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Report of the technical assessment of the forest management reference level submission of the European Union submitted in 2011

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Contents

I. Introduction and summary

A. Overview

1. This report covers the technical assessment (TA) of the submission of the European Union (EU) on its forest management reference level (FMRL), submitted on 17 May 2011 in accordance with decision 2/CMP.6. The report also covers the European Union's revised FMRL, submitted to the expert review team (ERT) on 11 August 2011 in response to the recommendations in this assessment and the initial draft review reports of individual member States. The TA took place as a centralized activity from 30 May to 3 June 2011 in Bonn, Germany, and was coordinated by the UNFCCC secretariat. The TA was conducted by the following team of nominated land use, land-use change and forestry experts from the UNFCCC roster of experts: Ms. Thelma Krug (Brazil), Mr. Atsushi Sato (Japan), Mr. Kumeh Assaf (Liberia), Ms. Marina Shvangiradze (Georgia), Ms. Rosa Rivas Palma (New Zealand) and Mr. Karsten Dunger (Germany). Ms. Thelma Krug and Mr. Atsushi Sato were the lead reviewers. The TA was coordinated by Ms. María José Sanz-Sánchez (UNFCCC secretariat).

2. In accordance with the "Guidelines for review of submissions of information on forest management reference levels" (decision 2/CMP.6, appendix II, part II), a draft version of this report was communicated to the European Commission, which provided comments that were considered and incorporated, as appropriate, into this final version of the report.

B. Proposed reference level

3. The European Union has proposed an FMRL of –313.69 million tonnes of carbon dioxide equivalent (Mt CO_2 eq) per year applying a first-order decay function for harvested wood products (HWP), and of –261.004 Mt CO_2 eq per year assuming instantaneous oxidation of HWP. However, the sum of the individual submissions as presented in the EU FMRL is –313.75 Mt CO_2 eq per year applying a first-order decay function for HWP of –261.02 Mt CO_2 eq per year assuming instantaneous oxidation of HWP. The HWP contribution is therefore estimated as –52.73 Mt CO_2 eq per year.

4. In response to the recommendations in this and in individual member States initial draft review reports, the European Union has revised its proposed FMRL to –306.37 Mt CO_2 eq per year applying a first-order decay function for HWP and –253.30 Mt CO_2 eq per year assuming instantaneous oxidation of HWP. These result in a HWP contribution of –53.07 Mt CO_2 eq per year.

II. General description of the reference level

A. Overview

5. The European Union FMRL submission was compiled by Hungary and the European Commission on behalf of the EU member States. This submission comprises individual submissions from 27 member States. Individual submissions which used: (i) country-specific methodologies (10 member States); (ii) the approach developed by the Joint Research Centre (JRC) of the European Commission (15 member States); and (iii) a linear extrapolation of historical emissions data (1990–2008) of forest land remaining forest

land due to insufficient data availability to forecast using the models (1 member State which is a Party not included in Annex I to the Convention (Cyprus) and 1 member State which is a Party included in Annex I to the Convention (Malta)). All member States submitted individual FMRLs except Luxembourg (used the JRC common approach), Cyprus and Malta.

6.   In response to the recommendations made by the ERTs during the TA, some member States revised their FMRLs:

(a)   Greece (one of the member States using the JRC common approach now proposes an FMRL calculated from the average removals for the period 1990–2009 as the best available estimate of projected removals over the period 2013 to 2020. This choice was related to unresolved problems on the input data for models. Therefore, 14 member States have now used the JRC common approach for their FMRL;

(b)   All other member States following the JRC methodology revised their FMRLs and re-ran the models (except Romania and Luxembourg) mainly to improve consistency with the forest management area reported in the greenhouse gas (GHG) inventories, to update projections with the latest data available, and to include pools previously omitted. Romania revised the FMRL based on the new forest management data in the resubmission of its 2011 GHG inventory[1] in response to the decision of non-compliance by the Compliance Committee. Luxembourg has also revised its FMRL based on its 2011 GHG inventory. However, an official resubmission did not take place, as the Party did not prepare an individual submission;

(c)   From the member States using country-specific methodologies, only Denmark, Ireland and Poland revised their FMRLs. This was mainly due to errors found in the data inputs originally used, including emissions previously omitted and improving consistency with the forest management area reported in the GHG inventories.

The following table shows the contribution of each methodological approach to the total FMRL of the European Union.

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[1] Romania's 2011 GHG inventory, national inventory report (NIR) and its common reporting format (CRF) were published on the UNFCCC website on 22 September and 15 September respectively.

Forest management reference levels for all member States of the European Union

Member States	Number of member States	Methodological approach	FMRL in Mt CO_2 eq per year average of 2013–2020			
			Original submission		Revised values by member States	
			Applying first-order decay function for HWP	Assuming instantaneous oxidation of HWP	Applying first-order decay function for HWP	Assuming instantaneous oxidation of HWP
Austria			–6.516	–2.121	–6.516	–2.121
Denmark			0.359	0.243	0.409	0.334
Finland			–20.100	–19.300	–20.100	–19.300
Germany			–22.418	–2.067	–22.418	–2.067
Ireland			–0.207	–0.073	–0.142	–0.008
Poland			–24.034	–22.750	–27.133	–22.750
Portugal			–6.827	–6.480	–6.830	–6.480
Slovenia			–3.171	–3.033	–3.171	–3.033
Sweden		Country specific	–41.336	–36.057	–41.336	–36.057
United Kingdom	10		–8.268	–3.442	–8.268	–3.442
Subtotal			**–132.518**	**–95.080**	**–135.505**	**–94.924**
(% of total)			42.2%	36.4%	44.2%	37.5%
Belgium			–2.527	–2.435	–2.499	–2.407
Bulgaria			–9.304	–9.522	–7.950	–8.168
Czech Republic			–5.566	–3.577	–4.686	–2.697
Estonia			–2.728	–1.728	–2.741	–1.742
France			–67.041	–62.741	–67.410	–63.109
Greece [a]			–1.396	–0.800	[b]	[b]
Hungary			–0.630	–0.572	–1.000	–0.892
Italy			–15.316	–14.331	–22.166	–21.182
Latvia			–16.340	–14.293	–16.302	–14.255
Lithuania			–4.447	–4.034	–4.552	–4.139
Luxembourg			–0.418	–0.418	NA	–0.380
Netherlands			–1.539	–1.578	–1.425	–1.464
Romania			–28.393	–28.044	–15.793	–15.444
Slovakia			–1.658	–0.216	–1.084	0.358
Spain	15–14 [a]	JRC	–23.725	–21.442	–23.100	–20.810
Subtotal			**–181.028**	**–165.731**	**–170.708**	**–156.331**
(% of total)			57.7%	63.5%	55.7%	61.7%
Greece [b]	1	1990–2009 average	[a]	[a]	NA	–1.830
Subtotal						**–1.830**
(% of total)						0.7%

Cyprus			−0.157	−0.164	−0.157	−0.164
Malta	2	Extrapolation	−0.049	−0.049	NA	−0.049
Subtotal			**−0.206**	**−0.213**	**−0.157**	**−0.213**
(% of total)			0.1%	0.1%	0.0%	0.1%
Total in FMRL submission			**−313.752**	**−261.024**	**−306.370**	**−253.298**

Abbreviations: HWP = harvested wood products, JRC = Joint Research Centre, FMRL = forest management reference level.

[a] Greece's initial FMRL was estimated using the JRC methodology. Therefore the original European Union submission included 15 member States using this methodology and 14 for the revised values.

[b] Greece's revised FMRL is based on the average removals value for the 1990 to 2009 period.

7.   The ERT notes that several member States reported an error in the calculation of the HWP model matrix, updated their proposed FMRL (first-order decay function HWP) and sent a corrigendum letter to the secretariat: Belgium, Bulgaria, Czech Republic, Estonia, France, Germany, Greece, Hungary, Italy, Latvia, Lithuania, Netherlands, Slovakia and Spain. The ERT notes that the European Union FMRL included all those updates in its submission. At the time this report was written, Romania had not sent a corrigendum to the secretariat. However, the ERT notes that during the TA, Romania noted this error in the HWP calculation and indicated the need for a change in the FMRL to the ERT reviewing the Romanian submission.

B.   How each element of footnote 1 to paragraph 4 of decision 2/CMP.6 was taken into account in the construction of the reference level

1.   Historical data from greenhouse gas inventory submissions

8.   The EU submission indicates that individual member States' FMRL submissions have sought to ensure consistency with data reported in their national GHG inventories. The forest management areas reported under the Kyoto Protocol (if elected) and forest land remaining forest land category reported under the Convention in 2008 for all member States have both been provided in the submission (see submission, table 4). Some discrepancies were observed between the areas provided in this table and those reported in the 2010 and/or 2011 GHG inventory of the member States (see annex). The ERT notes that in response to the recommendations in this and in individual member States initial draft report reviews, the European Union has undertaken model re-runs to remove most of the discrepancies.

2.   Age-class structure

9.   The forest land age-class structure for the 27 member States was projected using the EFISCEN (European Forest Information Scenario Model). The projections indicate significant changes in the projections of the two youngest classes: a gradual increase in the 1–20 years age class and a decrease in the 21 to 40 years age class. Forests in harvestable ages for most member States are within the 61 and 120 years age-class distribution. These classes represent approximately over 40 per cent of the forest area of the European Union as reported in the FMRL submission. There is a slow increase in the areas for the 61 to 100 years age class and a decrease in the 101 to 120 age class.

10.   The ERT recommends each member State to ensure consistency between age-class structure data used in the GHG inventories and that used for the construction of its own FMRL. The ERT also recommends that the European Union FMRL use each member State age-class structure to estimate the total age-class structure to be reported in association with

its FMRL. In response to the comments of the ERT in the draft version of this report regarding discrepancies found in the age-class distribution of some member States' submissions and the data used in their GHG inventories, the European Union explained that in some cases, the level of data disaggregation to be used in the projections was not available. Therefore, in some cases, scaling was needed to derive the age class for the forest management area from the total forest area. This is likely to have caused an overestimation of the first age class (0–20 years) and therefore of future removals also. This approach was considered adequate by the JRC as there were no other information alternatives and it resulted in conservative projections to some extent. In response to the comments of the ERT on the total age-class structure, the European Union is now collecting the necessary information from each member State and will provide the updated age-class structure in the future.

3.   The need to exclude removals from accounting in accordance with decision 16/CMP.1, paragraph 1

11.   The European Union FMRL submission indicates the indirect effects of climate change reflected in decision 16/CMP.1, paragraph 1: (i) the dynamic effects of age-class structure are the most significant and are explicitly factored out by the reference level approach; and (ii) any other effects, are factored out by the difference between the FMRL and net removals. Individual submissions by member States have not made explicit the latter approach or in some cases any approach for factoring out. The ERT notes that the effects of elevated CO_2 concentration and nitrogen deposition are not necessarily factored out solely by the projected FMRLs including the age-class structure, as the factoring out will depend on each of the member States' age-class structure and harvesting cycle.

4.   Other elements

Forest management activities already undertaken

12.   The European Union FMRL submission does not explain which are the forest management activities already undertaken by each member State. In response to the comments of the ERT in the draft version of this report, the European Union explained that forest management activities undertaken by each member State are included in the European Union FMRL submission by definition as it summarizes the FMRLs of individual member States. The detail of the activities is explained in the submission of the individual member State.

Projected forest management activities under a 'business as usual' scenario

13.   The European Union FMRL submission does not explain which are the projected forest management activities under the 'business as usual' scenario for the member States. In response to the comments of the ERT in the draft version of this report, the European Union explained that projected forest management activities already undertaken by each member State are included in the European Union FMRL submission by definition as it summarizes the FMRLs of individual member States. The detail of the activities is explained in the individual member State submissions.

Continuity with the treatment of forest management in the first commitment period

14.   Not applicable.

C. Pools and gases

1. Pools and gases included in the reference level

15. The pools and gases included in the individual member States' FMRL submissions are summarized in the European Union FMRL submission and the inclusion or exclusion of pools is consistent in these submissions. The European Union FMRL does not explain the reason for the exclusion of pools by each of the member States, but explanations are provided in the individual submissions of the member States and have been subject to a separate review.

2. Consistency with inclusion of pools in the estimates

16. The European Union FMRL submission indicates that full consistency will be ensured between carbon pools and GHG sources included in the member States' FMRL and the reporting and accounting in the second commitment period. In the case any of the pools not included by the member States' FMRL become a source in the future, the ERT recommends that a technical correction be applied to these member States' FMRL to make it consistent with their reported annual forest management or equivalent data. After these updates, the European Union FMRL should also be updated to reflect these changes.

17. The pools in European Union FMRL are consistent with the member States' GHG inventories with the following exceptions:

(a) Some inconsistencies were identified between the pools excluded by member States' individual FMRLs which are reported in these member States' GHG inventories (under forest management and/or forest land remaining forest land) for: Italy (mineral soils) and Slovenia (dead organic matter). The ERT recommends that adequate explanations be provided for inconsistencies (e.g. based on conservative considerations), or technical corrections be applied to ensure consistency, and that the FMRL should be revised accordingly.

(b) Net changes to non-biomass pools and other GHG sources are kept constant in the FMRL of the 14 member States using the JRC common approach at the level of the average values reported in the GHG inventory (2000–2008).

D. Approaches, methods and models used

1. Description

JRC common approach

18. Fourteen member States use the projections developed by the JRC of the European Commission in collaboration with two European Union modelling groups. The GLOBIOM (Global Biosphere Management Model)[2] model uses the following as input data: global macroeconomic variables (e.g. gross domestic product (GDP), population growth); bioenergy projections from the PRIMES[3] (country-specific for the European Union) and POLES models (for the rest of the world); and historic roundwood removals from FAOSTAT and other member States' data. These data are used to project the national level

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[2] GLOBIOM from IIASA is a recursive dynamic global partial equilibrium model integrating agricultural, bioenergy and forestry sectors to provide analysis on global issues concerning land-use competition between the major land-use sectors

[3] PRIMES biomass model is an economic supply model that computes the optimal use of resources and investment to meet a demand for biomass energy products. The production of biomass is linked with resource origin, availability and concurrent uses.

of total wood production and the timber and land prices that will be used by the next models.

19.   G4M[4] and EFISCEN[5] models use GLOBIOM outputs and other data to project annual estimates of emissions and removals from forest management until 2020 for the above- and below-ground biomass carbon pools. Neither model takes account of the impact of climate change on the carbon sequestration included in the projections as this was considered to be insignificant in the period up to 2020.

20.   The G4M model relies on spatial data and has used European-wide forest maps and data sources. In some cases, the uncertainty of these European maps compared with a national-level map can be approximately 10 to 20 per cent, mainly related to the degree of forest cover and to errors in classification. In response to the comments of the ERT in the draft version of this report, and in order to increase the consistency with data reported in GHG inventories, the European Union re-ran the G4M model by adjusting the original spatial data to match the forest management area used in the GHG inventories[6] for member States where the area difference was greater than 4 per cent (all member States except Bulgaria, Estonia, Latvia and the Netherlands). Other forest and forest management parameters (e.g. age structure, increment) were taken from national forest inventories, maps or country statistics. By using external wood-demand projections (from GLOBIOM), the model simulates harvesting maintaining a yield that optimizes forest increment and management to fit into the demand projections.

21.   The EFISCEN model uses as data input forest-area data from national forest inventories scaled to match the forest area reported in the GHG inventories. EFISCEN also uses the net annual increment (m^3 ha^{-1} year^{-1}), average standing volume growing stock (m^3 ha^{-1}) and management scenarios to predict: (i) stemwood volume, (ii) increment, (iii) age-class structure, and (iv) wood removals. Stemwood volume is converted into carbon removals and emissions for the living biomass pools.

22.   For the final FMRL estimate, emissions and removals from 2000 to 2020 estimated by the G4M and EFISCEN models were calibrated using historical emissions and removals data for the period 2000–2008.[7] This is performed to ensure consistency between past reported trends and future projections. Based on supplementary information on this method received during the course of the TA, the results from these models are not validated by past trends before 2000.

Country-specific approaches:

23.   Ten member States use country-specific approaches. Most of these are based on national forest inventory data, and statistics and imagery that are used with a mix of approaches ranging from scenario analysis, projections based on age class and projected future demand for timber, and partial equilibrium models, to name but a few. More

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[4] The G4M model relies on spatial data. These data may or may not have been provided by countries. Other forest and forest management parameters (e.g. age-class structure, increment and historical harvest) were taken from national forest inventories (NFIs) or other country statistics.

[5] EFISCEN uses as data input the forest area data from NFIs scaled to match the forest area reported in the national inventory report (the forest land remaining forest land area, from which the deforested area is deducted, or the forest management area if elected under the Kyoto Protocol) and provides projections on basic forest inventory data (stemwood volume, increment, age-class structure), and of carbon in forest biomass and soil.

[6] Either the forest land remaining forest land area or the forest management area if elected under the Kyoto Protocol is used, these are taken from 2011 national inventory reports (see annex).

[7] Historic data as reported by the country in the 2011 NIRs, with the exception of Estonia for which the 2010 GHG inventory was used following a recommendation by the ERT. See footnotes to table A-1 for more details.

information on each approach used is provided in the individual submissions of those member States.

Extrapolation approach:

24.   Two member States (Cyprus and Malta) use an extrapolation approach using historical data (1990–2008) for net emissions from submissions in the context of the European Union GHG monitoring mechanism were used to construct their FMRL.

Historical average:

25.   One member State (Greece) now uses the average forest land remaining forest land removals from a historical time series (1990–2009) as reported in the 2011 GHG inventory as a proxy for emissions over the period 2013 to 2020. Greece considers this to be the best data available to use in constructing its FMRL, as the G4M model could not project a credible FMRL due to the lack of data on age-class structure.

2.   Transparency and consistency

26.   The JRC methodological approach could highlight useful future trends for the European Union as a whole. The future demand for wood for use as a primary material in the European Union (i.e. timber not bioenergy) is projected by GLOBIOM using 2000 as its base year. Projections are based on GDP and population growth, which drive demand for timber through conventional demand functions applying demand price elasticities taken from Rametsteiner et al. (2007).[8] Detailed projections of timber production are not available at the national level. For the GLOBIOM projections, it was therefore assumed that timber production for each member State would follow the same factor forecast as the European Union as a whole. Further, timber demand projections are satisfied based on the assumption that competition and trade exist between the European Union and the rest of the world and that this will satisfy the demand. From this it is understood that timber trade trends within the European Union (i.e. between member States) and supply competition between member States beyond current levels have not been included in the projections. The ERT considers that the quality of timber production projections will be dependent on how well macroeconomic variables can predict timber production and demand for the European Union using this approach. In response to the comments of the ERT in the draft version of this report, the European Union explained that its approach is considered to provide the best methodology to forecast timber demands considering the constraints of country-specific information that could be used in this modelling framework, in particular policies affecting timber demand. In addition, the European Union considers it likely that the impact of these policies will be modest.

27.   In the JRC common approach, the future demand for wood for bioenergy is based on an analysis of country-specific policies implemented by April 2009 (by the PRIMES model) combined with the expected global market effects (by GLOBIOM).

28.   The ERT noted some discrepancies in the data used as input for each model and also between these datasets and that used for the GHG inventories. This could apply to forest management area, increment, rotation length and age-class structure for some member States. During the TA, member States using the JRC common approach provided revised FMRL values obtained with new runs of the models, with the aim to increase the consistency between input data used by models and data used in the GHG inventories. These changes were based on data from official sources verified or provided by each

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[8] Rametsteiner E, Nilsson S, Böttcher H, Havlik P, Kraxner F, Leduc S, Obersteiner M, Rydzak F, Schneider U, Schwab D and Willmore L. 2007. S*tudy of the Effects of Globalization on the Economic Viability of EU Forestry*. Final Report of the AGRI Tender Project: AGRI-G4-2006-06, EC Contract Number 30-CE-0097579/00-89.

member State. An overview of the changes made to FMRL values, following the initial recommendations made by the ERT, is provided in the annex. The changes covered the following:

(a)   Consistency in forest management area: By making forest management data used by EFISCEN consistent with data reported in the GHG inventories, except in cases where the area difference was less than 4 per cent (Bulgaria, Estonia, Latvia and the Netherlands);

(b)   Updates in age-structure data (Belgium);

(c)   Updates of increment values (Czech Republic, Latvia and Hungary);

(d)   Correct or update harvest information: Mistakes were corrected (Belgium, Italy) or new country-specific historical harvest data were used (Hungary).

29.   The application of the offset calibration (in the JRC common approach) is used to ensure consistency between historic net emissions rates and the projections seem not to take into account extreme fluctuations in the data for some member States. This fluctuation could be due to exceptional events that occurred in the member States themselves or to the quality of the data available for periods of time. The ERT recommends that historic trends used in the calibration exclude outliers from member States' data when these are due to extreme events. The ERT notes that depending on the decision of the Conference of the Parties on the treatment of disturbances, member States should make technical corrections to ensure consistency between their FMRLs and the accounting rules if necessary, the European Union FMRL should be adjusted accordingly.

30.   For the member States using country-specific methods, the ERT recommends they ensure that their FMRL is consistent with the recommendations provided by the TA for their individual submissions and that the European Union FMRL is consistent with any changes or updates.

31.   For the two member States using the extrapolation method, the ERT considers this a consistent and transparent methodology in which net emissions are projected from the limited information available.

E.   Description of the construction of the reference levels

1.   Area under forest management

32.   The European Union FMRL summarizes the forest area for the member States reported as forest land remaining forest land under the Convention (152,667 kha) and under forest management if elected under the Kyoto Protocol (135,327 kha) in table 4. Table A-4 (see annex) summarizes the forest management and forest land remaining forest land area data reported in the latest member States GHG inventories for information purposes (source GHG Locator). Some discrepancies were observed between the areas used in the FMRL and those reported in the GHG inventories. The ERT notes that in response to the recommendations in this and in the individual member States initial draft review reports, member States using JRC data addressed most of these discrepancies through the re-runs of the models.

2.   Relationship of the forest land remaining forest land category with the forest management activity reported previously under the Convention and the Kyoto Protocol

33.   The European Union FMRL covers 17 member States that elected to account for forest management under the Kyoto Protocol: Czech Republic, Denmark, Finland, France,

Germany, Greece, Hungary, Italy, Latvia, Lithuania, Poland, Portugal, Romania, Slovenia, Spain, Sweden and the United Kingdom of Great Britain and Northern. The ERT recommended that consistency between the forest management area reported in these 17 member States' GHG inventories and the data used for the construction of the FMRL data be maintained and to follow the recommendations made in response to the individual submissions. For the other eight member States, the forest land remaining forest land area reported under the Convention has been generally used as a proxy for the forest management area. The ERT recommended that consistency between the forest land remaining forest land area reported in these member States' GHG inventories and the data used for the construction of the FMRL data be maintained and follow the recommendations made to individual submissions.

34.   Two member States (Malta and Cyprus) used the historical net emissions data under the forest land remaining forest land category reported under the Convention. These estimates are consistent with the forest area from which they were derived.

3.   Forest characteristics

35.   European forests present a large range of ecosystems from the Mediterranean to the Arctic Circle as described in the European Union's 2011 GHG inventory. Deforestation does not appear to be a major activity and any forest loss is largely compensated for by the rate of new planting and forest expansion. The European Union's forest area increased in recent decades possibly because of lower harvest levels than forest increment, young age-class structure, increased fertility of forest soils due to improved silvicultural practices, fertilizing effects of nitrogen deposition and effects of climate change. Increments are dependent on tree species, forest characteristics, forest management as well as climatic and environmental conditions. The rotation lengths also vary with tree species, legal framework, intended timber use, etc.

4.   Historical and assumed harvesting rates

36.   The European Union FMRL presents data on historical harvest rates from national statistics and/or the UNECE and FAO databases. National-level data include harvest from all forests with most of the total harvest being mainly related to Article 3, paragraph 4, forest management areas, because of the low harvesting levels in forests associated with Article 3, paragraph 3 of the Convention (about 62,000 hectares in the 2011 GHG inventory).

37.   For member States using the JRC common approach, future harvesting rates under a 'business as usual' scenario are derived from macroeconomic drivers (e.g. GDP, population) driving the future timber demand as compared with a base year, country-specific policies driving the demand for wood for bioenergy (both implemented before mid-2009) and historic harvesting rates. Future harvest demand (2013–2020) is projected to be 8 per cent higher than the historical harvesting rate (2000–2008).

38.   For member States using country-specific methodologies, the use of historical harvesting rates in the construction of their FMRL depends on the approach used, as will the prediction of future harvesting rates. More information is provided in the individual submissions.

39.   For member States using the extrapolation approach, historical harvesting rates are embedded in the estimation of the net emission projections and are assumed to occur at a constant rate in the future.

5. **Harvest wood products**

40. The European Union FMRL includes -53.072 Mt CO_2 eq per year of estimated annual accumulation in the HWP pool. This is estimated based on the FMRL submissions of individual member States using the approach proposed in FCCC/KP/AWG/2010/CRP.4/Rev.4 with annual production data, specific half-lives for product types, application of the first-order decay function of the Intergovernmental Panel on Climate Change 2006GL equation 12.1 with default half-lives of 2 years for paper, 25 years for wood panels and 35 years for sawn wood and instantaneous oxidation assumed for wood in solid-waste disposal sites. Historical data from the earliest available year and an extrapolation of this data back to 1900 by using the average for the oldest available five years are taken into account. The estimates include exports. The FMRL values proposed by Greece, Luxembourg and Malta assume only instantaneous oxidation of HWP. The ERT recommends a technical adjustment to the European Union FMRL if needed when final agreement on HWP estimation is arrived at.

6. **Disturbances in the context of force majeure**

41. The European Union did not consider force majeure explicitly in the construction of its FMRL. The effect of past disturbances in each member State's forest land is incorporated into the FMRL through the methodologies used. The emissions from forest fires seem to represent the major natural disturbance and are reported by member States GHG inventories. Other disturbances occurring are related to windthrows. For most member States this represents a minor disturbance mainly due to the low frequency of these events rather than the magnitude of the impacts when they occur

7. **Factoring out**

42. The European Union FMRL submission indicates the use of a projected reference level factoring out of dynamic age-class effects. Other indirect effects of climate change are considered to be factored out by taking the difference between the FMRL and the net removals during the accounting period.

F. Policies included

1. **Description of policies**

43. The European Union FMRL submission describes policies and measures included in the FMRL submission in the annex for member States using the JRC common approach only. The FMRL projections include policies implemented by April 2009.

2. **How policies are taken into account in the construction of the reference level**

44. For member States using the JRC common approach, the effect of policies referred to in paragraph 43 above is included in the projections of the harvesting rates. The FMRL submissions of the European Union and of its member States include a general explanation of how policies are implemented, that is through the transposition of the European Union legislation (outlined in the annex to the European Union submission) into national legislation. The European Union explained that the collective impact which these policies have on the projections and particularly on harvesting rates is implicitly included in the models and reflected in the wood demand and therefore the FMRL. The JRC common approach is conservative in the sense that it assumes that the effect of existing but unspecified policies will remain unchanged.

45.   For member States using country-specific methodologies, the policies included in the FMRL depend on the approach used. More information is provided in the individual submissions.

46.   For member States using the extrapolation approach, the effect of policies is embedded in the estimation of the net emission projections and assumed to continue in the future.

III.   Conclusions and recommendations

47.   The European Union has calculated its FMRL on a reasonable, transparent basis and has some consistency issues that need to be addressed. The ERT recommends the first update to the European Union FMRL submission be performed on the basis of consistency with the FMRL submissions of the individual member States. Any further updates will be scheduled by the secretariat. As a result of this TA, the ERT recommends that:

(a)   The European Union and its member States provide a technical correction for the HWP component of their FMRLs when final agreement on HWP estimation is arrived at, if needed;

(b)   The European Union uses each member State's age-class structure to estimate the overall age-class structure to be reported in association with its FMRL;

(c)   The European Union FMRL is constructed consistent with the forest management activities undertaken and projected as assumed by the FMRL of each member State;

(d)   A technical correction will be applied to a member State's FMRL when pools not included in the reference level become a source in the future. After these updates, the European Union FMRL should also be updated to reflect these changes;

(e)   Historic trends used in the JRC common approach calibration should be consistent with the approach taken to disturbances, once agreed, and a technical correction applied if necessary. The European Union FMRL should be adjusted accordingly;

(f)   Member States using country-specific methods should ensure the European Union FMRL is consistent with any changes or updates to each member State's FMRL.

Annex

Documents and information used during the technical assessment

A.   Reference documents

Annual European Union greenhouse gas inventory 1990–2009 and inventory report 2011. Available at <http://unfccc.int/5888.php>.

Individual member States' forest management reference level submissions. Available at <http://unfccc.int/5896.php>.

FCCC/ARR/2009/EC. Report of the individual review of the annual submission of the European Community submitted in 2009. Available at <http://unfccc.int/resource/docs/2010/arr/ec.pdf>.

European Commission. European Union Energy Trends to 2030. Available at <http://ec.europa.eu/energy/observatory/trends_2030/doc/trends_to_2030_update_2009.pdf>.

B.   Additional information provided by the Party[1]

Table A-1: overview on the new FMRL proposed values by the EU Member States using the JRC/IIASA/EFI approach, and the reasons for changes made (*Gg CO2 eq per year)*. The reported values of FMRL are average of calibrated models' results for the period 2013-2020. Numbers in bold indicate a change as compared to April 2011 submission

	Submission April 2011		NEW models results		ADDITIONAL GENERAL INFORMATION			Average GHG for FM for 2000-2008 (used for calibration of models results) (2)
					Difference new vs. old FMRL values		Main reasons for changes compared to April 2011 submission	
	FM Reference level		FM Reference level		Gg CO2 eq	% total 1990 GHG		
	(A)	(B)	(A)	(B)				
Belgium	-2527	-2435	**-2499**	**-2407**	29	0,0	As requested by the ERT, the following changes were made: - New FM area used by models, = to area in GHGI - Corrected a mistake in harvest rate 2000-2005 used by models (the harvest demand did not change) Based on new data from the country, a slight variation was applied in the age structure	-3204
Bulgaria	-9304	-9522	**-7950**	**-8168**	1354	1,2	As requested by the ERT, the following changes were made: - New FM area used by EFISCEN, = to area in GHGI (very small impact on FMRL) (1) - The most updated data from NFI were used for the post-calibration (the impact of this change on FMRL is about +1500 GgCO2); the use of this new data was specifically requested by the ERT	-10142

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[1] Reproduced as received from the Party.

Czech Republic	-5566	-3577	**-4686**	**-2697**	879	0,5	As requested by the ERT, the following changes were made: - New FM area used by models, = to area in GHGI - Change the value of increment used by EFISCEN The new runs by models provide better data (i.e. models results now are closer to GHGI), since a number of problems have been solved)	-5300
Estonia	-2728	-1728	**-2741**	**-1742**	-14	0,0	As requested by the ERT, the following changes were made: - New FM area used by EFISCEN, = to area in GHGI (very small impact on FMRL). (1) Note that, as indicated by the ERT, the 2010 GHGI was used as basis for calibrating models results	-5518
France	-67041	-62741	**-67410**	**-63109**	-368	-0,1	As requested by the ERT, the following changes were made: - New FM area used by models, = to area in GHGI	-68886
Hungary	-680	-572	**-1000**	**-892**	-320	-0,3	As requested by the ERT, the following changes were made: - New FM area, new increments and new historical harvest (from the country) used by both models New models results are better than previous one (closer to GHGI)	-1728
Italy	-15316	-14331	-22166	-21182	-6851	-1,3	The following changes were made: new AREA, new HARVEST (a previous mistake was corrected), new AGE STRUCTURE (based on the latest NFI data on evenaged forests), the DOM pool was added. The main reasons of the higher sink as compared to previous submission are the addition of DOM pool (for the period 2000-2008 it was a sink of about -4000 GgCO2) and the new age structure.	-30185
Latvia	-16340	-14293	**-16302**	**-14255**	38	0,1	As requested by the ERT, the following changes were made: - New FM area used by EFISCEN, = to area in GHGI (very small impact on FMRL). (1) - EFISCEN applied a mortality rate of 20% - Slightly revised rotation lengths were used, as provided by the country	-18059
Lithuania	-4447	-4034	**-4552**	**-4139**	-105	-0,2	As requested by the ERT, the following changes were made: - New FM area used by models, = to area in GHGI	-4871
Luxembourg	-418	-418	**NA**	**-380**	38	0,3	No change in models results was done for Luxembourg; the small variation of FMRL is totally due to the use of 2011 GHGI (this change was done to be consistent with the other EU countries)	-443
Netherlands	-1539	-1578	**-1425**	**-1464**	114	0,1	As requested by the ERT, the following changes were made: - New FM area used by EFISCEN, = to area in GHGI (very small impact on FMRL). (1) - New data from 2011 GHG inventory was used for calibrating models' results in the period 2000-2008	-2156
Romania	-28393	-28044	**-15793**	**-15444**	12600	5,1	No change in models results was done. The difference compared to previous FMRL values is totally due to the calibration of models' results with the latest historical data provided by the country (September 2011).	--25203
Slovakia	-1658	-216	**-1084**	**358**	575	0,8	As requested by the ERT, the following changes were made: - New FM area used by models, = to area in GHGI (small impact on FMRL). - New data from 2011 GHG inventory was used for calibrating models' results in the period 2000-2008. This had an impact on FMRL (about +500 GgCO2), which is now a small source.	-2885
Spain	-23725	-21442	**-23100**	**-20810**	636	0,2	As requested by the ERT, the following changes were made: - New FM area used by models, = to area in GHGI	-18469
Total (3)	-179632	-164931	-170708	-156331				-196124

(A) with emissions/removals from HWP using the first order decay functions (from S. Rueter)

(B) assuming instantaneous oxidation (provided for transparency reasons only)

(1) No correction of area was done for G4M where the difference with GHGI was very small (less than 4%). Given the ex-post calibration of models' results, the impact of the remaining area discrepancies on FMRL can be considered absolutely negligible.

(2) Data for 2008 are from 2011 GHGIs (either FM, if elected, or FL-FL). For 2000-2007, data are from FL-FL of 2011 GHGIs or are country-specific estimates. For Estonia 2000-2008 data come from FL-FL of 2010 GHGI.

(3) Total excludes Greece. Greece now uses the average sink of 1990-2009, which gives a FMRL of -1830 Gg CO2eq.

Table A-2. FM area used by models for the 14 EU Member States using the JRC/IIASA/EFI approach. Numbers in bold indicate a change as compared to April 2011 submission.

| | AREA of FM in 2008 | | | | | | AREA of FM in 2020 used by models | |
| | from 2011 GHG inventories | | used by models | | difference % models vs. GHG inventories | | | |
	area (kha)	source	G4M (6)	EFISCEN	G4M	EFISCEN	G4M (7)	EFISCEN (8)
Belgium	692	*(2)*	**694**	692	0,3	0,0	**687**	**681**
Bulgaria	3504	*(2)*	3373	**3505**	-3,9	0,0	3371	**3501**
Czech Republic	2563	*(1)*	**2563**	**2563**	0,0	0,0	**2550**	**2556**
Estonia	2155	*(2)*	2142	**2156**	-0,6	0,1	2112	**2137**
France	13494	*(3)*	**13494**	**13494**	0,0	0,0	**13234**	**13097**
Hungary	1657	*(1)*	**1657**	**1657**	0,0	0,0	**1622**	**1652**
Italy	7451	*(1)*	**7451**	**7451**	0,0	0,0	**7440**	**7443**
Latvia	3131	*(1)*	3246	**3131**	3,5	0,0	3240	**3111**
Lithuania	1915	*(4)*	**1915**	**1915**	0,0	0,0	**1908**	**1903**
Luxembourg	86	*(2)*	87	86	0,8	0,0	87	86
Netherlands	327	*(5)*	330	**327**	0,9	0,0	322	**304**
Romania	6696	*(9)*	6294	6670	-6,4	-0,4	6230	6608
Slovakia	1975	*(2)*	**1975**	**1976**	0,0	0,0	**1970**	**1971**
Spain	12577	*(1)*	**12577**	**12577**	0,0	0,0	**12566**	**12571**

(1): area of FM in 2008 from KP LULUCF reporting (2011). For years between 2000 and 2007, the annual area of deforestation under KP reporting was considered.

(2): area of FL-FL in 2008 from GHG inventory 2011. For years between 2000 and 2007, the annual area of deforestation under KP reporting was considered.

(3): area of FM from KP LULUCF reporting, excluding overseas territories. For years between 2000 and 2007, the annual area of deforestation under KP reporting was considered.

(4): Since the FM area reported under KP is not correct, this estimate has been obtained as ((area of FL in 1990) - (area AR in 1990 (estimated as area AR in 2008 / 19)) - (area of D in 2008)). This estimate is very similar to FL-FL in 2008. For years between 2000 and 2007, the annual area of deforestation under KP reporting was considered.

(5): Forest under Kyoto definition in 2008, from CRF table 5A (2011)

(6): Given the difficulty for adjusting the area of G4M, no correction of area was done in cases where the difference with GHG inventories is very small (Bulgaria, Estonia, Latvia, the Netherlands). Given the ex-post calibration of models' results, the impact of the remaining area discrepancies on FMRL can be considered absolutely negligible.

(7): from 2008 onward FM area was estimated considering the deforestation estimated by G4M (as explained in the Annex of EU submission).

(8): from 2008 onward FM area was estimated assuming the continuation of the deforestation trends (average 1990-2008) reported under the KP

(9): area of FM from KP LULUCF reporting (2011). Following indication from the Party and its ERT, no change in input area was done.

Table A-3. Historical harvest rate and projected BAU harvest demand used by models for the 14 EU Member States using the JRC/IIASA/EFI approach (roundwood overbark 1000 m3). Numbers in bold indicate a change as compared to April 2011 submission

	2000	2005	2010	2015	2020	ratio (av. 2013-2020)/2005	ratio (av. 2013-2020)/2000	ratio (av. 2013-2020)/(av. 2000-2008)	Source of historical data (till 2007)
Belgium	3457	4104	4066	4028	3990	0,98	1,16	1,03	country data
Bulgaria	4836	6469	6237	6005	5773	0,92	1,23	1,01	FAO June 2010
Czech Rep.	15710	18147	18989	19831	20673	1,11	1,28	1,15	FAO June 2010
Estonia	9600	7410	8548	9685	10822	1,35	1,04	1,21	FAO June 2010
France	63637	57498	59425	61352	63279	1,08	0,97	1,04	EU subm Nov 2009
Hungary	6957	6992	7562	8132	8702	1,19	1,19	1,18	country data june 2011
Italy	12720	12322	13841	15360	16879	1,28	1,24	1,25	country data june 2011
Latvia	11040	10864	11356	11848	12341	1,10	1,09	1,09	EU subm Nov 2009
Lithuania	6163	6925	6702	6480	6257	0,93	1,04	0,97	FAO June 2010
Luxembourg	298	305	309	312	316	1,03	1,05	1,03	FAO June 2010
Netherlands	1090	1204	1188	1171	1155	0,97	1,07	1,00	FAO June 2010
Romania	14827	17104	16926	16749	16571	0,98	1,13	1,02	FAO June 2010
Slovakia	6599	8821	9110	9399	9688	1,08	1,44	1,17	FAO June 2010
Spain	17023	17755	18246	18738	19229	1,06	1,11	1,07	FAO June 2010
Total	173957	175921	182505	189090	195674	1,09	1,10	1,08	

Notes: values in the table express 5-yrs average (e.g. 2000 is the average 1998-2002, 2005 is the average 2003-2007). Till 2007, data are from statistics or other country data. Data for 2020 were estimated by the models Primes (wood for bioenergy) and Globiom (timber). Data between 2008 and 2020 are interpolated.

Table A-4. Reported FM and FL_FL areas by Member States based on the GHG locator (v3.4)

Member States	KP B1: Area reported under Forest Management (kha)		5.A.1: Forest Land remaining Forest Land (kha)	
	2010 GHGI	2011 GHGI	2010 GHGI	2011 GHGI
	2008	2008	2008	2008
Austria			3,769	3,769
Belgium			681	692
Bulgaria			3,595	3,499
Czech Republic	2,563	2,563	2,561	2,561
Denmark	533	533	533	533
Estonia			2,318	2,158
Finland	21,873	21,842	21,859	21,844

Member States	KP B1: Area reported under Forest Management (kha)		5.A.1: Forest Land remaining Forest Land (kha)	
	2010 GHGI	2011 GHGI	2010 GHGI	2011 GHGI
	2008	2008	2008	2008
France (KP)	14,574	21,699	21,454	22,234
Germany	10,710	10,873	10,710	10,873
Greece	1,167	1,167	3,356	3,356
Hungary	1,657	1,657	1,979	1,979
Ireland			301	431
Italy	7,451	7,451	8,839	8,838
Latvia	3,132	3,132	3,221	3,132
Lithuania		2,150	1,970	1,905
Luxembourg			85	85
Malta			1	1
The Netherlands			339	339
Poland	8,828	8,874	8,865	8,852
Portugal	2,408	3,766	3,404	3,748
Romania*	6,696	6,197	6,728	6,183
Slovakia			1,880	1,966
Slovenia	1,185	1,185	1,237	1,238
Spain	12,577	12,577	12,577	12,577
Sweden	26,741	28,376	27,064	27,829
UK	1,376	1,377	810	2,493
European Union	123,470	135,419	150,137	153,115

Note: Romania's figures for 2011 GHGI are based on the data from the resubmission on 15 September.

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