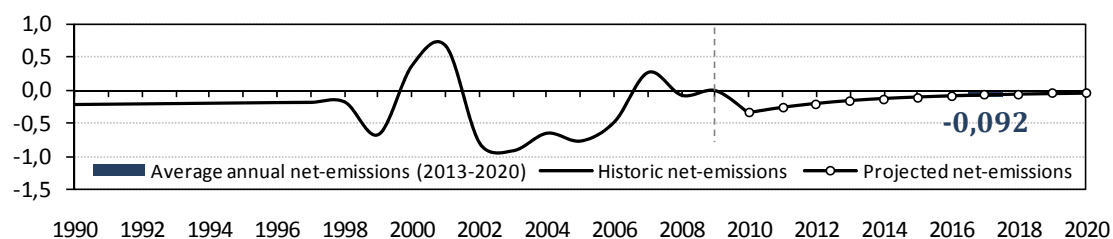


**Figure B: Carbon in production of HWP and accounted pool inflow [in Mt C]**

By means of the methods as described on page 5 ff, the historic and projected net-emissions from the HWP pool in Belgium were subsequently calculated (Table D). The annual average net-emissions in the time period 2013 to 2020 amount to -0,092 Mt CO<sub>2</sub> (Figure C).

**Table D: Historic (up to 2009) and projected net-emissions from HWP pool [in 1000t CO<sub>2</sub>]**

1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
-211	-206	-201	-197	-192	-187	-183	-178	-174	-658	376
2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
659	-788	-900	-639	-756	-468	269	-73	-5	-348	-266
2012	2013	2014	2015	2016	2017	2018	2019	2020		
-207	-163	-131	-108	-89	-75	-64	-55	-48		



**Figure C: Historic and projected net-emissions from the HWP pool [in Mt CO<sub>2</sub>]**

## Bulgaria

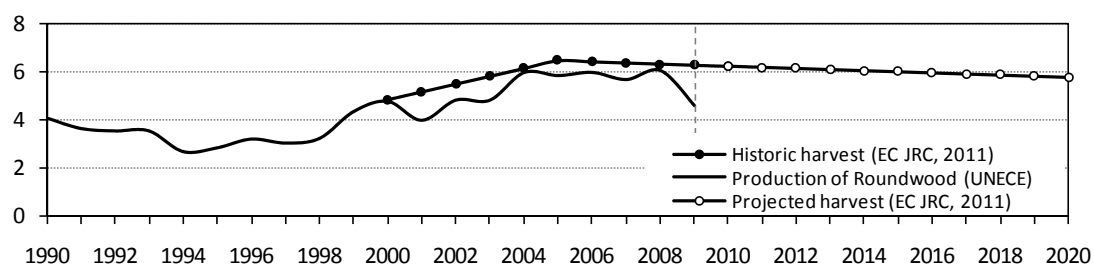
For Bulgaria, activity data from the TIMBER database (UNECE 2011) are available for the years 1964 to 2009 (Table A).

**Table A: Historic time series of amounts and share of accountable carbon inflow to the HWP pool [in 1000t and %]**

1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
529	533	497	474	499	517	531	518	543	571	581	564
99,6%	98,5%	95,9%	91,7%	89,4%	90,9%	89,2%	88,2%	89,3%	88,7%	88,8%	87,7%
1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
541	515	523	610	530	537	562	547	540	569	486	515
87,1%	86,7%	87,2%	92,3%	88,8%	88,7%	88,6%	86,0%	86,4%	88,8%	82,6%	85,8%
1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
537	539	446	496	229	222	225	206	204	204	204	196
88,9%	93,8%	96,6%	94,9%	95,1%	100,0%	99,9%	99,9%	99,9%	99,9%	100,0%	99,2%
2000	2001	2002	2003	2004	2005	2006	2007	2008	2009		
261	292	303	300	415	395	460	946	583	486		
96,7%	93,9%	97,6%	97,6%	97,3%	98,4%	98,5%	93,2%	93,9%	98,2%		

The annual carbon inflow (= carbon in produced HWP from domestic harvest) to the HWP pool prior to the year 1964 has been calculated from the five year average from 1964 to 1968 and was assumed to be the constant carbon pool inflow for the time period 1900-1963.

The projected HWP pool inflow (Table C and Figure B) was calculated by means of the annual growth rates of the projected harvest (EC JRC, 2011) of Bulgaria as compared to the average of the years 2003-2007 which amounts to 6,469 Mm<sup>3</sup> (Figure A). These change rates (Table B) were applied for the same years' average (2003-2007) of the historic HWP pool inflow, which amounts to 0,503 Mt C for Bulgaria.



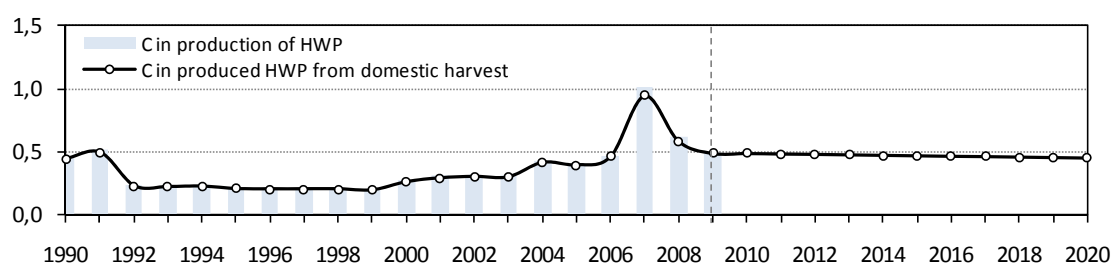
**Figure A: Historic and projected harvest and roundwood production [in Mm<sup>3</sup>]**

**Table B: Projected harvest and change as cp. to five year average of historic harvest [in 1000m<sup>3</sup> and %]**

2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
6 237	6 191	6 144	6 098	6 052	6 005	5 959	5 912	5 866	5 820	5 773
-3,6%	-4,3%	-5,0%	-5,7%	-6,5%	-7,2%	-7,9%	-8,6%	-9,3%	-10,0%	-10,8%

**Table C: Projected carbon Inflow to the HWP pool [in 1000t C]**

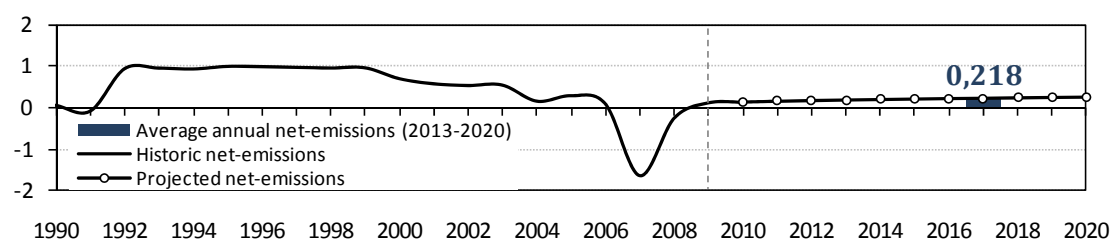
2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
485	482	478	474	471	467	464	460	456	453	449

**Figure B: Carbon in production of HWP and accounted pool inflow [in Mt C]**

By means of the methods as described on page 5 ff, the historic and projected net-emissions from the HWP pool in Bulgaria were subsequently calculated (Table D). The annual average net-emissions in the time period 2013 to 2020 amount to 0,218 Mt CO<sub>2</sub> (Figure C).

**Table D: Historic (up to 2009) and projected net-emissions from HWP pool [in 1000t CO<sub>2</sub>]**

1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
68	-71	947	963	942	1 004	998	982	965	970	709
2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
586	544	555	168	300	101	-1 622	-241	129	139	157
2012	2013	2014	2015	2016	2017	2018	2019	2020		
171	184	196	206	215	224	232	239	246		

**Figure C: Historic and projected net-emissions from the HWP pool [in Mt CO<sub>2</sub>]**

## Cyprus

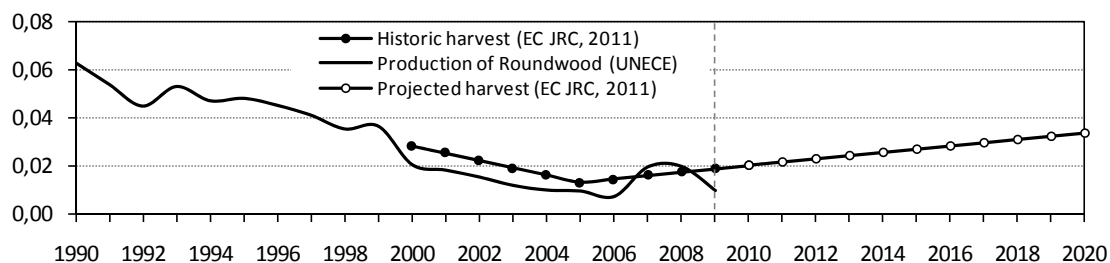
For Cyprus, activity data from the TIMBER database (UNECE 2011) are available for the years 1964 to 2009 (Table A).

**Table A: Historic time series of amounts and share of accountable carbon inflow to the HWP pool [in 1000t and %]**

1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
3	5	3	4	4	3	4	4	5	5	6	6
92,6%	92,4%	88,9%	91,4%	91,9%	84,9%	88,3%	88,9%	91,8%	95,6%	97,3%	89,9%
1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
13	17	17	18	17	14	23	17	17	19	18	18
98,6%	97,4%	99,5%	93,2%	94,2%	91,5%	95,9%	89,4%	84,0%	84,8%	87,1%	87,7%
1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
18	20	9	7	6	10	9	9	9	6	8	8
90,0%	100,0%	97,3%	97,5%	97,4%	97,2%	93,8%	96,6%	94,8%	71,6%	100,0%	100,0%
2000	2001	2002	2003	2004	2005	2006	2007	2008	2009		
5	3	2	2	2	1	1	3	3	2		
95,2%	92,2%	89,9%	94,6%	93,8%	96,6%	90,6%	97,5%	98,7%	94,1%		

The annual carbon inflow (= carbon in produced HWP from domestic harvest) to the HWP pool prior to the year 1964 has been calculated from the five year average from 1964 to 1968 and was assumed to be the constant carbon pool inflow for the time period 1900-1963.

The projected HWP pool inflow (Table C and Figure B) was calculated by means of the annual growth rates of the projected harvest (EC JRC, 2011) of Cyprus as compared to the average of the years 2003-2007 which amounts to 0,013 Mm<sup>3</sup> (Figure A). These change rates (Table B) were applied for the same years' average (2003-2007) of the historic HWP pool inflow, which amounts to 0,002 Mt C for Cyprus.



**Figure A: Historic and projected harvest and roundwood production [in Mm<sup>3</sup>]**

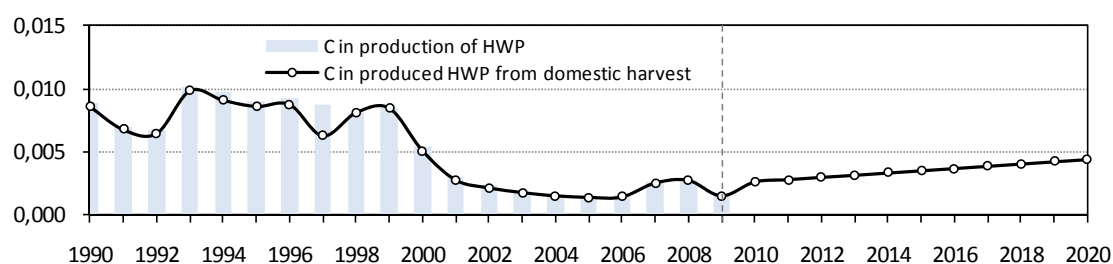


**Table B: Projected harvest and change as cp. to five year average of historic harvest [in 1000m<sup>3</sup> and %]**

2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
20	21	23	24	26	27	28	30	31	32	34
51,8%	62,2%	72,5%	82,9%	93,2%	103,6%	113,9%	124,3%	134,7%	145,0%	155,4%

**Table C: Projected carbon Inflow to the HWP pool [in 1000t C]**

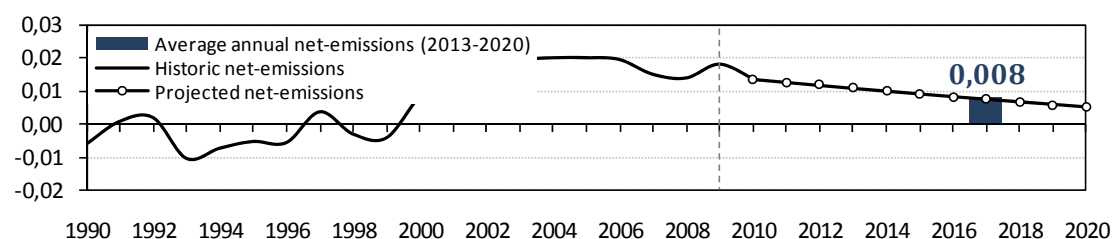
2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
3	3	3	3	3	4	4	4	4	4	4

**Figure B: Carbon in production of HWP and accounted pool inflow [in Mt C]**

By means of the methods as described on page 5 ff, the historic and projected net-emissions from the HWP pool in Cyprus were subsequently calculated (Table D). The annual average net-emissions in the time period 2013 to 2020 amount to 0,008 Mt CO<sub>2</sub> (Figure C).

**Table D: Historic (up to 2009) and projected net-emissions from HWP pool [in 1000t CO<sub>2</sub>]**

1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
-6	1	2	-10	-7	-5	-6	4	-3	-4	8
2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
17	19	19	20	20	19	15	14	18	14	13
2012	2013	2014	2015	2016	2017	2018	2019	2020		
12	11	10	9	8	8	7	6	5		

**Figure C: Historic and projected net-emissions from the HWP pool [in Mt CO<sub>2</sub>]**

## Czech Republic

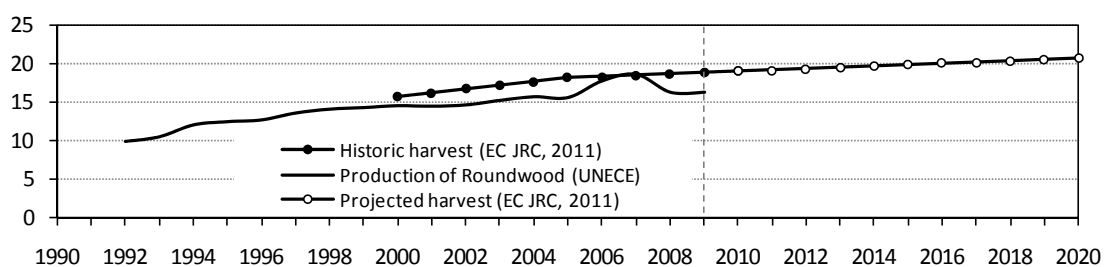
For Czech Republic, activity data from the TIMBER database (UNECE 2011) are available for the years 1992 to 2009 (Table A).

**Table A: Historic time series of amounts and share of accountable carbon inflow to the HWP pool [in 1000t and %]**

1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
1 134	1 182	1 266	1 345	1 348	1 346	1 309	1 343	1 465	1 473	1 468	1 614
98,6%	95,9%	97,5%	96,4%	97,6%	95,3%	93,2%	92,9%	92,4%	91,9%	91,9%	94,8%
2004	2005	2006	2007	2008	2009						
1 637	1 629	1 918	2 089	1 851	1 711						
94,3%	90,8%	91,9%	94,6%	94,0%	86,8%						

The annual carbon inflow (= carbon in produced HWP from domestic harvest) to the HWP pool prior to the year 1992 has been calculated from the five year average from 1992 to 1996 and was assumed to be the constant carbon pool inflow for the time period 1900-1991.

The projected HWP pool inflow (Table C and Figure B) was calculated by means of the annual growth rates of the projected harvest (EC JRC, 2011) of Czech Republic as compared to the average of the years 2003-2007 which amounts to 18,147 Mm<sup>3</sup> (Figure A). These change rates (Table B) were applied for the same years' average (2003-2007) of the historic HWP pool inflow, which amounts to 1,777 Mt C for Czech Republic.



**Figure A: Historic and projected harvest and roundwood production [in Mm<sup>3</sup>]**

**Table B: Projected harvest and change as cp. to five year average of historic harvest [in 1000m<sup>3</sup> and %]**

2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
18 989	19 158	19 326	19 494	19 663	19 831	20 000	20 168	20 336	20 505	20 673
4,6%	5,6%	6,5%	7,4%	8,4%	9,3%	10,2%	11,1%	12,1%	13,0%	13,9%

**Table C: Projected carbon inflow to the HWP pool [in 1000t C]**

2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
1 860	1 876	1 893	1 909	1 926	1 942	1 959	1 975	1 992	2 008	2 025

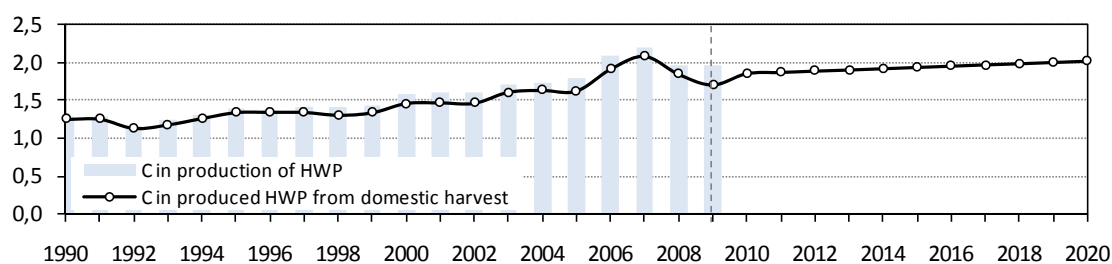


Figure B: Carbon in production of HWP and accounted pool inflow [in Mt C]

By means of the methods as described on page 5 ff, the historic and projected net-emissions from the HWP pool in Czech Republic were subsequently calculated (Table D). The annual average net-emissions in the time period 2013 to 2020 amount to -1,989 MtCO<sub>2</sub> (Figure C).

Table D: Historic (up to 2009) and projected net-emissions from HWP pool [in 1000t CO<sub>2</sub>]

1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
-505	-494	-47	-239	-548	-801	-775	-742	-586	-694	-1 115
2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
-1 095	-1 020	-1 480	-1 481	-1 385	-2 362	-2 883	-1 942	-1 415	-1 942	-1 954
2012	2013	2014	2015	2016	2017	2018	2019	2020		
-1 964	-1 971	-1 978	-1 983	-1 988	-1 993	-1 997	-2 000	-2 004		

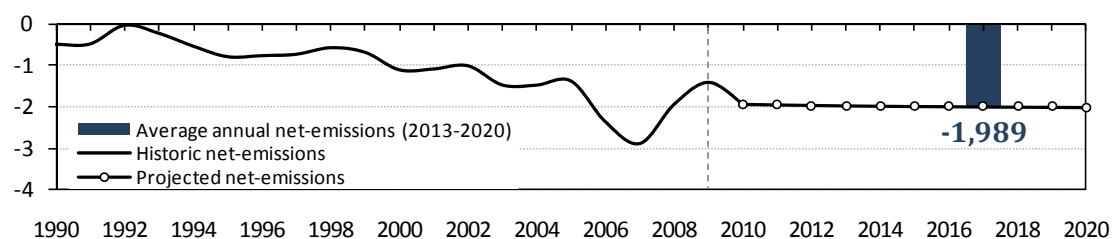


Figure C: Historic and projected net-emissions from the HWP pool [in Mt CO<sub>2</sub>]

## Denmark

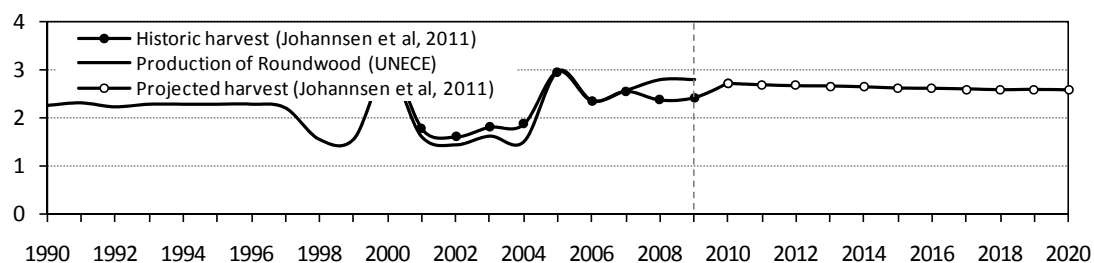
For Denmark, activity data from the TIMBER database (UNECE 2011) are available for the years 1964 to 2009 (Table A).

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

1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
209	223	301	315	383	388	421	407	400	387	363	337
86,8%	87,8%	90,7%	91,5%	92,5%	93,1%	93,0%	93,2%	91,9%	85,6%	81,7%	89,0%
1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
401	392	443	462	399	403	360	423	409	378	365	393
90,6%	90,1%	95,9%	96,4%	93,4%	95,2%	94,9%	94,5%	90,4%	81,2%	79,0%	82,6%
1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
376	386	392	391	334	419	373	370	282	273	231	256
77,7%	81,0%	82,7%	83,0%	81,2%	90,6%	78,5%	74,1%	82,9%	76,8%	65,0%	70,7%
2000	2001	2002	2003	2004	2005	2006	2007	2008	2009		
282	195	221	220	174	263	352	245	318	332		
84,9%	55,4%	66,6%	63,0%	52,3%	78,0%	76,2%	67,4%	81,5%	84,9%		

The annual carbon inflow (= carbon in produced HWP from domestic harvest) to the HWP pool prior to the year 1964 has been calculated from the five year average from 1964 to 1968 and was assumed to be the constant carbon pool inflow for the time period 1900-1963.

The projected HWP pool inflow (Table C and Figure B) was calculated by means of the annual growth rates of the projected harvest (Johannsen et al, 2011) of Denmark as compared to the average of the years 2005-2009 which amounts to 2,530 Mm<sup>3</sup> (Figure A). These change rates (Table B) were applied for the same years' average (2005-2009) of the historic HWP pool inflow, which amounts to 0,302 Mt C for Denmark.



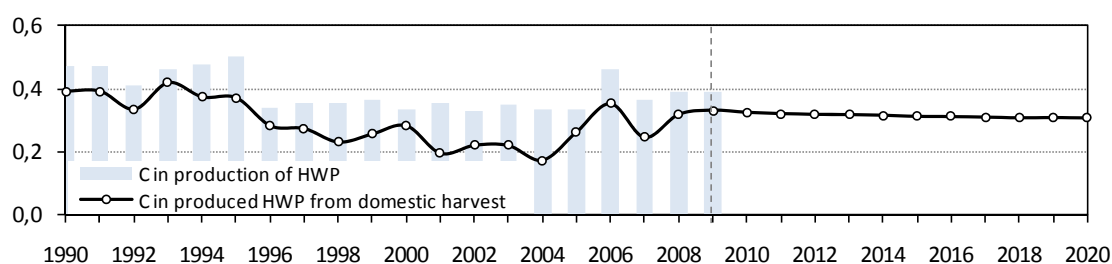
**Figure A: Historic and projected harvest and roundwood production [in Mm<sup>3</sup>]**

**Table B: Projected harvest and change as cp. to five year average of historic harvest [in 1000m<sup>3</sup> and %]**

2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
2 721	2 689	2 668	2 661	2 643	2 613	2 608	2 595	2 576	2 582	2 572
7,5%	6,3%	5,5%	5,2%	4,5%	3,3%	3,1%	2,6%	1,8%	2,0%	1,6%

**Table C: Projected carbon inflow to the HWP pool [in 1000t C]**

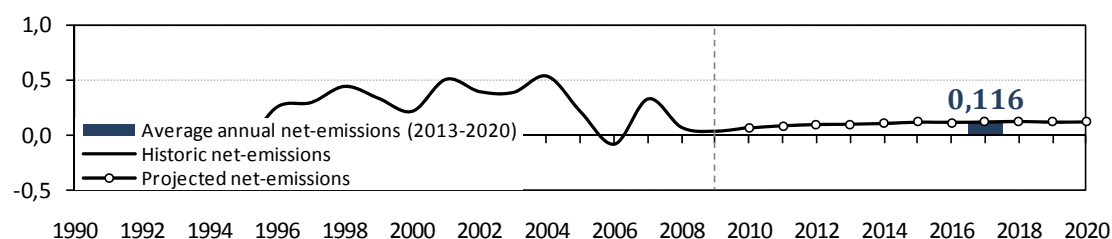
2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
325	321	318	318	316	312	311	310	307	308	307

**Figure B: Carbon in production of HWP and accounted pool inflow [in Mt C]**

By means of the methods as described on page 5 ff, the historic and projected net-emissions from the HWP pool in Denmark were subsequently calculated (Table D). The annual average net-emissions in the time period 2013 to 2020 amount to 0,116 Mt CO<sub>2</sub> (Figure C).

**Table D: Historic (up to 2009) and projected net-emissions from HWP pool [in 1000t CO<sub>2</sub>]**

1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
-215	-199	16	-281	-99	-80	255	293	439	331	214
2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
503	391	384	531	208	-82	326	67	35	70	88
2012	2013	2014	2015	2016	2017	2018	2019	2020		
99	102	108	119	118	120	125	119	121		

**Figure C: Historic and projected net-emissions from the HWP pool [in Mt CO<sub>2</sub>]**

## Estonia

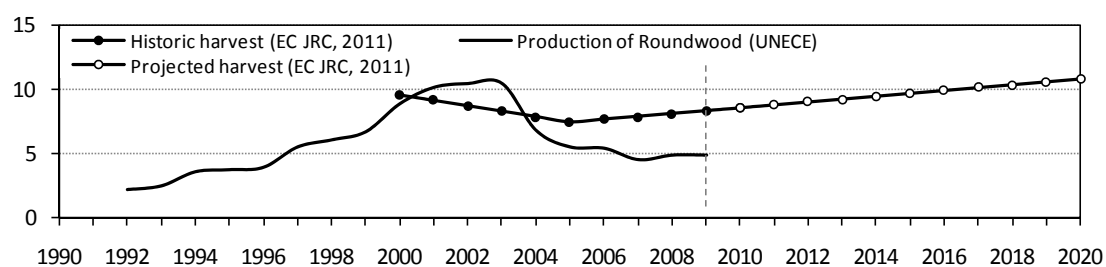
For Estonia, activity data from the TIMBER database (UNECE 2011) are available for the years 1992 to 2009 (Table A).

**Table A: Historic time series of amounts and share of accountable carbon inflow to the HWP pool [in 1000t and %]**

1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
128	146	148	184	211	276	290	357	437	488	504	495
100,0%	100,0%	98,3%	97,5%	97,0%	89,2%	84,8%	84,0%	89,7%	88,8%	89,2%	84,9%
2004	2005	2006	2007	2008	2009						
419	371	367	300	326	338						
68,4%	58,7%	59,7%	58,4%	80,0%	91,2%						

The annual carbon inflow (= carbon in produced HWP from domestic harvest) to the HWP pool prior to the year 1992 has been calculated from the five year average from 1992 to 1996 and was assumed to be the constant carbon pool inflow for the time period 1900-1991.

The projected HWP pool inflow (Table C and Figure B) was calculated by means of the annual growth rates of the projected harvest (EC JRC, 2011) of Estonia as compared to the average of the years 2003-2007 which amounts to 7,410 Mm<sup>3</sup> (Figure A). These change rates (Table B) were applied for the same years' average (2003-2007) of the historic HWP pool inflow, which amounts to 0,390 Mt C for Estonia.



**Figure A: Historic and projected harvest and roundwood production [in Mm<sup>3</sup>]**

**Table B: Projected harvest and change as cp. to five year average of historic harvest [in 1000m<sup>3</sup> and %]**

2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
8 548	8 775	9 003	9 230	9 458	9 685	9 913	10 140	10 368	10 595	10 822
15,3%	18,4%	21,5%	24,6%	27,6%	30,7%	33,8%	36,8%	39,9%	43,0%	46,0%

**Table C: Projected carbon inflow to the HWP pool [in 1000t C]**

2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
450	462	474	486	498	510	522	534	546	558	570

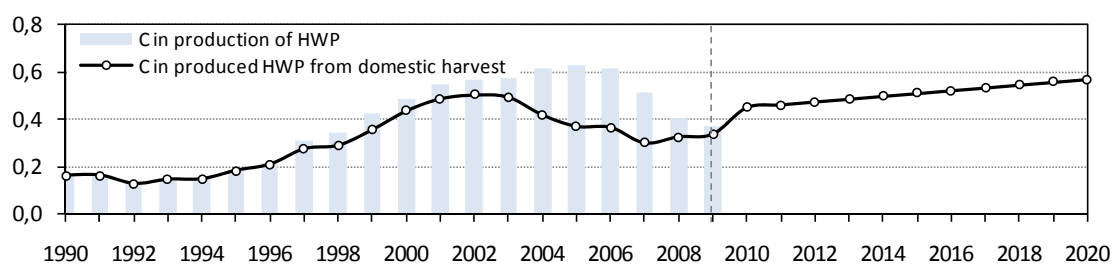


Figure B: Carbon in production of HWP and accounted pool inflow [in Mt C]

By means of the methods as described on page 5 ff, the historic and projected net-emissions from the HWP pool in Estonia were subsequently calculated (Table D). The annual average net-emissions in the time period 2013 to 2020 amount to -0,999 Mt CO<sub>2</sub> (Figure C).

Table D: Historic (up to 2009) and projected net-emissions from HWP pool [in 1000t CO<sub>2</sub>]

1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
-67	-66	65	-1	-9	-140	-235	-467	-510	-740	-1 011
2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
-1 170	-1 195	-1 133	-838	-651	-625	-373	-459	-486	-879	-895
2012	2013	2014	2015	2016	2017	2018	2019	2020		
-913	-931	-951	-970	-990	-1 009	-1 029	-1 048	-1 067		

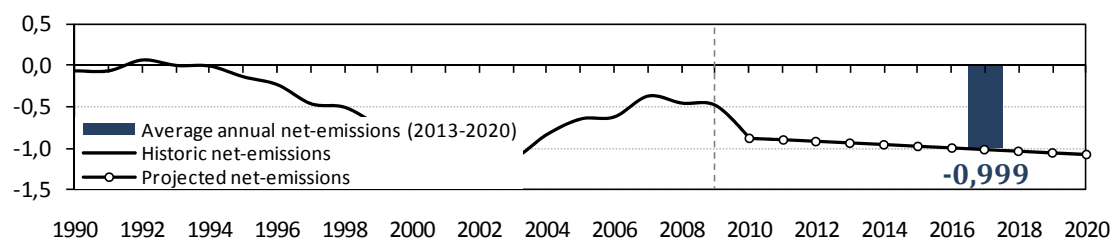


Figure C: Historic and projected net-emissions from the HWP pool [in Mt CO<sub>2</sub>]

## Finland

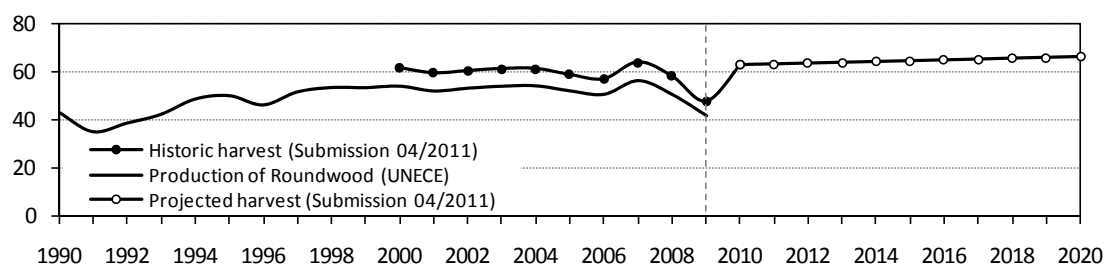
For Finland, activity data from the TIMBER database (UNECE 2011) are available for the years 1964 to 2009 (Table A).

**Table A: Historic time series of amounts and share of accountable carbon inflow to the HWP pool [in 1000t and %]**

1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
3 087	3 137	3 135	3 150	3 276	3 658	3 848	3 923	4 205	4 432	4 388	3 001
94,8%	92,7%	94,0%	94,4%	94,5%	95,7%	95,2%	93,6%	93,6%	91,0%	92,4%	90,5%
1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
3 413	3 694	4 116	4 988	5 179	4 795	4 280	4 532	4 880	4 882	4 978	5 300
90,7%	91,6%	92,3%	94,7%	94,3%	94,1%	90,5%	88,9%	87,9%	90,6%	92,4%	92,8%
1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
5 714	5 695	5 722	5 269	5 624	6 551	7 244	7 473	7 472	8 066	8 289	8 363
94,0%	92,9%	93,0%	92,0%	92,5%	96,1%	94,6%	93,6%	92,5%	93,4%	92,8%	91,2%
2000	2001	2002	2003	2004	2005	2006	2007	2008	2009		
8 723	7 917	8 032	8 253	8 585	7 279	8 124	8 522	7 385	6 429		
90,8%	88,2%	86,7%	87,1%	86,8%	82,2%	84,0%	87,2%	86,2%	93,7%		

The annual carbon inflow (= carbon in produced HWP from domestic harvest) to the HWP pool prior to the year 1964 has been calculated from the five year average from 1964 to 1968 and was assumed to be the constant carbon pool inflow for the time period 1900-1963.

The projected HWP pool inflow (Table C and Figure B) was calculated by means of the annual growth rates of the projected harvest (Submission 04/2011) of Finland as compared to the average of the years 2003-2007 which amounts to 58,684 Mm<sup>3</sup> (Figure A). These change rates (Table B) were applied for the same years' average (2003-2007) of the historic HWP pool inflow, which amounts to 8,153 Mt C for Finland.



**Figure A: Historic and projected harvest and roundwood production [in Mm<sup>3</sup>]**

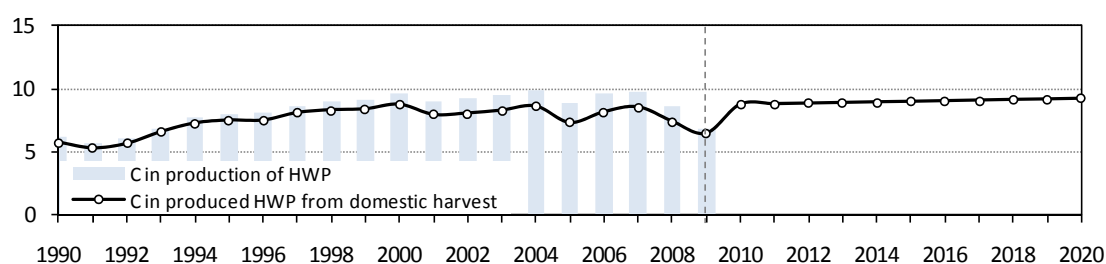


**Table B: Projected harvest and change as cp. to five year average of historic harvest [in 1000m<sup>3</sup> and %]**

2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
62.787	63.126	63.465	63.805	64.144	64.483	64.822	65.161	65.501	65.840	66.179
7,0%	7,6%	8,1%	8,7%	9,3%	9,9%	10,5%	11,0%	11,6%	12,2%	12,8%

**Table C: Projected carbon Inflow to the HWP pool [in 1000t C]**

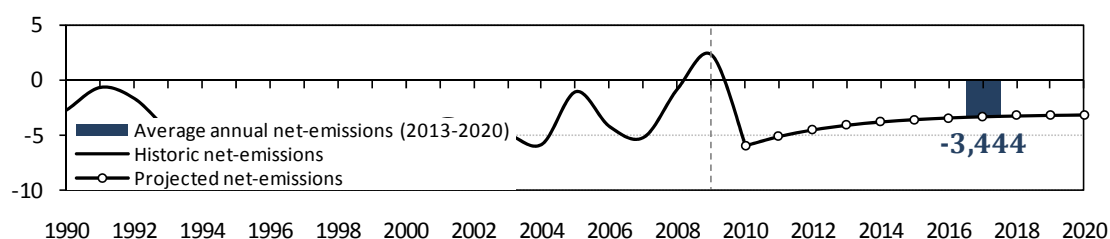
2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
8 723	8 770	8 817	8 864	8 911	8 958	9 005	9 052	9 099	9 147	9 194

**Figure B: Carbon in production of HWP and accounted pool inflow [in Mt C]**

By means of the methods as described on page 5 ff, the historic and projected net-emissions from the HWP pool in Finland were subsequently calculated (Table D). The annual average net-emissions in the time period 2013 to 2020 amount to -3,444 Mt CO<sub>2</sub> (Figure C).

**Table D: Historic (up to 2009) and projected net-emissions from HWP pool [in 1000t CO<sub>2</sub>]**

1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
-2 701	-674	-1 688	-4 477	-6 101	-5 904	-4 974	-6 337	-6 396	-6 067	-6 804
2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
-3 625	-4 135	-4 889	-5 769	-1 058	-4 214	-5 146	-775	2 220	-5 954	-5 099
2012	2013	2014	2015	2016	2017	2018	2019	2020		
-4 493	-4 065	-3 762	-3 548	-3 396	-3 289	-3 212	-3 158	-3 120		

**Figure C: Historic and projected net-emissions from the HWP pool [in Mt CO<sub>2</sub>]**

## France

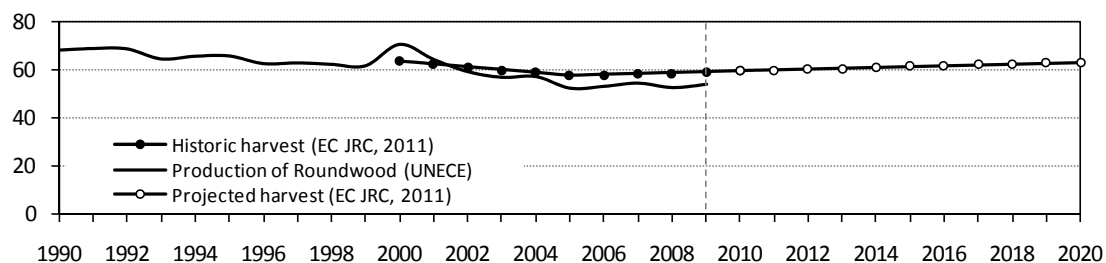
For France, activity data from the TIMBER database (UNECE 2011) are available for the years 1964 to 2009 (Table A).

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

1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
2 933	3 699	3 893	3 978	4 125	4 432	4 560	4 779	5 165	5 502	4 188	3 455
90,0%	91,4%	91,2%	90,9%	91,0%	89,8%	90,0%	91,6%	91,6%	91,8%	90,2%	91,3%
1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
4 869	5 002	5 195	5 437	5 401	5 233	5 169	5 290	5 398	5 190	5 504	5 604
90,9%	92,4%	93,2%	93,0%	92,9%	94,0%	94,7%	95,8%	96,2%	95,7%	96,4%	96,7%
1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
6 204	6 553	6 749	6 750	6 758	6 836	7 334	6 989	7 208	7 455	7 837	8 024
97,2%	97,6%	96,0%	93,0%	93,7%	96,2%	95,1%	94,4%	95,7%	95,6%	95,3%	94,7%
2000	2001	2002	2003	2004	2005	2006	2007	2008	2009		
8 429	8 140	7 954	7 836	8 172	8 168	8 081	7 881	7 606	6 744		
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 from domestic harvest) to the HWP pool prior to the year 1964 has been calculated from the five year average from 1964 to 1968 and was assumed to be the constant carbon pool inflow for the time period 1900-1963.

The projected HWP pool inflow (Table C and Figure B) was calculated by means of the annual growth rates of the projected harvest (EC JRC, 2011) of France as compared to the average of the years 2003-2007 which amounts to 57,498 Mm<sup>3</sup> (Figure A). These change rates (Table B) were applied for the same years' average (2003-2007) of the historic HWP pool inflow, which amounts to 8,028 Mt C for France.



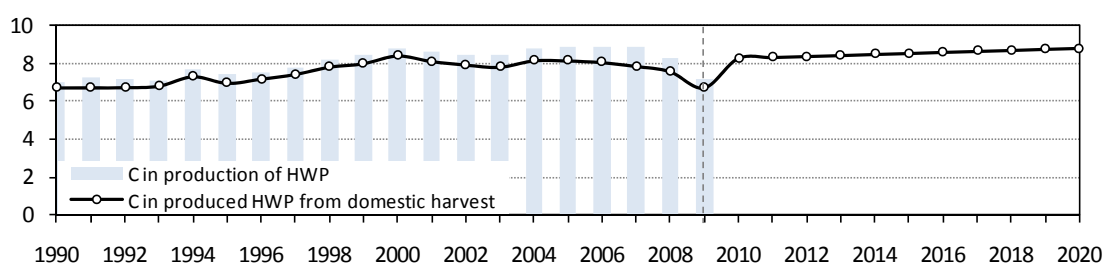
**Figure A: Historic and projected harvest and roundwood production [in Mm<sup>3</sup>]**

**Table B: Projected harvest and change as cp. to five year average of historic harvest [in 1000m<sup>3</sup> and %]**

2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
59 425	59 810	60 196	60 581	60 967	61 352	61 737	62 123	62 508	62 894	63 279
3,4%	4,0%	4,7%	5,4%	6,0%	6,7%	7,4%	8,0%	8,7%	9,4%	10,1%

**Table C: Projected carbon Inflow to the HWP pool [in 1000t C]**

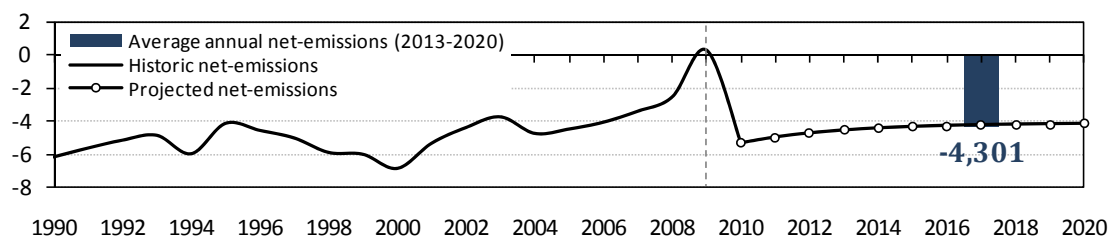
2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
8 297	8 350	8 404	8 458	8 512	8 566	8 619	8 673	8 727	8 781	8 835

**Figure B: Carbon in production of HWP and accounted pool inflow [in Mt C]**

By means of the methods as described on page 5 ff, the historic and projected net-emissions from the HWP pool in France were subsequently calculated (Table D). The annual average net-emissions in the time period 2013 to 2020 amount to -4,301 Mt CO<sub>2</sub> (Figure C).

**Table D: Historic (up to 2009) and projected net-emissions from HWP pool [in 1000t CO<sub>2</sub>]**

1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
-6 154	-5 620	-5 145	-4 855	-5 964	-4 131	-4 559	-5 016	-5 886	-5 997	-6 847
2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
-5 325	-4 381	-3 738	-4 739	-4 475	-4 060	-3 400	-2 540	285	-5 322	-4 977
2012	2013	2014	2015	2016	2017	2018	2019	2020		
-4 732	-4 558	-4 434	-4 345	-4 282	-4 237	-4 204	-4 181	-4 164		

**Figure C: Historic and projected net-emissions from the HWP pool [in Mt CO<sub>2</sub>]**

## Germany

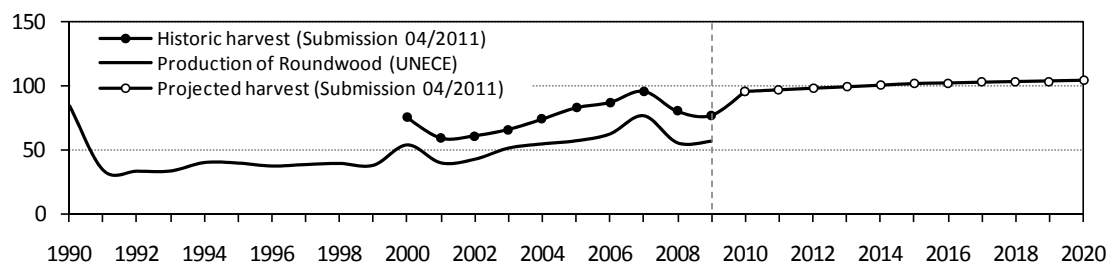
For Germany, activity data from the TIMBER database (UNECE 2011) are available for the years 1964 to 2009 (Table A).

**Table A: Historic time series of amounts and share of accountable carbon inflow to the HWP pool [in 1000t and %]**

1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
5 213	5 417	5 586	5 704	5 995	6 361	6 645	7 013	7 212	7 958	8 069	7 139
87,1%	87,4%	88,6%	90,0%	88,7%	86,9%	87,8%	89,7%	88,9%	90,7%	91,9%	90,7%
1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
7 983	8 243	8 351	8 675	8 786	8 416	8 273	8 676	9 320	9 187	9 430	9 690
90,8%	91,1%	90,8%	91,0%	91,6%	91,2%	92,0%	91,5%	92,4%	92,3%	93,0%	93,1%
1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
10 257	11 103	11 487	10 799	10 947	11 168	12 260	12 641	12 781	13 342	13 420	13 743
92,4%	93,5%	97,0%	91,6%	91,5%	96,3%	94,1%	95,2%	96,0%	94,8%	93,1%	91,1%
2000	2001	2002	2003	2004	2005	2006	2007	2008	2009		
14 984	14 102	15 223	16 209	17 766	18 756	19 662	20 111	16 609	15 858		
92,8%	89,2%	92,3%	93,9%	95,0%	93,4%	92,4%	92,7%	86,6%	84,4%		

The annual carbon inflow (= carbon in produced HWP from domestic harvest) to the HWP pool prior to the year 1964 has been calculated from the five year average from 1964 to 1968 and was assumed to be the constant carbon pool inflow for the time period 1900-1963.

The projected HWP pool inflow (Table C and Figure B) was calculated by means of the annual growth rates of the projected harvest (Submission 04/2011) of Germany as compared to the average of the years 2005-2009 which amounts to 84,623 Mm<sup>3</sup> (Figure A). These change rates (Table B) were applied for the same years' average (2005-2009) of the historic HWP pool inflow, which amounts to 18,199 Mt C for Germany.



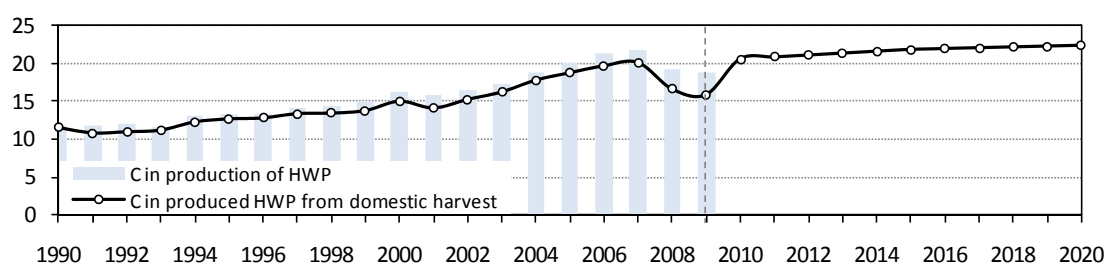
**Figure A: Historic and projected harvest and roundwood production [in Mm<sup>3</sup>]**

**Table B: Projected harvest and change as cp. to five year average of historic harvest [in 1000m<sup>3</sup> and %]**

2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
95 723	96 893	98 063	99 233	100 403	101 573	102 078	102 583	103 089	103 594	104 099
13,1%	14,5%	15,9%	17,3%	18,6%	20,0%	20,6%	21,2%	21,8%	22,4%	23,0%

**Table C: Projected carbon Inflow to the HWP pool [in 1000t C]**

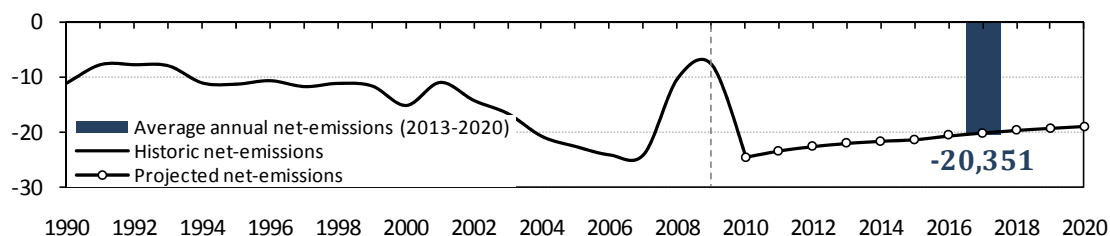
2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
20 586	20 838	21 090	21 341	21 593	21 844	21 953	22 062	22 170	22 279	22 388

**Figure B: Carbon in production of HWP and accounted pool inflow [in Mt C]**

By means of the methods as described on page 5 ff, the historic and projected net-emissions from the HWP pool in Germany were subsequently calculated (Table D). The annual average net-emissions in the time period 2013 to 2020 amount to -20,351 Mt CO<sub>2</sub> (Figure C).

**Table D: Historic (up to 2009) and projected net-emissions from HWP pool [in 1000t CO<sub>2</sub>]**

1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
-11 193	-7 879	-7 892	-8 098	-11 192	-11 404	-10 786	-11 845	-11 267	-11 751	-15 267
2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
-11 095	-14 382	-16 752	-20 870	-22 706	-24 227	-24 102	-10 327	-7 892	-24 400	-23 268
2012	2013	2014	2015	2016	2017	2018	2019	2020		
-22 470	-21 908	-21 512	-21 234	-20 559	-20 014	-19 562	-19 178	-18 843		

**Figure C: Historic and projected net-emissions from the HWP pool [in Mt CO<sub>2</sub>]**

## Greece

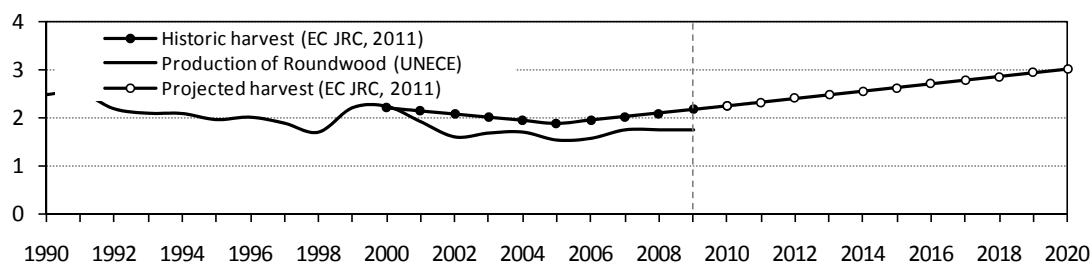
For Greece, activity data from the TIMBER database (UNECE 2011) are available for the years 1964 to 2009 (Table A).

**Table A: Historic time series of amounts and share of accountable carbon inflow to the HWP pool [in 1000t and %]**

1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
71	82	66	68	78	83	101	113	126	131	120	145
88,7%	86,8%	74,9%	74,9%	74,0%	70,5%	76,5%	76,9%	71,6%	66,2%	63,0%	75,8%
1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
146	159	165	183	189	194	206	269	283	278	299	290
74,2%	73,7%	71,8%	68,2%	72,0%	77,5%	82,9%	82,5%	83,9%	85,6%	80,4%	80,2%
1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
290	291	307	328	258	486	524	533	514	385	307	312
78,4%	79,8%	81,0%	81,1%	68,1%	89,6%	96,6%	95,7%	95,9%	92,0%	71,0%	77,3%
2000	2001	2002	2003	2004	2005	2006	2007	2008	2009		
356	333	373	345	341	360	324	412	373	373		
76,4%	74,1%	73,5%	65,3%	64,4%	67,9%	67,6%	86,0%	77,9%	77,9%		

The annual carbon inflow (= carbon in produced HWP from domestic harvest) to the HWP pool prior to the year 1964 has been calculated from the five year average from 1964 to 1968 and was assumed to be the constant carbon pool inflow for the time period 1900-1963.

The projected HWP pool inflow (Table C and Figure B) was calculated by means of the annual growth rates of the projected harvest<sup>2</sup> (EC JRC, 2011) of Greece as compared to the average of the years 2003-2007 which amounts to 1,870 Mm<sup>3</sup> (Figure A). These change rates (Table B) were applied for the same years' average (2003-2007) of the historic HWP pool inflow, which amounts to 0,356 Mt C for Greece.



**Figure A: Historic and projected harvest and roundwood production [in Mm<sup>3</sup>]**

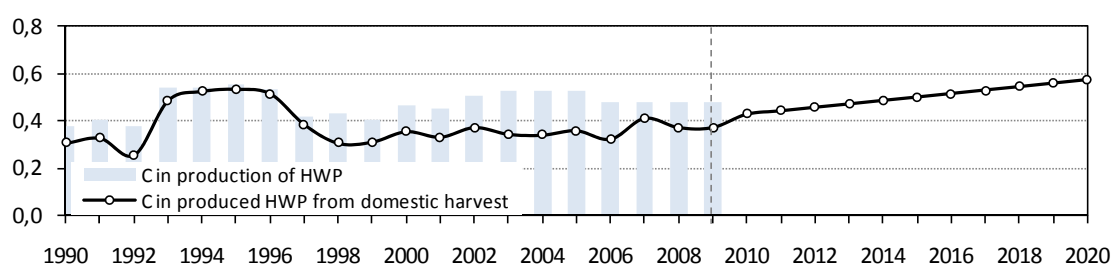
<sup>2</sup> The projected harvest rates are based on assumptions as presented in the submission of Greece from 21 April 2011

**Table B: Projected harvest and change as cp. to five year average of historic harvest [in 1000m<sup>3</sup> and %]**

2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
2 250	2 325	2 401	2 477	2 553	2 629	2 705	2 781	2 857	2 933	3 009
20,3%	24,4%	28,4%	32,5%	36,6%	40,6%	44,7%	48,7%	52,8%	56,9%	60,9%

**Table C: Projected carbon inflow to the HWP pool [in 1000t C]**

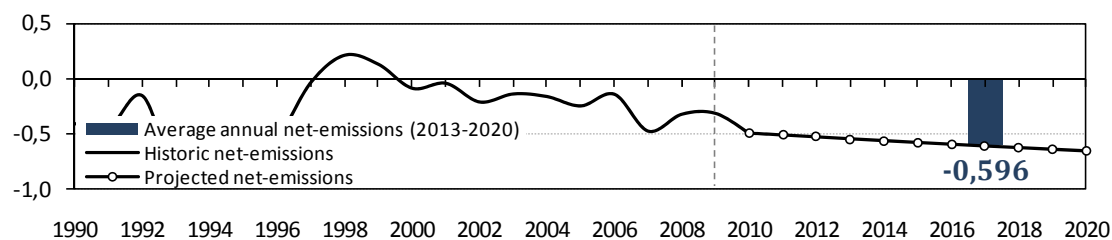
2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
429	443	458	472	487	501	516	530	545	559	574

**Figure B: Carbon in production of HWP and accounted pool inflow [in Mt C]**

By means of the methods as described on page 5 ff, the historic and projected net-emissions from the HWP pool in Greece were subsequently calculated (Table D). The annual average net-emissions in the time period 2013 to 2020 amount to -0,596 Mt CO<sub>2</sub> (Figure C).

**Table D: Historic (up to 2009) and projected net-emissions from HWP pool [in 1000t CO<sub>2</sub>]**

1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
-407	-437	-156	-888	-843	-712	-530	-31	212	129	-86
2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
-42	-210	-138	-162	-246	-141	-473	-320	-313	-495	-511
2012	2013	2014	2015	2016	2017	2018	2019	2020		
-527	-543	-559	-575	-590	-605	-619	-633	-647		

**Figure C: Historic and projected net-emissions from the HWP pool [in Mt CO<sub>2</sub>]**

## Hungary

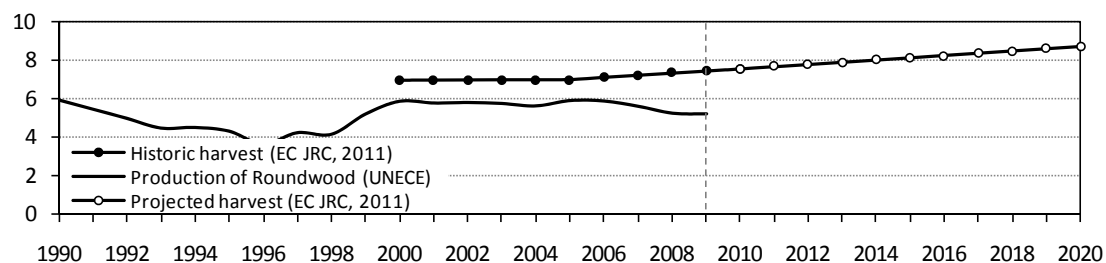
For Hungary, activity data from the TIMBER database (UNECE 2011) are available for the years 1964 to 2009 (Table A).

**Table A: Historic time series of amounts and share of accountable carbon inflow to the HWP pool [in 1000t and %]**

1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
179	175	190	192	177	186	200	215	245	242	258	281
55,4%	54,1%	54,4%	46,3%	43,5%	40,6%	38,8%	41,6%	44,0%	40,1%	40,9%	43,7%
1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
280	274	332	396	397	393	374	393	403	391	345	332
44,5%	41,5%	46,3%	55,1%	52,9%	53,0%	54,3%	54,4%	53,3%	52,6%	45,8%	44,6%
1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
350	379	409	321	258	274	371	265	270	324	310	316
47,1%	49,3%	61,2%	55,3%	52,3%	66,8%	86,3%	73,3%	69,1%	74,3%	65,2%	68,0%
2000	2001	2002	2003	2004	2005	2006	2007	2008	2009		
345	341	361	326	316	416	413	416	409	248		
70,8%	71,6%	71,5%	63,0%	61,9%	79,9%	80,5%	75,7%	83,4%	69,4%		

The annual carbon inflow (= carbon in produced HWP from domestic harvest) to the HWP pool prior to the year 1964 has been calculated from the five year average from 1964 to 1968 and was assumed to be the constant carbon pool inflow for the time period 1900-1963.

The projected HWP pool inflow (Table C and Figure B) was calculated by means of the annual growth rates of the projected harvest (EC JRC, 2011) of Hungary as compared to the average of the years 2003-2007 which amounts to 6,992 Mm<sup>3</sup> (Figure A). These change rates (Table B) were applied for the same years' average (2003-2007) of the historic HWP pool inflow, which amounts to 0,377 Mt C for Hungary.



**Figure A: Historic and projected harvest and roundwood production [in Mm<sup>3</sup>]**

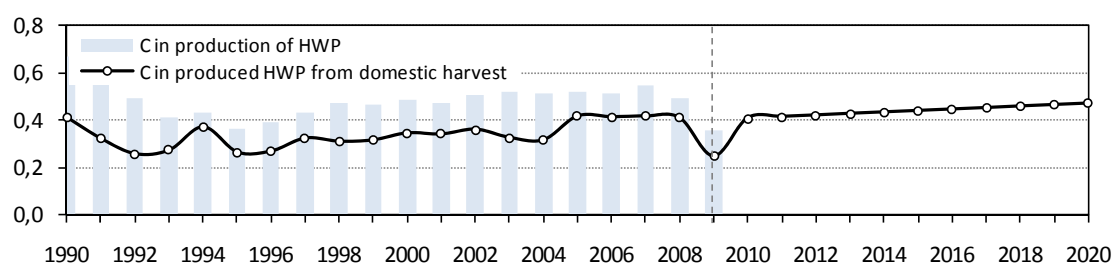


**Table B: Projected harvest and change as cp. to five year average of historic harvest [in 1000m<sup>3</sup> and %]**

2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
7 562	7 676	7 790	7 904	8 018	8 132	8 246	8 360	8 474	8 588	8 702
8,1%	9,8%	11,4%	13,0%	14,7%	16,3%	17,9%	19,6%	21,2%	22,8%	24,4%

**Table C: Projected carbon Inflow to the HWP pool [in 1000t C]**

2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
408	414	420	427	433	439	445	451	457	464	470

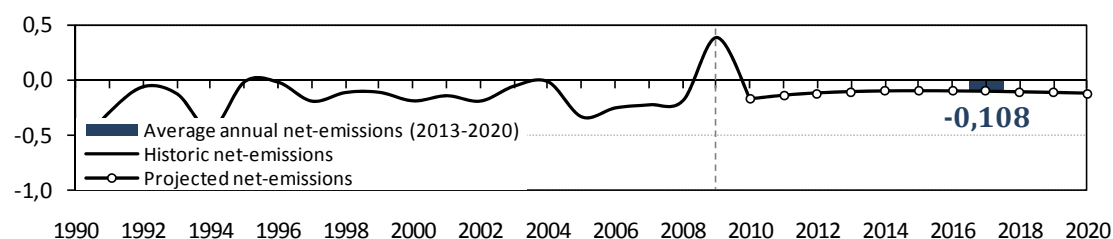


**Figure B: Carbon in production of HWP and accounted pool inflow [in Mt C]**

By means of the methods as described on page 5 ff, the historic and projected net-emissions from the HWP pool in Hungary were subsequently calculated (Table D). The annual average net-emissions in the time period 2013 to 2020 amount to -0,108 Mt CO<sub>2</sub> (Figure C).

**Table D: Historic (up to 2009) and projected net-emissions from HWP pool [in 1000t CO<sub>2</sub>]**

1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
-639	-286	-57	-125	-445	-13	-18	-190	-111	-110	-187
2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
-140	-189	-52	-14	-333	-251	-222	-185	389	-177	-142
2012	2013	2014	2015	2016	2017	2018	2019	2020		
-120	-107	-101	-100	-101	-105	-110	-116	-122		



**Figure C: Historic and projected net-emissions from the HWP pool [in Mt CO<sub>2</sub>]**

## Ireland

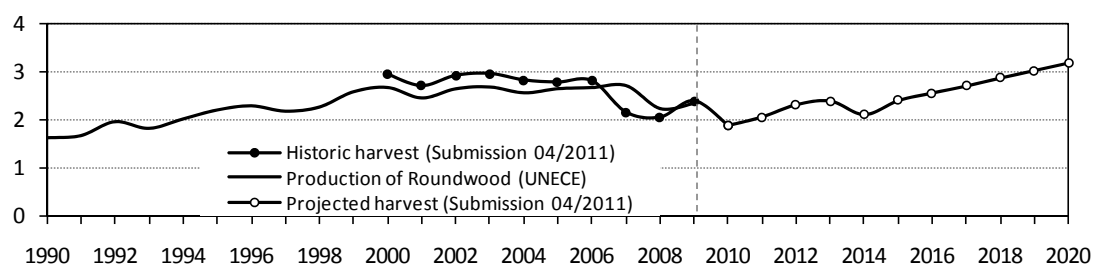
For Ireland, activity data from the TIMBER database (UNECE 2011) are available for the years 1964 to 2009 (Table A).

**Table A: Historic time series of amounts and share of accountable carbon inflow to the HWP pool [in 1000t and %]**

1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
40	44	64	75	86	84	97	111	113	122	108	94
87,5%	83,0%	88,3%	90,6%	91,3%	90,4%	92,3%	93,8%	92,6%	89,2%	81,1%	86,8%
1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
97	120	102	71	77	62	89	100	149	181	212	228
92,1%	91,4%	91,9%	82,1%	88,8%	65,5%	93,6%	96,2%	98,0%	98,5%	98,7%	98,7%
1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
230	240	248	248	279	285	313	271	310	319	358	385
98,7%	99,4%	99,5%	99,6%	99,7%	96,9%	96,7%	97,3%	99,9%	96,1%	95,8%	88,2%
2000	2001	2002	2003	2004	2005	2006	2007	2008	2009		
440	446	409	474	458	475	504	528	371	374		
96,7%	96,9%	95,9%	93,8%	92,9%	91,4%	92,3%	91,8%	87,3%	92,3%		

The annual carbon inflow (= carbon in produced HWP from domestic harvest) to the HWP pool prior to the year 1964 has been calculated from the five year average from 1964 to 1968 and was assumed to be the constant carbon pool inflow for the time period 1900-1963.

The projected HWP pool inflow (Table C and Figure B) was calculated by means of the annual growth rates of the projected harvest (Submission 04/2011) of Ireland as compared to the average of the years 2005-2009 which amounts to 2,437 Mm<sup>3</sup> (Figure A). These change rates (Table B) were applied for the same years' average (2005-2009) of the historic HWP pool inflow, which amounts to 0,450 Mt C for Ireland.



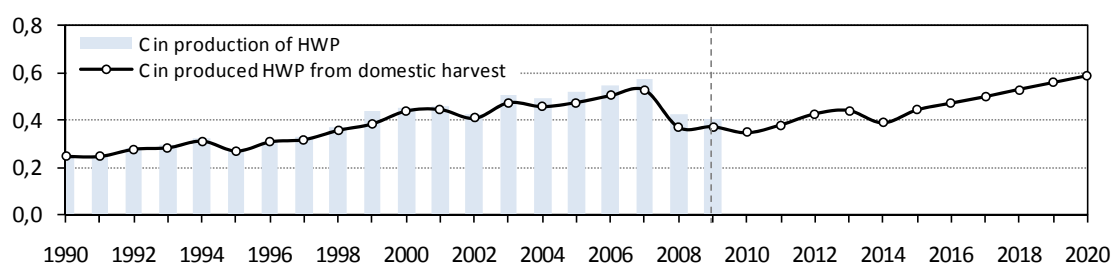
**Figure A: Historic and projected harvest and roundwood production [in Mm<sup>3</sup>]**

**Table B: Projected harvest and change as cp. to five year average of historic harvest [in 1000m<sup>3</sup> and %]**

2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
1 883	2 061	2 314	2 390	2 109	2 402	2 558	2 704	2 870	3 026	3 182
-22,7%	-15,4%	-5,1%	-1,9%	-13,5%	-1,4%	5,0%	10,9%	17,8%	24,2%	30,6%

**Table C: Projected carbon inflow to the HWP pool [in 1000t C]**

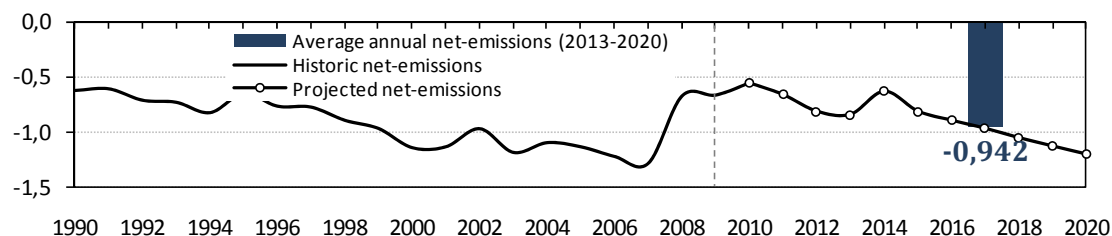
2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
348	381	428	442	390	444	473	500	530	559	588

**Figure B: Carbon in production of HWP and accounted pool inflow [in Mt C]**

By means of the methods as described on page 5 ff, the historic and projected net-emissions from the HWP pool in Ireland were subsequently calculated (Table D). The annual average net-emissions in the time period 2013 to 2020 amount to -0,942 Mt CO<sub>2</sub> (Figure C).

**Table D: Historic (up to 2009) and projected net-emissions from HWP pool [in 1000t CO<sub>2</sub>]**

1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
-625	-611	-713	-732	-825	-652	-766	-775	-893	-967	-1 139
2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
-1 131	-969	-1 182	-1 094	-1 132	-1 218	-1 281	-676	-667	-557	-662
2012	2013	2014	2015	2016	2017	2018	2019	2020		
-813	-841	-632	-812	-895	-968	-1 053	-1 128	-1 202		

**Figure C: Historic and projected net-emissions from the HWP pool [in Mt CO<sub>2</sub>]**

## Italy

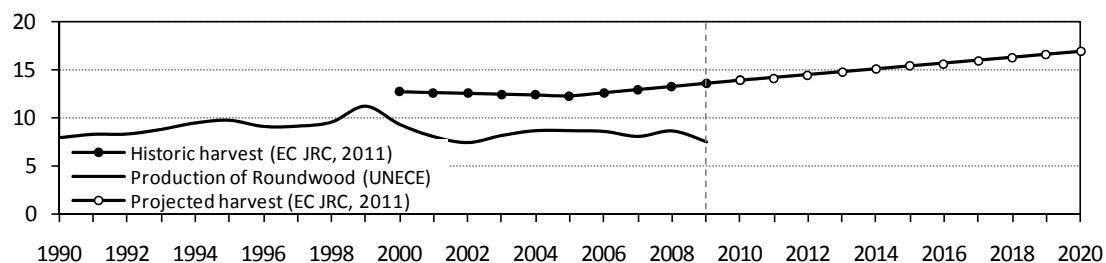
For Italy, activity data from the TIMBER database (UNECE 2011) are available for the years 1964 to 2009 (Table A).

**Table A: Historic time series of amounts and share of accountable carbon inflow to the HWP pool [in 1000t and %]**

1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
729	779	1 172	1 267	1 402	1 383	1 522	1 563	1 528	1 252	1 153	1 225
58,1%	60,1%	58,8%	56,4%	55,6%	50,5%	54,1%	55,2%	49,4%	49,9%	35,9%	42,8%
1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
1 260	1 424	1 476	1 456	1 617	1 631	1 618	1 446	1 421	1 545	1 576	1 611
36,3%	41,1%	42,1%	40,5%	42,6%	43,4%	47,1%	45,2%	40,7%	43,8%	46,7%	44,8%
1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
2 071	1 958	1 665	1 638	1 384	1 689	1 668	2 165	1 962	2 234	2 207	2 353
47,1%	44,1%	37,2%	37,0%	32,0%	39,5%	36,4%	44,3%	40,4%	41,8%	37,9%	39,8%
2000	2001	2002	2003	2004	2005	2006	2007	2008	2009		
2 076	2 061	2 044	2 154	2 206	2 356	2 543	2 803	2 730	2 668		
33,4%	33,6%	32,4%	34,3%	34,2%	35,8%	38,1%	41,9%	44,4%	49,8%		

The annual carbon inflow (= carbon in produced HWP from domestic harvest) to the HWP pool prior to the year 1964 has been calculated from the five year average from 1964 to 1968 and was assumed to be the constant carbon pool inflow for the time period 1900-1963.

The projected HWP pool inflow (Table C and Figure B) was calculated by means of the annual growth rates of the projected harvest (EC JRC, 2011) of Italy as compared to the average of the years 2003-2007 which amounts to 12,322 Mm<sup>3</sup> (Figure A). These change rates (Table B) were applied for the same years' average (2003-2007) of the historic HWP pool inflow, which amounts to 2,413 Mt C for Italy.



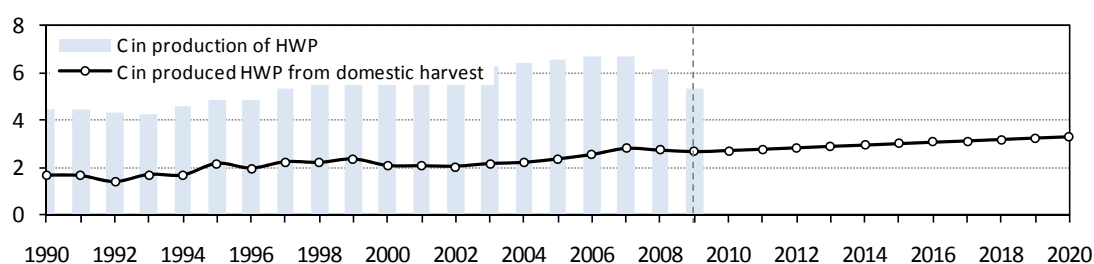
**Figure A: Historic and projected harvest and roundwood production [in Mm<sup>3</sup>]**

**Table B: Projected harvest and change as cp. to five year average of historic harvest [in 1000m³ and %]**

2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
13 841	14 145	14 448	14 752	15 056	15 360	15 664	15 968	16 272	16 575	16 879
12,3%	14,8%	17,3%	19,7%	22,2%	24,7%	27,1%	29,6%	32,1%	34,5%	37,0%

**Table C: Projected carbon inflow to the HWP pool [in 1000t C]**

2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
2 710	2 770	2 829	2 889	2 948	3 007	3 067	3 126	3 186	3 245	3 305

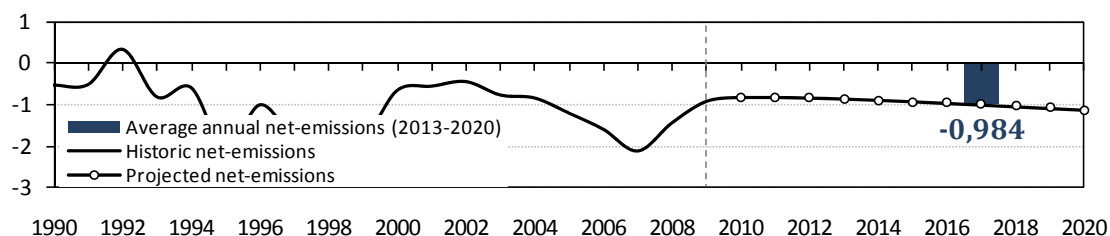


**Figure B: Carbon in production of HWP and accounted pool inflow [in Mt C]**

By means of the methods as described on page 5 ff, the historic and projected net-emissions from the HWP pool in Italy were subsequently calculated (Table D). The annual average net-emissions in the time period 2013 to 2020 amount to -0,984 Mt CO<sub>2</sub> (Figure C).

**Table D: Historic (up to 2009) and projected net-emissions from HWP pool [in 1000t CO<sub>2</sub>]**

1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
-536	-518	323	-814	-595	-2 077	-1 006	-1 717	-1 415	-1 790	-657
2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
-559	-450	-770	-843	-1 205	-1 593	-2 110	-1 434	-992	-826	-824
2012	2013	2014	2015	2016	2017	2018	2019	2020		
-838	-861	-891	-925	-962	-1 000	-1 040	-1 079	-1 119		



**Figure C: Historic and projected net-emissions from the HWP pool [in Mt CO<sub>2</sub>]**

## Latvia

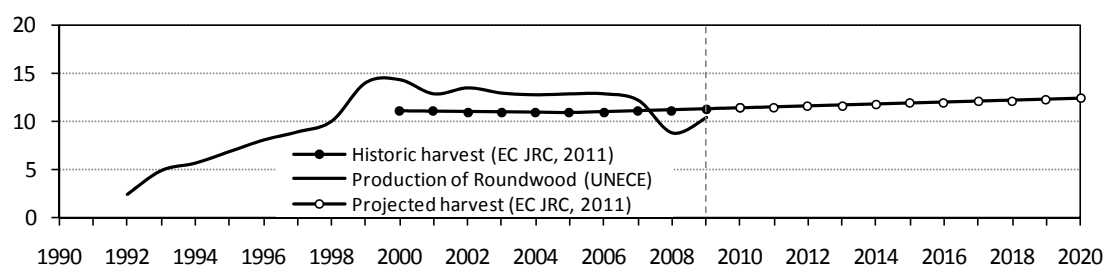
For Latvia, activity data from the TIMBER database (UNECE 2011) are available for the years 1992 to 2009 (Table A).

**Table A: Historic time series of amounts and share of accountable carbon inflow to the HWP pool [in 1000t and %]**

1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
279	170	311	418	471	721	854	966	1 011	997	1 029	1 037
99,9%	100,0%	100,0%	99,1%	99,9%	99,3%	98,4%	98,4%	98,4%	97,1%	95,4%	94,6%
2004	2005	2006	2007	2008	2009						
1 029	1 044	1 072	809	736	787						
90,2%	87,6%	87,2%	82,0%	90,6%	98,0%						

The annual carbon Inflow (= carbon in produced HWP from domestic harvest) to the HWP pool prior to the year 1992 has been calculated from the five years average from 1992 to 1996 and was assumed to be the constant carbon pool Inflow for the time period 1900-1991.

The projected HWP pool inflow (Table C and Figure B) was calculated by means of the annual growth rates of the projected harvest (EC JRC, 2011) of Latvia as compared to the average of the years 2003-2007 which amounts to 10,864 Mm<sup>3</sup> (Figure A). These change rates (Table B) were applied for the same years' average (2003-2007) of the historic HWP pool inflow, which amounts to 0,998 Mt C for Latvia.



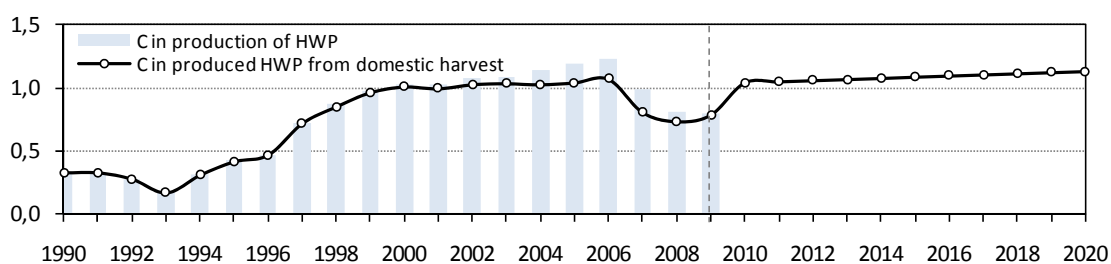
**Figure A: Historic and projected harvest and roundwood production [in Mm<sup>3</sup>]**

**Table B: Projected harvest and change as cp. to five year average of historic harvest [in 1000m<sup>3</sup> and %]**

2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
11 356	11 455	11 553	11 652	11 750	11 848	11 947	12 045	12 144	12 242	12 341
4,5%	5,4%	6,3%	7,2%	8,2%	9,1%	10,0%	10,9%	11,8%	12,7%	13,6%

**Table C: Projected carbon inflow to the HWP pool [in 1000t C]**

2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
1 043	1 052	1 061	1 071	1 080	1 089	1 098	1 107	1 116	1 125	1 134

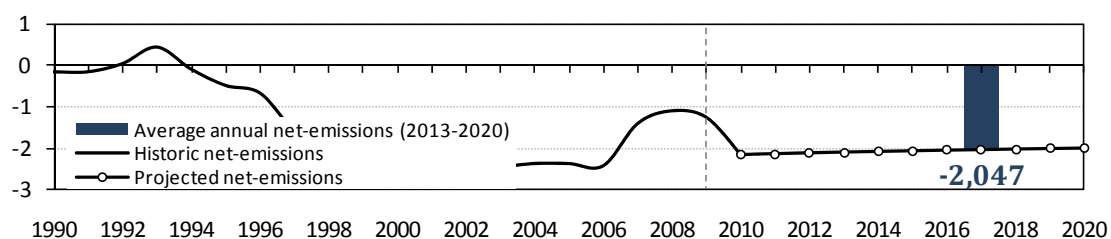


**Figure B: Carbon in production of HWP and accounted pool inflow [in Mt C]**

By means of the methods as described on page 5 ff, the historic and projected net-emissions from the HWP pool in Latvia were subsequently calculated (Table D). The annual average net-emissions in the time period 2013 to 2020 amount to -2,047 Mt CO<sub>2</sub> (Figure C).

**Table D: Historic (up to 2009) and projected net-emissions from HWP pool [in 1000t CO<sub>2</sub>]**

1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
-173	-170	25	420	-109	-497	-678	-1 572	-2 021	-2 387	-2 505
2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
-2 403	-2 470	-2 443	-2 363	-2 365	-2 414	-1 404	-1 103	-1 262	-2 157	-2 134
2012	2013	2014	2015	2016	2017	2018	2019	2020		
-2 115	-2 097	-2 081	-2 066	-2 052	-2 039	-2 026	-2 014	-2 002		



**Figure C: Historic and projected net-emissions from the HWP pool [in Mt CO<sub>2</sub>]**

## Lithuania

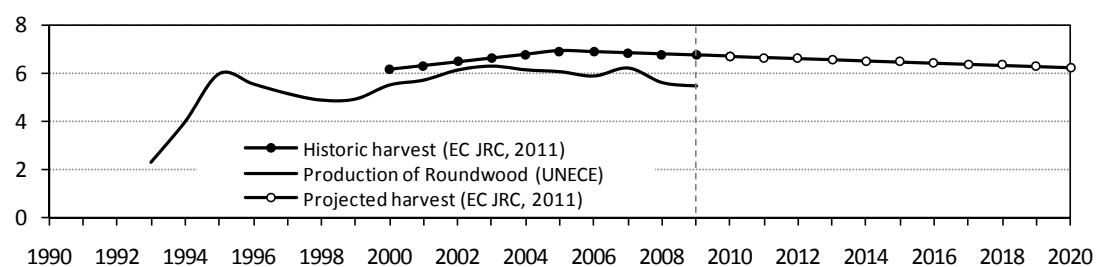
For Lithuania, activity data from the TIMBER database (UNECE 2011) are available for the years 1993 to 2009 (Table A).

**Table A: Historic time series of amounts and share of accountable carbon inflow to the HWP pool [in 1000t and %]**

1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
237	248	298	424	381	371	350	417	407	447	502	506
100,0%	99,5%	99,7%	99,6%	96,5%	96,7%	97,1%	98,0%	96,5%	97,0%	97,9%	94,3%
2005	2006	2007	2008	2009							
504	518	526	510	461							
93,8%	95,1%	91,0%	95,0%	94,9%							

The annual carbon inflow (= carbon in produced HWP from domestic harvest) to the HWP pool prior to the year 1993 has been calculated from the five year average from 1993 to 1997 and was assumed to be the constant carbon pool inflow for the time period 1900-1992.

The projected HWP pool inflow (Table C and Figure B) was calculated by means of the annual growth rates of the projected harvest (EC JRC, 2011) of Lithuania as compared to the average of the years 2003-2007 which amounts to 6,925 Mm<sup>3</sup> (Figure A). These change rates (Table B) were applied for the same years' average (2003-2007) of the historic HWP pool inflow, which amounts to 0,511 Mt C for Lithuania.



**Figure A: Historic and projected harvest and roundwood production [in Mm<sup>3</sup>]**

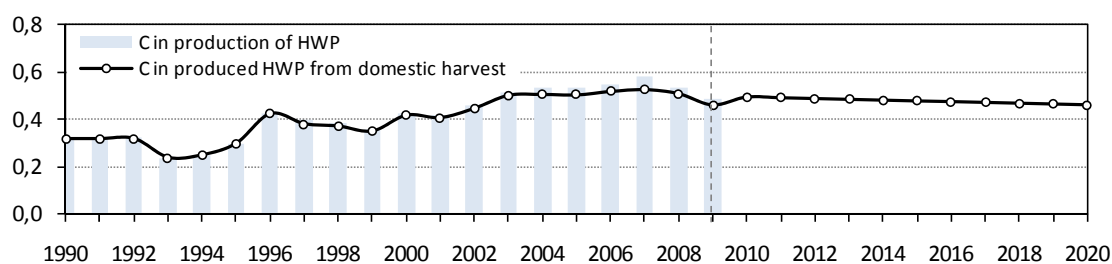
**Table B: Projected harvest and change as cp. to five year average of historic harvest [in 1000m<sup>3</sup> and %]**

2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
6 702	6 658	6 613	6 569	6 524	6 480	6 435	6 390	6 346	6 301	6 257
-3,2%	-3,9%	-4,5%	-5,1%	-5,8%	-6,4%	-7,1%	-7,7%	-8,4%	-9,0%	-9,6%

**Table C: Projected carbon inflow to the HWP pool [in 1000t C]**

2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
495	491	488	485	482	478	475	472	468	465	462



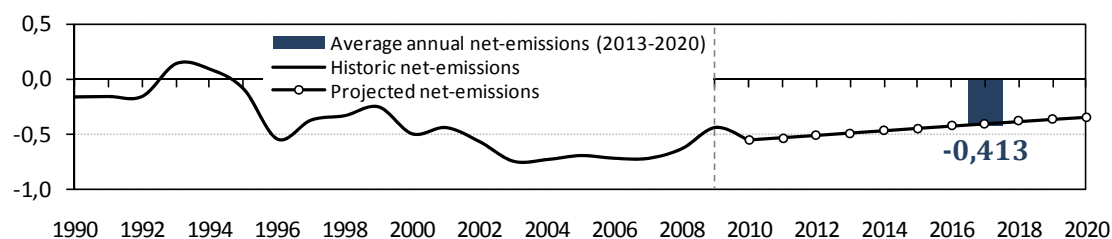


**Figure B: Carbon in production of HWP and accounted pool inflow [in Mt C]**

By means of the methods as described on page 5 ff, the historic and projected net-emissions from the HWP pool in Lithuania were subsequently calculated (Table D). The annual average net-emissions in the time period 2013 to 2020 amount to -0,413 Mt CO<sub>2</sub> (Figure C).

**Table D: Historic (up to 2009) and projected net-emissions from HWP pool [in 1000t CO<sub>2</sub>]**

1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
-162	-159	-156	135	86	-92	-539	-369	-329	-251	-491
2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
-436	-562	-736	-721	-686	-710	-711	-624	-434	-553	-532
2012	2013	2014	2015	2016	2017	2018	2019	2020		
-510	-488	-466	-444	-422	-401	-380	-360	-340		



**Figure C: Historic and projected net-emissions from the HWP pool [in Mt CO<sub>2</sub>]**

## Luxembourg

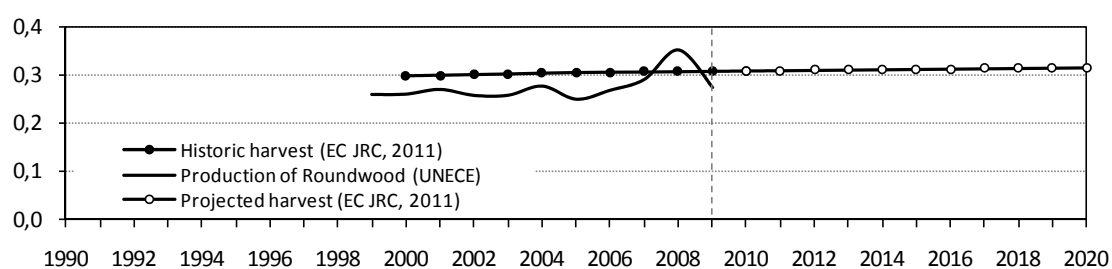
For Luxembourg, activity data from the TIMBER database (UNECE 2011) are available for the years 1999 to 2009 (Table A).

**Table A: Historic time series of amounts and share of accountable carbon inflow to the HWP pool [in 1000t and %]**

1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009
6	37	41	28	51	127	3	2	153	171	131
7,9%	48,3%	54,1%	34,7%	64,3%	82,0%	1,9%	1,4%	94,7%	76,5%	78,3%

The annual carbon inflow (= carbon in produced HWP from domestic harvest) to the HWP pool prior to the year 1999 has been calculated from the five year average from 1999 to 2003 and was assumed to be the constant carbon pool inflow for the time period 1900-1998.

The projected HWP pool inflow (Table C and Figure B) was calculated by means of the annual growth rates of the projected harvest (EC JRC, 2011) of Luxembourg as compared to the average of the years 2003-2007 which amounts to 0,305 Mm<sup>3</sup> (Figure A). These change rates (Table B) were applied for the same years' average (2003-2007) of the historic HWP pool inflow, which amounts to 0,068 Mt C for Luxembourg.



**Figure A: Historic and projected harvest and roundwood production [in Mm<sup>3</sup>]**

**Table B: Projected harvest and change as cp. to five year average of historic harvest [in 1000m<sup>3</sup> and %]**

2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
309	310	310	311	312	312	313	314	314	315	316
1,1%	1,4%	1,6%	1,8%	2,1%	2,3%	2,5%	2,8%	3,0%	3,2%	3,4%

**Table C: Projected carbon Inflow to the HWP pool [in 1000t C]**

2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
68	69	69	69	69	69	69	69	70	70	70

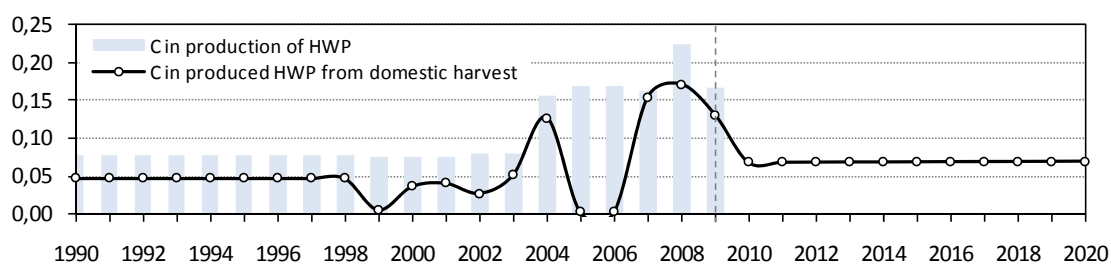


Figure B: Carbon in production of HWP and accounted pool inflow [in Mt C]

By means of the methods as described on page 5 ff, the historic and projected net-emissions from the HWP pool in Luxembourg were subsequently calculated (Table D). The annual average net-emissions in the time period 2013 to 2020 amount to -0,056 Mt CO<sub>2</sub> (Figure C).

Table D: Historic (up to 2009) and projected net-emissions from HWP pool [in 1000t CO<sub>2</sub>]

1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
-15	-15	-15	-14	-14	-13	-13	-13	-12	137	22
2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
6	53	-34	-308	150	149	-401	-454	-597	-63	-62
2012	2013	2014	2015	2016	2017	2018	2019	2020		
-61	-59	-58	-57	-56	-55	-54	-53	-52		

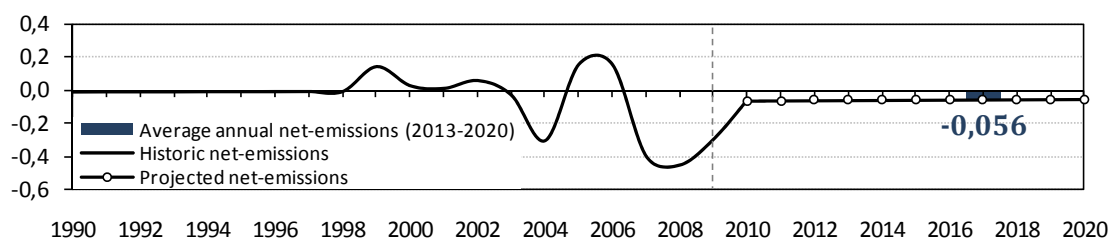


Figure C: Historic and projected net-emissions from the HWP pool [in Mt CO<sub>2</sub>]

## The Netherlands

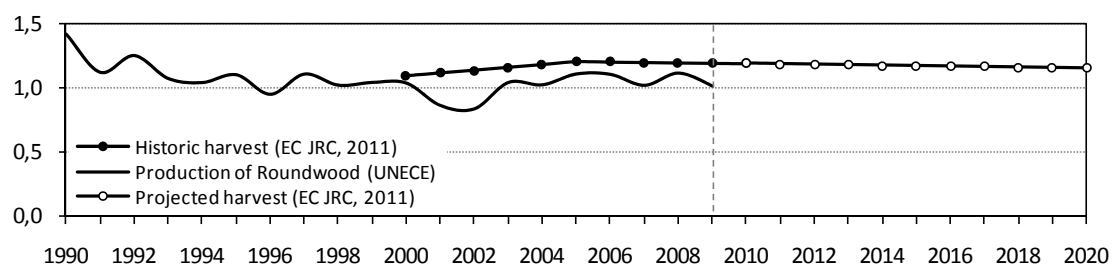
For the Netherlands, activity data from the TIMBER database (UNECE 2011) are available for the years 1964 to 2009 (Table A).

**Table A: Historic time series of amounts and share of accountable carbon inflow to the HWP pool [in 1000t and %]**

1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
123	336	318	329	351	341	349	377	558	308	243	293
32,3%	43,4%	40,1%	42,0%	40,2%	38,2%	39,7%	45,0%	65,4%	33,8%	26,0%	41,1%
1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
388	365	429	352	298	375	514	573	516	526	577	548
44,8%	41,9%	47,3%	39,4%	33,0%	44,7%	61,4%	63,7%	53,7%	51,7%	53,1%	49,4%
1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
754	776	864	730	702	693	768	858	923	1 046	903	1 100
60,0%	58,9%	61,6%	50,8%	49,5%	48,8%	51,5%	58,1%	62,7%	67,9%	58,5%	69,5%
2000	2001	2002	2003	2004	2005	2006	2007	2008	2009		
1 225	666	644	655	727	893	515	22	522	559		
75,6%	44,2%	40,7%	41,6%	44,6%	54,5%	32,5%	1,4%	37,1%	45,3%		

The annual carbon inflow (= carbon in produced HWP from domestic harvest) to the HWP pool prior to the year 1964 has been calculated from the five year average from 1964 to 1968 and was assumed to be the constant carbon pool inflow for the time period 1900-1963.

The projected HWP pool inflow (Table C and Figure B) was calculated by means of the annual growth rates of the projected harvest (EC JRC, 2011) of the Netherlands as compared to the average of the years 2003-2007 which amounts to 1,204 Mm<sup>3</sup> (Figure A). These change rates (Table B) were applied for the same years' average (2003-2007) of the historic HWP pool inflow, which amounts to 0,562 Mt C for the Netherlands.



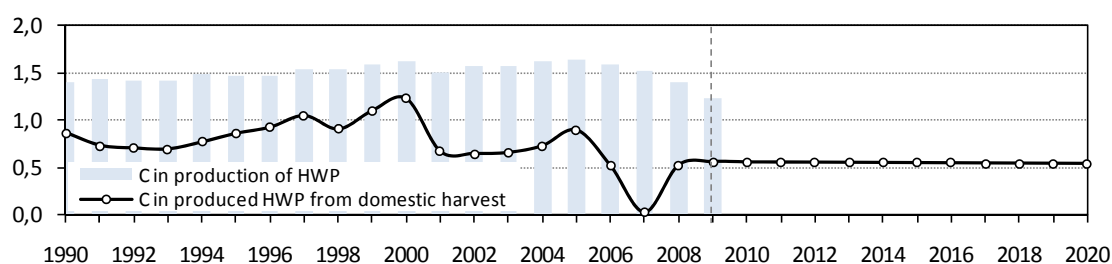
**Figure A: Historic and projected harvest and roundwood production [in Mm<sup>3</sup>]**

**Table B: Projected harvest and change as cp. to five year average of historic harvest [in 1000m<sup>3</sup> and %]**

2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
1 188	1 185	1 181	1 178	1 175	1 171	1 168	1 165	1 162	1 158	1 155
-1,4%	-1,6%	-1,9%	-2,2%	-2,5%	-2,7%	-3,0%	-3,3%	-3,6%	-3,8%	-4,1%

**Table C: Projected carbon inflow to the HWP pool [in 1000t C]**

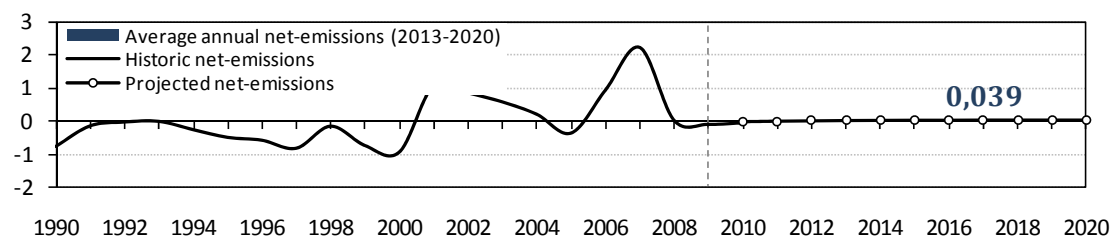
2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
555	553	551	550	548	547	545	544	542	541	539

**Figure B: Carbon in production of HWP and accounted pool inflow [in Mt C]**

By means of the methods as described on page 5 ff, the historic and projected net-emissions from the HWP pool in the Netherlands were subsequently calculated (Table D). The annual average net-emissions in the time period 2013 to 2020 amount to 0,039 Mt CO<sub>2</sub> (Figure C).

**Table D: Historic (up to 2009) and projected net-emissions from HWP pool [in 1000t CO<sub>2</sub>]**

1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
-736	-121	-7	15	-234	-465	-550	-790	-131	-710	-905
2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
1 094	863	596	226	-336	951	2 224	42	-75	-28	-4
2012	2013	2014	2015	2016	2017	2018	2019	2020		
12	24	32	37	41	43	45	46	46		

**Figure C: Historic and projected net-emissions from the HWP pool [in Mt CO<sub>2</sub>]**

## Poland

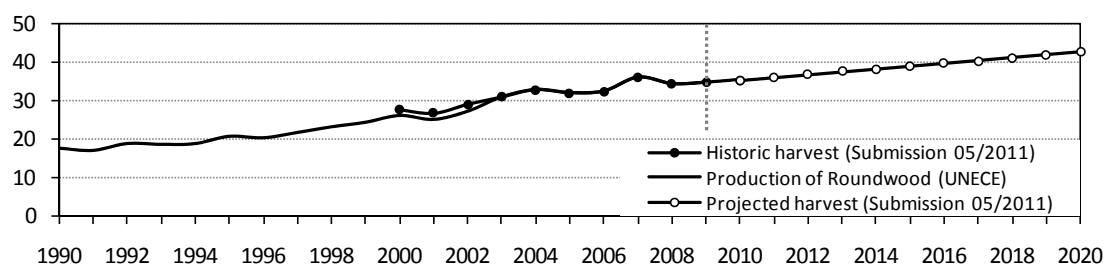
For Poland, activity data from the TIMBER database (UNECE 2011) are available for the years 1964 to 2009 (Table A).

**Table A: Historic time series of amounts and share of accountable carbon inflow to the HWP pool [in 1000t and %]**

1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
1 856	2 143	2 181	2 216	2 308	2 315	2 394	2 483	2 573	2 733	2 819	3 069
98,7%	99,3%	98,6%	98,4%	98,7%	98,8%	98,9%	99,0%	99,2%	99,6%	99,2%	99,2%
1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
3 099	3 123	3 143	2 941	2 896	2 649	2 612	2 725	2 774	2 777	2 843	2 774
99,2%	99,3%	98,9%	99,1%	98,8%	98,9%	99,1%	99,0%	99,2%	99,1%	99,2%	99,2%
1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
2 636	2 383	2 016	1 847	2 044	2 162	2 573	2 278	2 352	2 669	2 904	2 950
98,9%	98,7%	99,6%	99,4%	99,5%	100,0%	99,8%	98,1%	98,0%	98,7%	98,5%	97,6%
2000	2001	2002	2003	2004	2005	2006	2007	2008	2009		
3 160	2 929	3 163	3 525	3 840	3 734	4 027	4 563	4 351	4 317		
97,3%	96,7%	97,5%	97,9%	97,2%	93,9%	94,6%	94,3%	94,9%	94,8%		

The annual carbon inflow (= carbon in produced HWP from domestic harvest) to the HWP pool prior to the year 1964 has been calculated from the five year average from 1964 to 1968 and was assumed to be the constant carbon pool inflow for the time period 1900-1963.

The projected HWP pool inflow (Table C and Figure B) was calculated by means of the annual growth rates of the projected harvest (Submission 05/2011) of Poland as compared to the average of the years 2005-2009 which amounts to 33,833 Mm<sup>3</sup> (Figure A). These change rates (Table B) were applied for the same years' average (2005-2009) of the historic HWP pool inflow, which amounts to 4,199 Mt C for Poland.



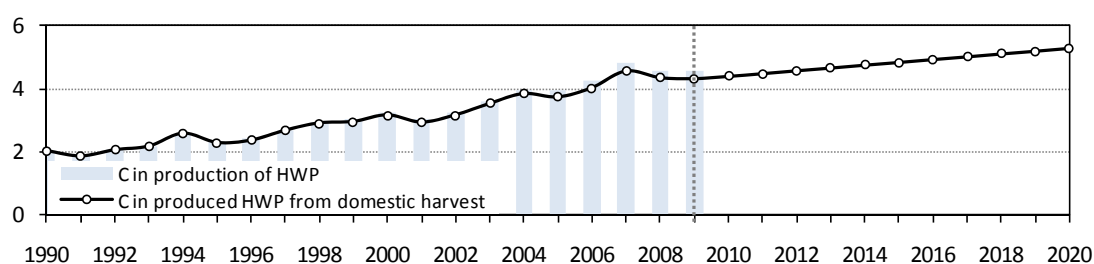
**Figure A: Historic and projected harvest and roundwood production [in Mm<sup>3</sup>]**

**Table B: Projected harvest and change as cp. to five year average of historic harvest [in 1000m<sup>3</sup> and %]**

2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
35 350	36 072	36 794	37 516	38 238	38 960	39 682	40 404	41 126	41 848	42 570
4,5%	6,6%	8,8%	10,9%	13,0%	15,2%	17,3%	19,4%	21,6%	23,7%	25,8%

**Table C: Projected carbon Inflow to the HWP pool [in 1000t C]**

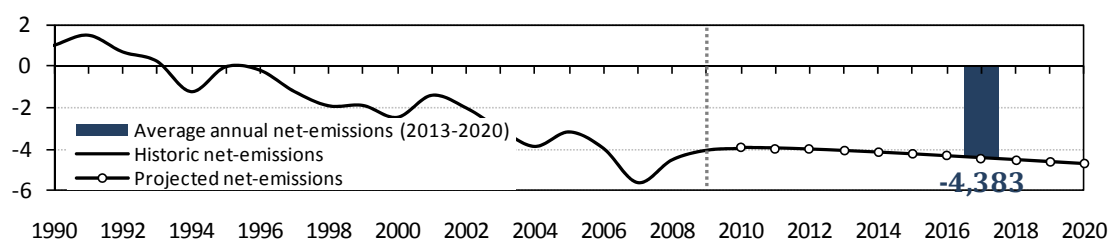
2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
4 387	4 476	4 566	4 656	4 745	4 835	4 924	5 014	5 104	5 193	5 283

**Figure B: Carbon in production of HWP and accounted pool inflow [in Mt C]**

By means of the methods as described on page 5 ff, the historic and projected net-emissions from the HWP pool in Poland were subsequently calculated (Table D). The annual average net-emissions in the time period 2013 to 2020 amount to -4,383 Mt CO<sub>2</sub> (Figure C).

**Table D: Historic (up to 2009) and projected net-emissions from HWP pool [in 1000t CO<sub>2</sub>]**

1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
998	1 487	688	239	-1 222	-34	-194	-1 213	-1 901	-1 884	-2 455
2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
-1 398	-1 999	-3 021	-3 851	-3 156	-3 945	-5 588	-4 493	-4 033	-3 948	-3 975
2012	2013	2014	2015	2016	2017	2018	2019	2020		
-4 024	-4 089	-4 165	-4 247	-4 334	-4 423	-4 513	-4 603	-4 693		

**Figure C: Historic and projected net-emissions from the HWP pool [in Mt CO<sub>2</sub>]**

## Portugal

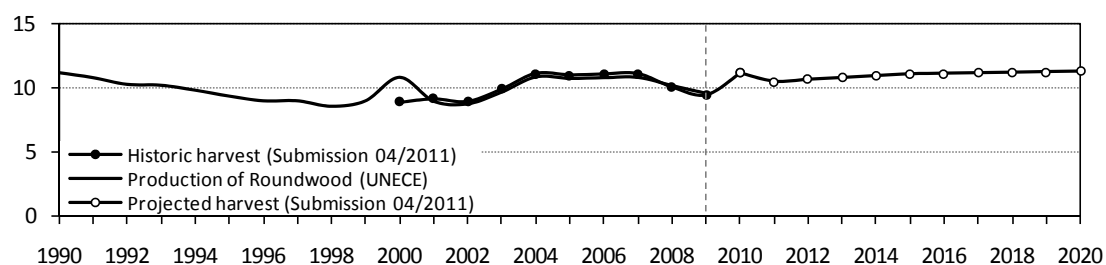
For Portugal, activity data from the TIMBER database (UNECE 2011) are available for the years 1964 to 2009 (Table A).

**Table A: Historic time series of amounts and share of accountable carbon inflow to the HWP pool [in 1000t and %]**

1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
357	423	443	456	483	529	569	585	630	677	638	596
97,9%	97,7%	98,4%	98,3%	98,7%	98,5%	98,6%	98,0%	97,8%	96,5%	97,0%	97,4%
1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
652	748	764	871	880	793	894	981	1 085	957	984	1 012
97,2%	96,6%	98,2%	98,8%	98,2%	97,3%	96,8%	97,7%	97,6%	97,8%	97,5%	97,3%
1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
1 026	1 155	1 281	1 269	1 193	1 151	1 257	1 133	1 210	1 170	1 107	1 151
95,5%	95,1%	95,8%	96,9%	97,1%	97,7%	92,2%	89,1%	93,0%	89,2%	87,4%	91,0%
2000	2001	2002	2003	2004	2005	2006	2007	2008	2009		
1 234	1 292	1 327	1 369	1 371	1 298	1 342	1 297	1 311	1 361		
92,0%	91,7%	94,0%	96,3%	97,9%	96,8%	97,6%	94,2%	94,4%	96,1%		

The annual carbon inflow (= carbon in produced HWP from domestic harvest) to the HWP pool prior to the year 1964 has been calculated from the five year average from 1964 to 1968 and was assumed to be the constant carbon pool inflow for the time period 1900-1963.

The projected HWP pool inflow (Table C and Figure B) was calculated by means of the annual growth rates of the projected harvest<sup>3</sup> (Submission 04/2011) of Portugal as compared to the average of the years 2005-2009 which amounts to 10,532 Mm<sup>3</sup> (Figure A). These change rates (Table B) were applied for the same years' average (2005-2009) of the historic HWP pool inflow, which amounts to 1,322 Mt C for Portugal.



**Figure A: Historic and projected harvest and roundwood production [in Mm<sup>3</sup>]**

<sup>3</sup> Portugal provides harvest volumes differentiated by activity. The numbers applied here include harvest from forest management (Art. 3.4 FM) only

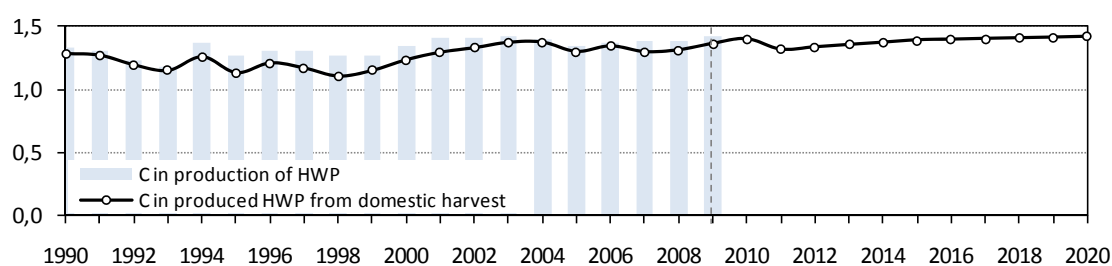


**Table B: Projected harvest and change as cp. to five year average of historic harvest [in 1000m<sup>3</sup> and %]**

2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
11 137	10 490	10 633	10 777	10 921	11 065	11 108	11 151	11 193	11 236	11 279
5,7%	-0,4%	1,0%	2,3%	3,7%	5,1%	5,5%	5,9%	6,3%	6,7%	7,1%

**Table C: Projected carbon Inflow to the HWP pool [in 1000t C]**

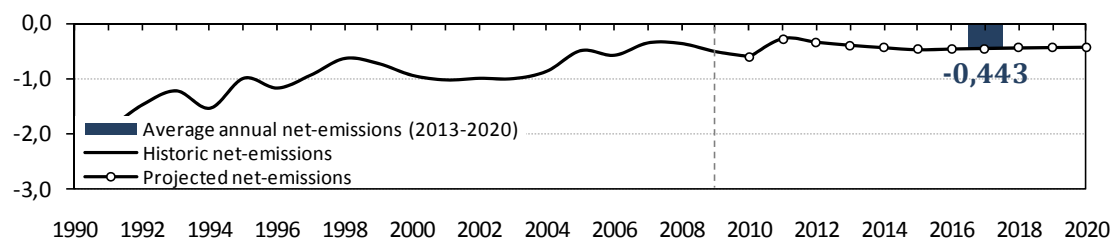
2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
1 398	1 316	1 334	1 353	1 371	1 389	1 394	1 399	1 405	1 410	1 415


**Figure B: Carbon in production of HWP and accounted pool inflow [in Mt C]**

By means of the methods as described on page 5 ff, the historic and projected net-emissions from the HWP pool in Portugal were subsequently calculated (Table D). The annual average net-emissions in the time period 2013 to 2020 amount to -0,443 Mt CO<sub>2</sub> (Figure C).

**Table D: Historic (up to 2009) and projected net-emissions from HWP pool [in 1000t CO<sub>2</sub>]**

1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
-2 052	-1 886	-1 476	-1 225	-1 540	-994	-1 174	-935	-634	-728	-942
2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
-1 026	-997	-1 002	-865	-492	-577	-351	-365	-511	-601	-282
2012	2013	2014	2015	2016	2017	2018	2019	2020		
-348	-399	-441	-476	-463	-453	-445	-438	-433		


**Figure C: Historic and projected net-emissions from the HWP pool [in Mt CO<sub>2</sub>]**

## Romania

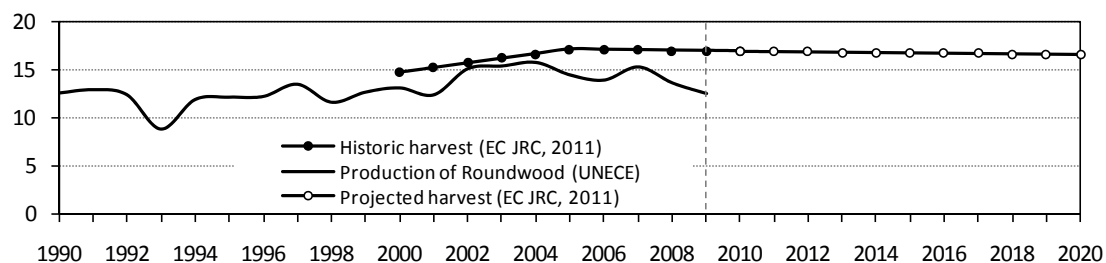
For Romania, activity data from the TIMBER database (UNECE 2011) are available for the years 1964 to 2009 (Table A).

**Table A: Historic time series of amounts and share of accountable carbon inflow to the HWP pool [in 1000t and %]**

1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
1 515	1 629	1 756	1 899	1 946	2 004	2 045	2 160	2 172	2 182	2 112	2 096
100,0%	100,0%	100,0%	100,0%	100,0%	99,9%	99,9%	100,0%	99,9%	99,9%	98,5%	98,6%
1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
2 064	2 124	2 231	2 192	2 136	2 135	2 182	2 254	2 292	2 123	1 863	1 648
99,1%	99,9%	99,8%	97,4%	96,7%	98,8%	99,8%	99,9%	99,4%	99,5%	99,6%	99,9%
1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
1 623	1 626	1 420	1 053	1 145	1 146	783	797	722	756	805	961
100,0%	100,0%	99,5%	99,5%	99,6%	99,6%	99,8%	99,1%	99,2%	99,7%	100,0%	100,0%
2000	2001	2002	2003	2004	2005	2006	2007	2008	2009		
1 144	1 131	1 320	1 549	1 692	1 580	1 487	1 716	1 737	1 698		
99,8%	99,7%	99,2%	99,8%	98,6%	96,9%	95,2%	96,8%	97,8%	95,9%		

The annual carbon inflow (= carbon in produced HWP from domestic harvest) to the HWP pool prior to the year 1964 has been calculated from the five year average from 1964 to 1968 and was assumed to be the constant carbon pool inflow for the time period 1900-1963.

The projected HWP pool inflow (Table C and Figure B) was calculated by means of the annual growth rates of the projected harvest (EC JRC, 2011) of Romania as compared to the average of the years 2003-2007 which amounts to 17,104 Mm<sup>3</sup> (Figure A). These change rates (Table B) were applied for the same years' average (2003-2007) of the historic HWP pool inflow, which amounts to 1,605 Mt C for Romania.



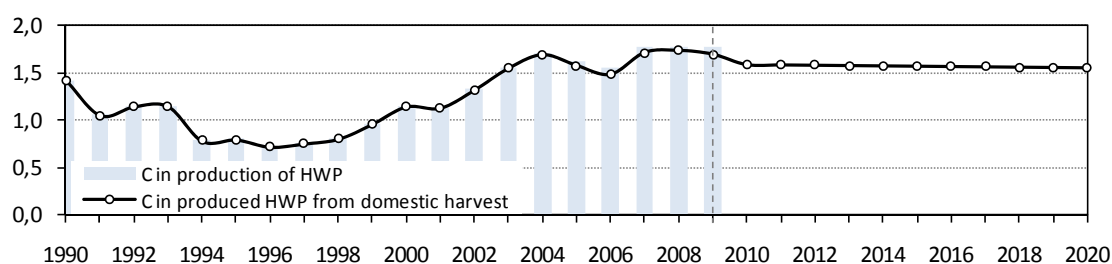
**Figure A: Historic and projected harvest and roundwood production [in Mm<sup>3</sup>]**

**Table B: Projected harvest and change as cp. to five year average of historic harvest [in 1000m<sup>3</sup> and %]**

2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
16 926	16 891	16 855	16 820	16 784	16 749	16 713	16 678	16 642	16 607	16 571
-1,0%	-1,2%	-1,5%	-1,7%	-1,9%	-2,1%	-2,3%	-2,5%	-2,7%	-2,9%	-3,1%

**Table C: Projected carbon inflow to the HWP pool [in 1000t C]**

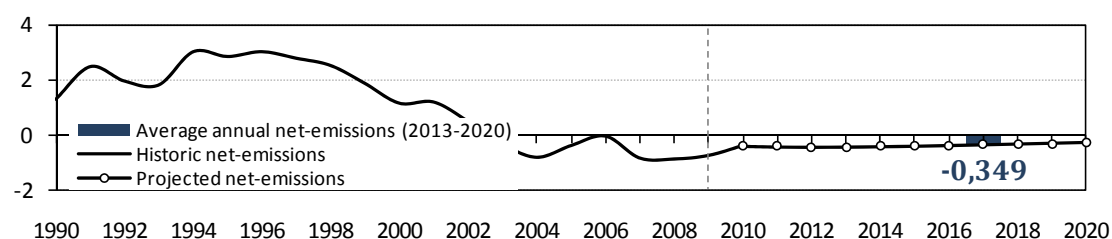
2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
1 588	1 585	1 581	1 578	1 575	1 571	1 568	1 565	1 561	1 558	1 555

**Figure B: Carbon in production of HWP and accounted pool inflow [in Mt C]**

By means of the methods as described on page 5 ff, the historic and projected net-emissions from the HWP pool in Romania were subsequently calculated (Table D). The annual average net-emissions in the time period 2013 to 2020 amount to -0,349 Mt CO<sub>2</sub> (Figure C).

**Table D: Historic (up to 2009) and projected net-emissions from HWP pool [in 1000t CO<sub>2</sub>]**

1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
1 281	2 455	1 936	1 798	2 993	2 822	2 995	2 760	2 497	1 852	1 139
2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
1 180	485	-333	-814	-388	-49	-841	-875	-1 492	-385	-404
2012	2013	2014	2015	2016	2017	2018	2019	2020		
-409	-406	-395	-380	-363	-344	-323	-302	-281		

**Figure C: Historic and projected net-emissions from the HWP pool [in Mt CO<sub>2</sub>]**

## Slovakia

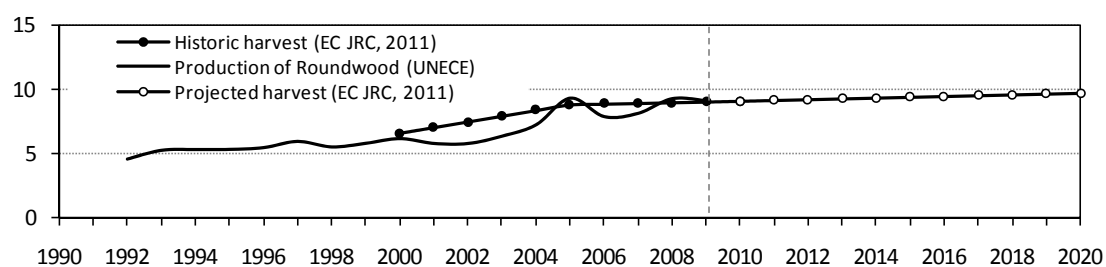
For Slovakia, activity data from the TIMBER database (UNECE 2011) are available for the years 1993 to 2009 (Table A).

**Table A: Historic time series of amounts and share of accountable carbon inflow to the HWP pool [in 1000t and %]**

1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
369	421	608	575	583	678	774	837	674	757	831	948
100,0%	99,4%	99,8%	99,9%	96,9%	97,9%	98,3%	98,4%	75,5%	98,1%	98,0%	97,3%
2005	2006	2007	2008	2009							
1 212	1 184	1 291	1 268	1 133							
98,8%	95,7%	95,2%	91,3%	93,0%							

The annual carbon inflow (= carbon in produced HWP from domestic harvest) to the HWP pool prior to the year 1993 has been calculated from the five year average from 1993 to 1997 and was assumed to be the constant carbon pool inflow for the time period 1900-1992.

The projected HWP pool inflow (Table C and Figure B) was calculated by means of the annual growth rates of the projected harvest (EC JRC, 2011) of Slovakia as compared to the average of the years 2003-2007 which amounts to 8,821 Mm<sup>3</sup> (Figure A). These change rates (Table B) were applied for the same years' average (2003-2007) of the historic HWP pool inflow, which amounts to 1,093 Mt C for Slovakia.



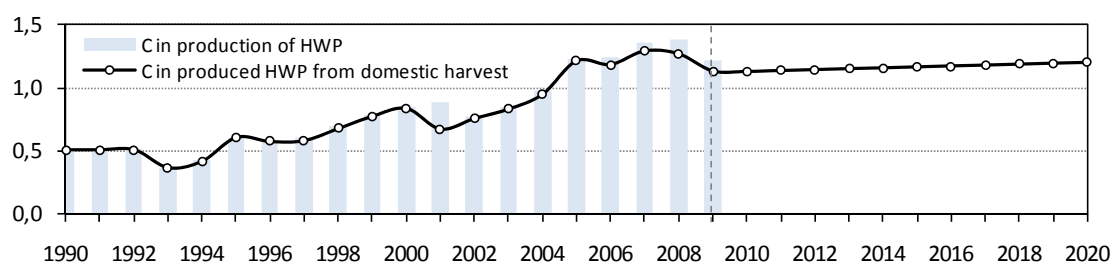
**Figure A: Historic and projected harvest and roundwood production [in Mm<sup>3</sup>]**

**Table B: Projected harvest and change as cp. to five year average of historic harvest [in 1000m<sup>3</sup> and %]**

2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
9 110	9 167	9 225	9 283	9 341	9 399	9 456	9 514	9 572	9 630	9 688
3,3%	3,9%	4,6%	5,2%	5,9%	6,6%	7,2%	7,9%	8,5%	9,2%	9,8%

**Table C: Projected carbon inflow to the HWP pool [in 1000t C]**

2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
1 129	1 136	1 143	1 150	1 158	1 165	1 172	1 179	1 186	1 193	1 201

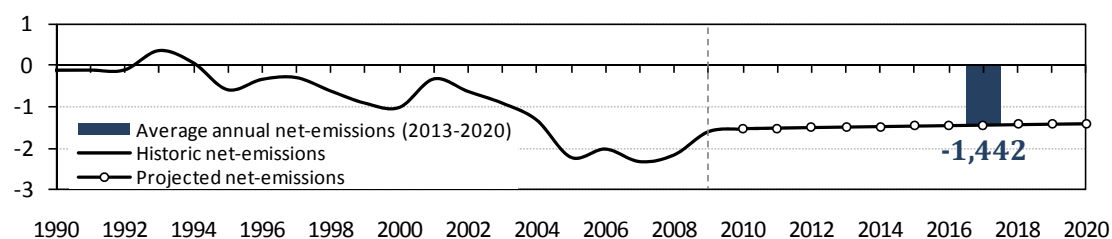


**Figure B: Carbon in production of HWP and accounted pool inflow [in Mt C]**

By means of the methods as described on page 5 ff, the historic and projected net-emissions from the HWP pool in Slovakia were subsequently calculated (Table D). The annual average net-emissions in the time period 2013 to 2020 amount to -1,442 Mt CO<sub>2</sub> (Figure C).

**Table D: Historic (up to 2009) and projected net-emissions from HWP pool [in 1000t CO<sub>2</sub>]**

1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
-133	-130	-128	333	44	-597	-353	-309	-627	-917	-1 019
2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
-342	-639	-918	-1 320	-2 207	-2 009	-2 309	-2 148	-3 189	-1 536	-1 520
2012	2013	2014	2015	2016	2017	2018	2019	2020		
-1 505	-1 490	-1 476	-1 462	-1 448	-1 435	-1 421	-1 408	-1 396		



**Figure C: Historic and projected net-emissions from the HWP pool [in Mt CO<sub>2</sub>]**



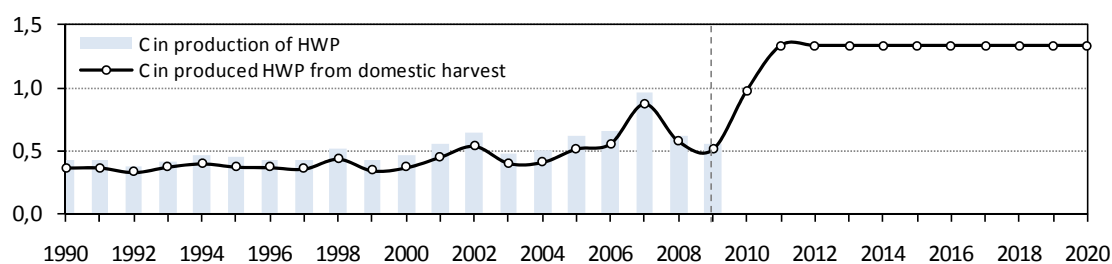


Figure B: Carbon in production of HWP and accounted pool inflow [in Mt C]

By means of the methods as described on page 5 ff, the historic and projected net-emissions from the HWP pool in Slovenia were subsequently calculated (Table D). The annual average net-emissions in the time period 2013 to 2020 amount to -1,275 Mt CO<sub>2</sub> (Figure C).

Table D: Historic (up to 2009) and projected net-emissions from HWP pool [in 1000t CO<sub>2</sub>]

1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
-91	-89	41	-120	-202	-104	-83	-43	-317	26	-76
2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
-342	-567	-56	-110	-440	-490	-1 536	-359	-77	-1 592	-2 482
2012	2013	2014	2015	2016	2017	2018	2019	2020		
-2 065	-1 762	-1 541	-1 378	-1 255	-1 162	-1 089	-1 031	-984		

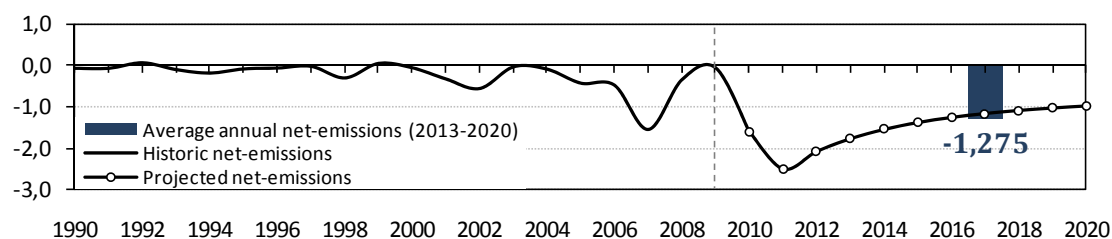


Figure C: Historic and projected net-emissions from the HWP pool [in Mt CO<sub>2</sub>]

## Spain

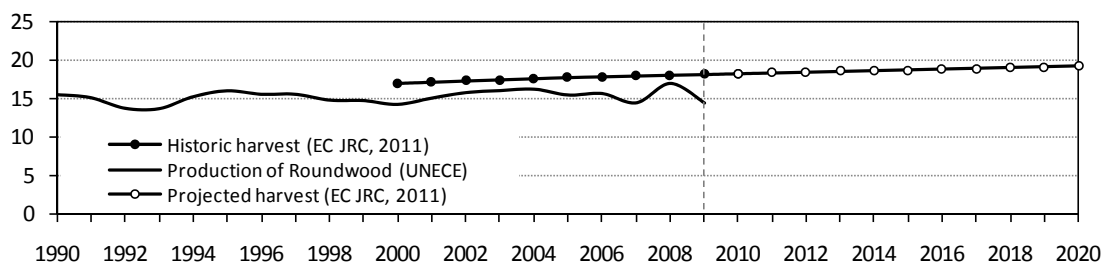
For Spain, activity data from the TIMBER database (UNECE 2011) are available for the years 1964 to 2009 (Table A).

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

1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
598	820	864	997	1 083	1 093	1 232	1 411	1 630	1 702	1 762	1 723
95,5%	94,4%	93,0%	92,0%	91,8%	90,0%	91,9%	92,7%	92,6%	89,2%	88,3%	94,9%
1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
1 911	1 984	2 037	2 266	2 134	2 353	2 460	2 351	2 415	2 455	2 651	2 698
93,5%	94,4%	92,3%	89,0%	90,5%	97,2%	97,2%	97,2%	96,6%	96,0%	96,0%	96,1%
1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
2 661	2 865	2 981	3 025	2 802	2 881	3 056	3 008	3 064	3 013	2 827	3 365
94,6%	94,8%	93,1%	93,1%	92,5%	92,6%	92,9%	91,1%	93,1%	91,8%	82,9%	85,6%
2000	2001	2002	2003	2004	2005	2006	2007	2008	2009		
3 608	3 844	3 967	4 033	4 124	4 059	4 485	4 164	4 099	4 114		
80,6%	79,9%	83,1%	84,5%	84,4%	81,8%	80,6%	76,8%	86,1%	85,9%		

The annual carbon inflow (= carbon in produced HWP from domestic harvest) to the HWP pool prior to the year 1964 has been calculated from the five year average from 1964 to 1968 and was assumed to be the constant carbon pool inflow for the time period 1900-1963.

The projected HWP pool inflow (Table C and Figure B) was calculated by means of the annual growth rates of the projected harvest (EC JRC, 2011) of Spain as compared to the average of the years 2003-2007 which amounts to 17,755 Mm<sup>3</sup> (Figure A). These change rates (Table B) were applied for the same years' average (2003-2007) of the historic HWP pool inflow, which amounts to 4,173 Mt C for Spain.



**Figure A: Historic and projected harvest and roundwood production [in Mm<sup>3</sup>]**

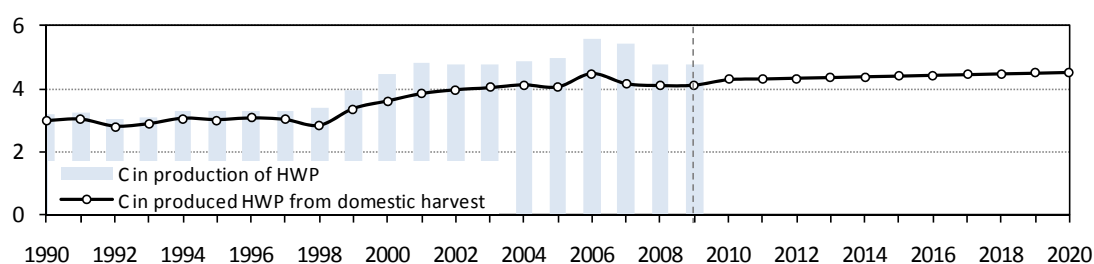


**Table B: Projected harvest and change as cp. to five year average of historic harvest [in 1000m<sup>3</sup> and %]**

2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
18 246	18 345	18 443	18 541	18 639	18 738	18 836	18 934	19 032	19 131	19 229
2,8%	3,3%	3,9%	4,4%	5,0%	5,5%	6,1%	6,6%	7,2%	7,7%	8,3%

**Table C: Projected carbon Inflow to the HWP pool [in 1000t C]**

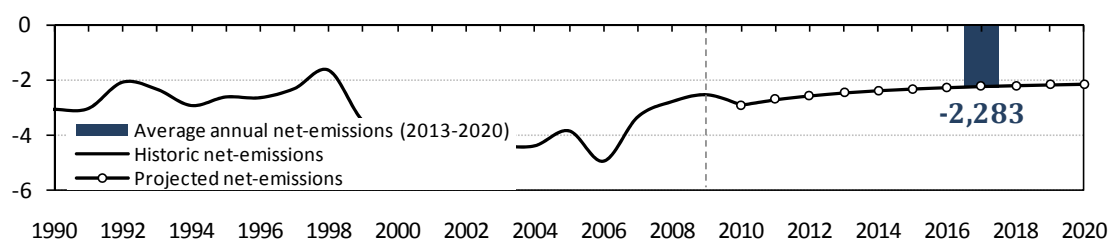
2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
4 288	4 312	4 335	4 358	4 381	4 404	4 427	4 450	4 473	4 496	4 519


**Figure B: Carbon in production of HWP and accounted pool inflow [in Mt C]**

By means of the methods as described on page 5 ff, the historic and projected net-emissions from the HWP pool in Spain were subsequently calculated (Table D). The annual average net-emissions in the time period 2013 to 2020 amount to -2,283 Mt CO<sub>2</sub> (Figure C).

**Table D: Historic (up to 2009) and projected net-emissions from HWP pool [in 1000t CO<sub>2</sub>]**

1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
-3 061	-3 033	-2 076	-2 328	-2 922	-2 614	-2 638	-2 310	-1 642	-3 483	-4 044
2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
-4 563	-4 600	-4 414	-4 383	-3 840	-4 939	-3 333	-2 778	-5 059	-2 896	-2 709
2012	2013	2014	2015	2016	2017	2018	2019	2020		
-2 570	-2 467	-2 389	-2 329	-2 281	-2 242	-2 210	-2 183	-2 159		


**Figure C: Historic and projected net-emissions from the HWP pool [in Mt CO<sub>2</sub>]**

## Sweden

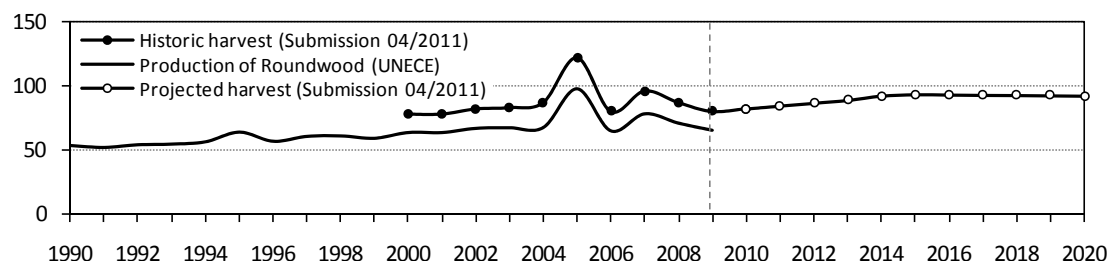
For Sweden, activity data from the TIMBER database (UNECE 2011) are available for the years 1964 to 2009 (Table A).

**Table A: Historic time series of amounts and share of accountable carbon inflow to the HWP pool [in 1000t and %]**

1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
3 184	4 311	4 250	4 508	4 714	5 077	5 371	5 460	5 672	6 194	6 254	4 897
99,3%	99,2%	99,4%	99,4%	99,5%	99,4%	99,4%	99,3%	99,6%	99,1%	97,9%	94,4%
1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
5 260	5 200	5 614	5 914	5 614	5 168	5 408	5 751	5 969	5 737	5 737	5 793
94,2%	93,7%	97,1%	95,1%	93,2%	90,0%	94,2%	94,9%	92,9%	91,5%	89,3%	87,7%
1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
5 880	6 102	6 502	6 240	6 335	6 706	6 998	7 235	7 249	7 523	7 368	7 217
87,9%	89,5%	93,7%	92,9%	93,5%	94,5%	92,4%	93,0%	94,5%	92,1%	90,2%	88,2%
2000	2001	2002	2003	2004	2005	2006	2007	2008	2009		
7 714	7 743	7 930	8 212	8 417	9 040	9 208	9 126	8 929	8 504		
87,6%	89,9%	90,8%	91,5%	91,2%	95,1%	94,0%	94,5%	94,4%	96,2%		

The annual carbon inflow (= carbon in produced HWP from domestic harvest) to the HWP pool prior to the year 1964 has been calculated from the five year average from 1964 to 1968 and was assumed to be the constant carbon pool inflow for the time period 1900-1963.

The projected HWP pool Inflow (Table C and Figure B) was calculated by means of the annual growth rates of the projected harvest (Submission 04/2011) of Sweden as compared to the average of the years 2005-2009, which amounts to 93 Mm<sup>3</sup> (Figure A). These change rates (Table B) were applied on the same years average (2005-2009) of the historic HWP pool Inflow, which amounts to 8,961 Mt C for Sweden.



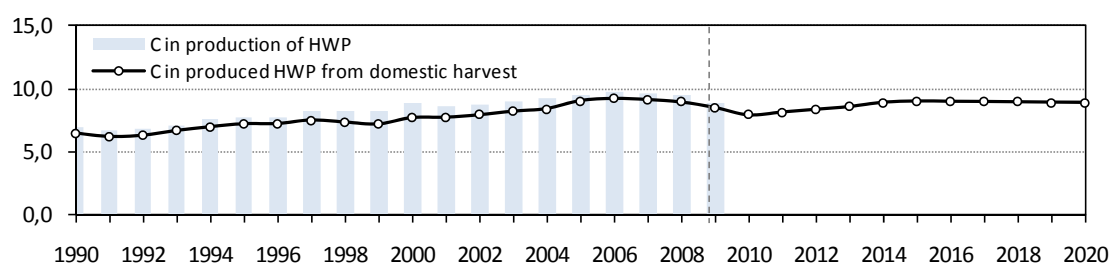
**Figure A: Historic and projected harvest and roundwood production [in Mm<sup>3</sup>]**

**Table B: Projected harvest and change as cp. to five year average of historic harvest [in 1000m³ and %]**

2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
82 250	84 500	86 750	89 000	92 417	93 500	93 280	93 060	92 840	92 620	92 400
-11,6%	-9,1%	-6,7%	-4,3%	-0,6%	0,5%	0,3%	0,1%	-0,2%	-0,4%	-0,6%

**Table C: Projected carbon Inflow to the HWP pool [in 1000t C]**

2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
7 926	8 142	8 359	8 576	8 905	9 010	8 988	8 967	8 946	8 925	8 904

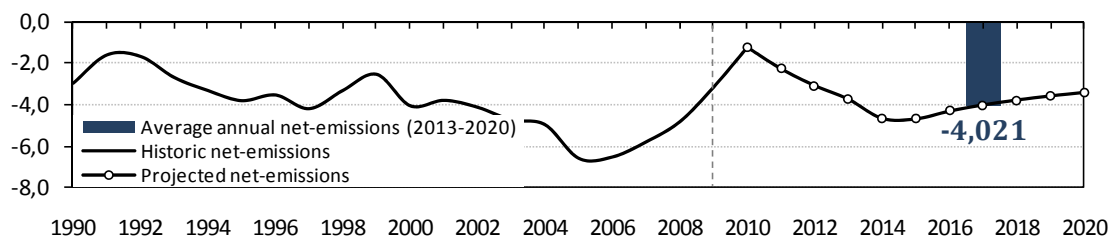


**Figure B: Carbon in production of HWP and accounted pool inflow [in Mt C]**

By means of the methods as described on page 5 ff, the historic and projected net-emissions from the HWP pool in Sweden were subsequently calculated (Table D). The annual average net-emissions in the time period 2013 to 2020 amount to -4,021 Mt CO<sub>2</sub> (Figure C).

**Table D: Historic (up to 2009) and projected net-emissions from HWP pool [in 1000t CO<sub>2</sub>]**

1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
-2 985	-1 625	-1 696	-2 712	-3 340	-3 826	-3 554	-4 213	-3 333	-2 559	-4 073
2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
-3 810	-4 145	-4 756	-4 986	-6 605	-6 538	-5 809	-4 837	-3 171	-1 256	-2 282
2012	2013	2014	2015	2016	2017	2018	2019	2020		
-3 090	-3 742	-4 657	-4 681	-4 306	-4 012	-3 775	-3 580	-3 415		



**Figure C: Historic and projected net-emissions from the HWP pool [in Mt CO<sub>2</sub>]**

## The United Kingdom

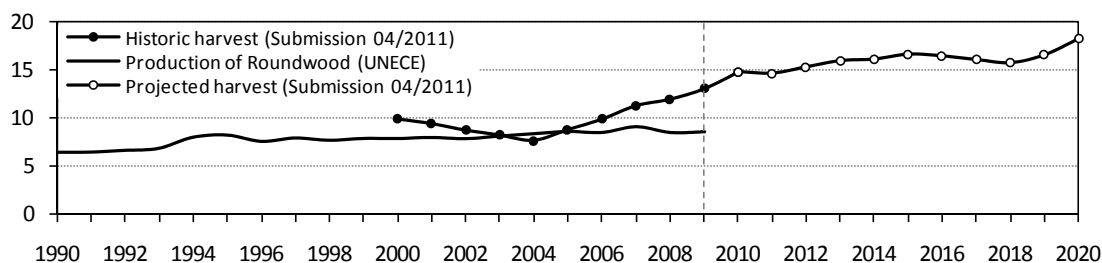
For the United Kingdom, activity data from the TIMBER database (UNECE 2011) are available for the years 1964 to 2009 (Table A).

**Table A: Historic time series of amounts and share of accountable carbon inflow to the HWP pool [in 1000t and %]**

1964	1965	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975
822	818	1 780	1 773	1 912	2 044	2 111	2 071	2 199	2 241	2 133	1 962
66,2%	65,7%	72,1%	74,8%	76,4%	77,6%	77,9%	85,2%	89,9%	86,2%	84,4%	89,6%
1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
2 345	2 367	2 398	2 435	2 228	1 946	1 958	1 961	2 130	2 329	2 514	2 639
92,9%	93,6%	94,7%	93,5%	93,4%	91,5%	93,8%	95,0%	95,9%	97,0%	98,0%	97,1%
1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
2 882	3 035	3 217	3 291	3 367	3 582	3 884	3 768	3 738	4 034	4 110	4 344
97,9%	98,0%	97,9%	97,9%	96,8%	97,6%	97,4%	92,8%	90,4%	94,2%	95,5%	97,7%
2000	2001	2002	2003	2004	2005	2006	2007	2008	2009		
4 430	4 216	4 238	4 193	4 263	4 114	3 960	3 815	3 584	3 379		
97,5%	96,2%	94,7%	92,6%	93,1%	92,5%	95,4%	92,6%	94,0%	96,4%		

The annual carbon inflow (= carbon in produced HWP from domestic harvest) to the HWP pool prior to the year 1964 has been calculated from the five year average from 1964 to 1968 and was assumed to be the constant carbon pool inflow for the time period 1900-1963.

The projected HWP pool inflow (Table C and Figure B) was calculated by means of the annual growth rates of the projected harvest (Submission 04/2011) of the United Kingdom as compared to the average of the years 2005-2009 which amounts to 10,972 Mm<sup>3</sup> (Figure A). These change rates (Table B) were applied for the same years' average (2005-2009) of the historic HWP pool inflow, which amounts to 3,770 Mt C for the United Kingdom.



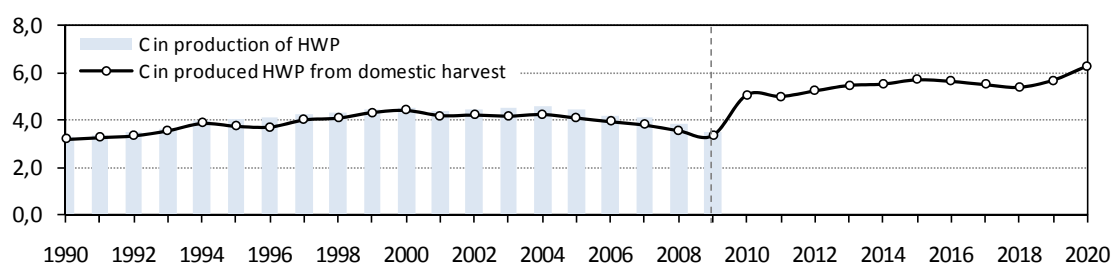
**Figure A: Historic and projected harvest and roundwood production [in Mm<sup>3</sup>]**

**Table B: Projected harvest and change as cp. to five year average of historic harvest [in 1000m<sup>3</sup> and %]**

2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
14 781	14 605	15 274	15 940	16 109	16 632	16 442	16 051	15 721	16 574	18 307
34,7%	33,1%	39,2%	45,3%	46,8%	51,6%	49,9%	46,3%	43,3%	51,1%	66,9%

**Table C: Projected carbon Inflow to the HWP pool [in 1000t C]**

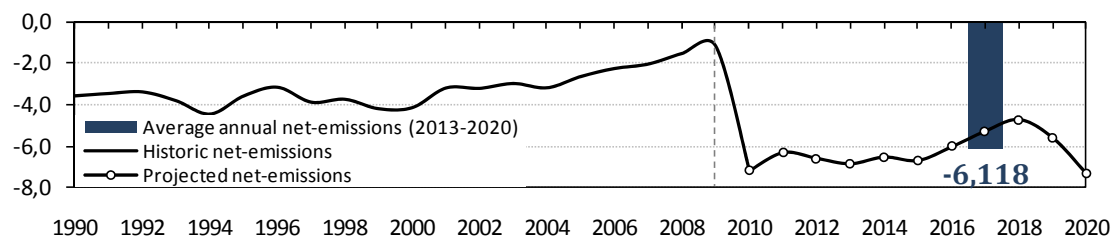
2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
5 079	5 018	5 248	5 477	5 535	5 715	5 650	5 515	5 402	5 695	6 290

**Figure B: Carbon in production of HWP and accounted pool inflow [in Mt C]**

By means of the methods as described on page 5 ff, the historic and projected net-emissions from the HWP pool in the United Kingdom were subsequently calculated (Table D). The annual average net-emissions in the time period 2013 to 2020 amount to -6,118 Mt CO<sub>2</sub> (Figure C).

**Table D: Historic (up to 2009) and projected net-emissions from HWP pool [in 1000t CO<sub>2</sub>]**

1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
-3 581	-3 467	-3 393	-3 824	-4 468	-3 588	-3 166	-3 889	-3 750	-4 208	-4 156
2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
-3 203	-3 218	-2 983	-3 192	-2 645	-2 257	-2 043	-1 529	-1 163	-7 191	-6 302
2012	2013	2014	2015	2016	2017	2018	2019	2020		
-6 581	-6 840	-6 518	-6 685	-6 028	-5 270	-4 711	-5 587	-7 309		

**Figure C: Historic and projected net-emissions from the HWP pool [in Mt CO<sub>2</sub>]**

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