



Framework Convention on Climate Change

Distr.: General
22 November 2011

English only

Ad Hoc Working Group on Further Commitments for Annex I Parties under the Kyoto Protocol Sixteenth session, part four Durban, 29 November 2011–*

Agenda item 3

Consideration of further commitments for Annex I Parties under the Kyoto Protocol

Synthesis report of the technical assessments of the forest management reference level submissions

Note by the secretariat

Summary

The technical assessments performed by six expert review teams, in accordance with decision 2/CMP.6 and its appendix II, resulted in 38 technical assessment reports of the forest management reference level (FMRL) submissions. The secretariat prepared a synthesis report of the key conclusions of the FMRL review process, in accordance with decision 2/CMP.6 and its appendix II, paragraph 33, for consideration by the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol at its seventh session.

* The fourth part of the session will be held in conjunction with the seventh session of the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (CMP). The Ad Hoc Working Group on Further Commitments for Annex I Parties under the Kyoto Protocol (AWG-KP) will aim to complete its work and have its results adopted by the CMP as per decision 1/CMP.6, paragraph 1. The closing date of the session of the AWG-KP will be determined in Durban.

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I. Introduction and summary

A. Overview

1. The synthesis of the 38 technical assessment reports (TARs) of the forest management reference levels (FMRLs) in accordance with decision 2/CMP.6 and its appendix II, part II (“Guidelines for review of submissions of information on forest management reference levels” (hereinafter referred to as the technical assessment (TA) guidelines)) is presented in this synthesis report. The TAs were performed by six expert review teams (ERTs) in accordance with the TA guidelines. They took place as centralized activities on 23–27 May 2011 and from 30 May to 3 June 2011 in Bonn, Germany, and were coordinated by the UNFCCC secretariat.

2. In accordance with the TA guidelines referred to in paragraph 1 above, the objectives of the TA were as follows:

(a) To assess whether Parties had provided transparent, complete, consistent, comparable and accurate information on how the elements referred to in paragraph 6 below were taken into account in the construction of their FMRLs;

(b) To ascertain whether the construction of the FMRLs was consistent with the information and descriptions used by the Parties;

(c) To provide, as appropriate, technical recommendations to each Party included in Annex I to the Convention (Annex I Party);

(d) To provide a technical assessment to support the consideration of the FMRL by the Conference of the Parties serving as the meeting of the Parties to the Kyoto Protocol (CMP) at its seventh session, as an approach to be used during the second commitment period of the Kyoto Protocol;

(e) To assess whether Parties had provided transparent, complete, consistent, comparable and accurate methodological information to evaluate methodological consistency.

3. Six ERTs were organized, each one in charge of reviewing between six and seven FMRL submissions. Each of the ERTs was composed of six nominated land use, land-use change and forestry experts selected from the UNFCCC roster of experts, working under the same rules as those set out in decision 22/CMP.1, annex, paragraphs 9–10. The ERTs consisted of an equal number of experts from Annex I Parties and Parties not included in Annex I to the Convention (non-Annex I Parties), with two co-lead reviewers – one from an Annex I Party and the other from a non-Annex I Party. The TA thus had an equal balance of experts from developed and developing countries.

4. The technical assessments performed by the ERTs referred in paragraph 2 above resulted in 38 TARs that are published on the UNFCCC website.¹ These 38 TARs are the basis for the present synthesis report.

B. Proposed reference levels

5. The following table shows the FMRLs proposed by each Annex I Party that is also a Party to the Kyoto Protocol in the original FMRL submissions received between February

¹ The TARs are available at <<http://unfccc.int/5896.php>>.

and May 2011.² The table also shows any revisions to the FMRL undertaken as a result of the TA (see para. 11 below).

Table 1
Forest management reference levels

Party	FMRL in Mt CO ₂ eq per year average of 2013–2020			
	Original submission ^a		Revised values ^b	
	Applying first-order decay function for HWP	Assuming instantaneous oxidation of HWP	Applying first-order decay function for HWP	Assuming instantaneous oxidation of HWP
Australia ^c		Under 0–1% threshold not accountable: –0.2–1.0		
		Under 0–1% threshold accountable: –0.2–4.1		
		Without: 8.5		
Austria	–6.516	–2.121		
Belarus		–30.05		–30.02
Belgium	–2.527	–2.435	–2.499	–2.407
Bulgaria	–9.304	–9.522	–7.950	–8.168
Canada	Starting in 1900: –102.81		Starting in 1900: –102.75	
	Starting in 1990: –114.36		Starting in 1990: –114.30	–70.60
Croatia		–5.149 ^d		–6.289
Cyprus	–0.157	–0.164		
Czech Republic	–5.566	–3.577	–4.686	–2.697
Denmark	0.359	0.243	0.409	0.334
Estonia	–2.728	–1.728	–2.741	–1.742
European Union ^e	–313.752	–261.024	–306.853	–253.298
Finland	–20.100	–19.300	–20.466	–19.300
France	–67.042	–62.741	–67.410	–63.109
Germany	–22.418	–2.067		
Greece ^e	–1.396	–0.800		–1.830
Hungary	–0.630	–0.572	–1.000	–0.892
Iceland		–0.154		
Ireland	–0.207	–0.073	–0.142	–0.008
Italy	–15.315	–14.331	–22.166	–21.182
Japan		0.000		

² The submissions are available at <<http://unfccc.int/5896.php>>.

Party	FMRL in Mt CO ₂ eq per year average of 2013–2020			
	Original submission ^a		Revised values ^b	
	Applying first-order decay function for HWP	Assuming instantaneous oxidation of HWP	Applying first-order decay function for HWP	Assuming instantaneous oxidation of HWP
Latvia	-16.340	-14.293	-16.302	-14.255
Liechtenstein	0.0001	0.0025		
Lithuania	-4.447	-4.034	-4.552	-4.139
Luxembourg	-0.418	-0.418		
Malta	-0.049	-0.049		
Monaco ^f				
Netherlands	-1.539	-1.578	-1.425	-1.464
New Zealand		11.15		
Norway		-11.4		
Poland	-24.032	-22.750	-27.133	-22.750
Portugal	-6.830	-6.480		
Romania	-28.393	-28.044		-15.444 ^g
Russian Federation		-94.735		-116.300
Slovakia	-1.658	-0.216	-1.084	-0.358
Slovenia	-3.171	-3.033	-3.171	-3.033
Spain	-23.725	-21.442	-23.100	-20.810
Sweden	-41.336	-36.057	-41.336	-36.057
Switzerland		0.22 ^h		
Ukraine		-46.6		-48.7 ⁱ
United Kingdom	-8.268	-3.442		

Abbreviations: FMRL = forest management reference level, HWP = harvested wood products, IPCC = Intergovernmental Panel on Climate Change, JRC = Joint Research Centre, TA = technical assessment.

^a Values were submitted by Parties in accordance with decision 2/CMP.6, paragraph 4, including corrections submitted before the technical assessments took place.

^b Values revised during the TA.

^c Australia's FMRL includes three possible scenarios for the consideration of force majeure.

^d Croatia's revision is due to a change from the projected estimated emissions for 2020 only, to the average projected estimated emissions for 2013–2020.

^e 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 using the revised values. Greece's single revised FMRL is based on the average removals value for 1990 to 2009. Cyprus, Luxembourg and Malta did not prepare individual submissions and were included in the TA of the European Union.

^f Monaco did not propose an FMRL due to its lack of forest land.

^g Romania did provide a revised estimate of its FMRL, but the ERT was unable to review the new material submitted on 11 August due to lack of time.

^h This consists of net emissions of 0.48 Mt CO₂ eq per year less accumulations of 0.21 Mt CO₂ eq and 0.05 Mt CO₂ eq in the HWP and soil carbon pools, respectively.

ⁱ Ukraine's revised FMRL is a preliminary or interim estimate.

II. General description of the reference levels

A. Overview

6. In accordance with footnote 1 to paragraph 4 of decision 2/CMP.6, the FMRLs were to be constructed taking into account historical data from greenhouse gas (GHG) inventory submissions, age-class structure and the need to exclude removals from accounting in line with decision 16/CMP.1, paragraph 1. Forest management activities which were already undertaken, projected forest management activities under a 'business as usual' scenario, and continuity with the treatment of forest management in the first commitment period were also to be taken into account where relevant. Finally, pools and gases were required to be included consistently in the construction of the FMRLs.

7. During the TA, the ERTs presumed the accuracy of the methodological assumptions indicated by Parties in their GHG inventories and concentrated on assessing the methodology and data used in the construction of the FMRLs proposed in relation to forest management estimates.

8. To construct their FMRLs, Parties used the following:³

(a) Projections using country-specific methodologies (17 Parties, 10 of which were European Union (EU) member States);

(b) Projections using a common approach developed by the Joint Research Centre (JRC) of the European Commission (14 EU member States);

(c) Historical FMRL based on the single year 1990 (Belarus, Norway and the Russian Federation);

(d) Average removals during the historical time series (1990–2009) (Greece);

(e) Linear extrapolation of historical emissions data (1990–2008) of the forest land remaining forest land category used for reporting under the Convention (Cyprus and Malta);⁴

(f) Zero value (Japan), equivalent to gross-net accounting using a narrow approach;

(g) Monaco did not provide a value for the FMRL in its submission since, as noted in its national inventory report (NIR), it has no land area classified as forest land;

(h) The FMRL submission of the EU comprises individual submissions of 27 member States.

9. Many Parties also presented values related to the contribution of harvested wood products (HWP) assuming both instantaneous oxidation, and the approach reflected in document FCCC/KP/AWG/2010/18/Add.1, chapter II, annex I, paragraph 27. Most estimates include a period starting at 1990, but a few Parties for information purposes also provided estimates of the HWP pool starting in 1900.

10. One Party (Australia) presented a number of FMRL values in its submission to reflect a range of possible outcomes on the force majeure/disturbances provision currently under negotiation.

³ See chapter II.D for more details on the approaches.

⁴ Cyprus and Malta did not provide individual FMRL submissions, their FMRLs are included in the EU submission only.

11. In response to the recommendations made by the ERTs during the TA, some Parties revised their FMRLs, as follows:

(a) Of the 27 EU member States, the 14 which followed the JRC methodology revised their FMRLs and re-ran their models (except Luxembourg and Romania), mainly to improve consistency with the forest management area reported in the GHG inventories, update projections with the latest data available, and include pools which had previously been omitted. Romania revised the FMRL based on the new forest management data in the resubmission of its 2011 GHG inventory in response to the decision of non-compliance by the Compliance Committee. Luxembourg also revised its FMRL based on its 2011 GHG inventory. Four EU member States using country-specific methodologies also revised their FMRL (Denmark, Finland, Ireland and Poland). This was mainly due to errors found in the data inputs originally used, including emissions that were previously omitted, and to improve consistency with the forest management areas reported in their GHG inventories. One EU member State (Greece) revised its FMRL as a result of changing its approach from a projected to a historical one given the lack of appropriate data for age-class structure to apply the JRC methodology with the suggested modifications by the ERT.

(b) One Party (Ukraine) originally submitted a historical FMRL based on 1990 data but, as a result of more recent research, proposed instead an interim revised estimate based on projected removals for the period 2013–2020.

(c) One other Party (Croatia) revised its FMRL approach using the average of the time-series projections; originally it proposed the projection for 2020 as its FMRL.

Table 2

Methodological approaches

<i>Party</i>	<i>Methodological approach</i>	<i>Includes force majeure provision^a</i>
Australia	Country-specific projection	Various scenarios for the inclusion
Austria	Country-specific projection	N
Belarus	Historical 1990	N
Belgium	JRC approach	N
Bulgaria	JRC approach	N
Canada	Country-specific projection	N ^b
Croatia	Country-specific projection	N
Cyprus	Extrapolation	N
Czech Republic	JRC approach	N
Denmark	Country-specific projection	N
Estonia	JRC approach	N
EU	See member States	
Finland	Country-specific projection	N
France	JRC approach	N

<i>Party</i>	<i>Methodological approach</i>	<i>Includes force majeure provision^a</i>
Germany	Country-specific projection	N
Greece	JRC – revised to 1990–2009 average	N
Hungary	JRC approach	N
Iceland	Country-specific projection	N
Ireland	Country-specific projection	N
Italy	JRC approach	N
Japan	Gross–net accounting, narrow approach	N
Latvia	JRC approach	N
Liechtenstein	Country-specific projection	N
Lithuania	JRC approach	N
Luxembourg	JRC approach	N
Malta	Extrapolation	N
Netherlands	JRC approach	N
New Zealand	Country-specific projection	N
Norway	Historical 1990	N
Poland	Country-specific projection	N
Portugal	Country-specific projection	N ^c
Romania	JRC approach	N
Russian Federation	Historical 1990	N
Slovakia	JRC approach	N
Slovenia	Country-specific projection	N
Spain	JRC approach	N
Sweden	Country-specific projection	N
Switzerland	Country-specific projection	N
Ukraine	Historical 1990 – revised to country-specific projection	N
United Kingdom	Country-specific projection	N

Abbreviations: JRC = Joint Research Centre, N = force majeure not included.

^a Emissions from force majeure or disturbances are not explicitly excluded (i.e. some or all gases from such events may be included at the background level or as part of the historical record).

^b All three numbers for Canada include a 12.5 Mt CO₂ eq background level for wild-fires.

^c Given the high variability and occasionally significant contribution of emissions from forest fires in a given year, Portugal has averaged the two highest years with the two lowest ones.

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

12. The FMRLs proposed by the submitting Parties are largely consistent with each Party's GHG inventory and NIR. A common approach to calculating the FMRLs was noticeable among Parties in the frequency with which the use of national forest inventories were used as the historical data source and/or the methods, conversion factors and emission factors which were used for the GHG inventory were employed. For those Parties who chose forest management as an additional activity under Article 3, paragraph 4, in the first commitment period, supplementary information reported under the Kyoto Protocol was also used.

13. For Parties proposing projected FMRLs, GHG inventories and relevant historical data were taken into account by adjusting the results of the modelling exercise through an ex post processing of the model results, as was the case in the 14 EU member States that followed the JRC approach.

14. In cases where there were discrepancies between the historical data and the projections, these were often addressed by the Party in response to an enquiry by the ERTs. For example, Australia provided additional information to allow comparison between different forest sub-categories used in the FMRL and in its latest NIR; Hungary revised its FMRL to make it consistent with the 2011 GHG inventory; the 14 EU member States following the common approach developed by JRC undertook model re-runs to remove most of the discrepancies related to forest management areas reported in the 2010 and/or 2011 GHG inventories (see para. 11 above).

15. Other inconsistencies identified during the TA prompted recommendations by the ERTs. In the case of France, for example, discrepancies were found between the data sources for the forest area, and the increments and removals used for the construction of the FMRL and those used in the GHG inventory. Although a post-adjustment was applied to make the net emissions projected by the models more consistent with historical data, the ERT recommended France to explain the differences and ensure consistent use of harvesting rates (see paragraph 30 below).

16. During the TA, many Parties stated that they expected to update their FMRL to reflect continued improvements in the GHG inventory and data availability.

2. Age-class structure

17. For the most part, Parties included age-class structure information in the construction of their FMRLs and elaborated on it during the TA in response to questions from the ERTs. One exception was Greece, for which no recent data for age-class structure was available; see paragraph 11(a) above. Details on each Party's age-class structure can be found in the individual TARs.

18. Discrepancies identified by the ERTs related to age-class structure were reported in the TAR, often along with a recommendation for technical correction. For example, inconsistencies between the GHG inventories and the age-class structure used in the FMRL projections of those EU member States using the EFISCEN model (European Forest Information Scenario Model) were reportedly due to inadequate disaggregation in the model, resulting in a likely overestimation of the first age class (0–20 years) and therefore, future removals; although this produced a more conservative FMRL estimate, in response to the comments of the ERT on the total age-class structure, the EU is now collecting the necessary information from each member State and will provide an updated age-class

structure in the future. Other recommendations by the ERT included one that Germany incorporate a further historical series of data to ensure the FMRL does not include assumptions about changes to domestic policies adopted and implemented after December 2009, and for Ukraine to address issues with continuity and consistency in a new time series of age-class structure as the revised increment rates are substantially lower than those used for the GHG inventory or for reporting under the Kyoto Protocol for 2009.

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

19. See paragraphs 69–71 below.

4. Other elements

Forest management activities already undertaken

20. Sustainable forest management activities have already been undertaken in the majority of Parties submitting FMRLs and are accordingly reported in the TARs and the submissions. Many Parties have developed regional and national forestry programmes in order to further develop responsible forest management. Policy measures supporting and promoting an increase in demand for woody biomass are currently the most important drivers for harvesting activities.

21. Most Parties, in particular EU member States, note that the forest management activities already undertaken are indirectly incorporated through the use of the latest available forest time-series data.

22. For Parties using 1990 as their FMRL, forest management activities are limited to those undertaken before 1990.

Projected forest management activities under a ‘business as usual’ scenario

23. Projections incorporate ‘business as usual’ activities, and a continuation of the main drivers, practices, rates and policies in place before 2009 is generally assumed. For the EU member States, for example, ‘business as usual’ activities are taken into account through the estimation of the evolution of harvest demand by 2020 based on macroeconomic drivers, the application of policies implemented by April 2009 and legislative provisions adopted by April 2009. Canada assumes that the average historical harvest and the historical forest management activities during the period 1990–2009 will continue in the period 2013–2020. For Germany, the ‘business as usual’ forest management scenarios used for the projection of biomass have been in place since 2004, and they were also used during the last inventory cycle (2002–2008). Hungary informed the ERT during the review that it plans to continue to manage its forests under a ‘business as usual’ scenario with respect to the intensity and type of interventions, including gradual changes to allow its forest to move towards a ‘close-to-nature’ state in the stands of its indigenous species.

24. Some discrepancies between the ‘business as usual’ and projected scenarios were noted by the ERTs and reported in the TARs. The ERT, for example, noted that the average harvest age projected by the FOLPI model (Forestry-Oriented Linear Programming Interpreter) used by New Zealand is slightly older than the average for the years between 1995 and 2010; it also noted an increase in the harvesting of mature pre-1990 planted forest stocks during the period 2013–2020 relative to current silvicultural practices.

25. Although ‘business as usual’ activities are not relevant for Parties proposing a historical FMRL, some elaborated on them in their submissions.

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

26. To maintain continuity in the accounting of forest management in the first commitment period for those Parties which elected forest management as an additional activity under Article 3, paragraph 4, of the Kyoto Protocol, Japan proposed to use the narrow approach with gross-net accounting. As explained by Japan, the narrow approach accounts for emissions and removals only from forest land where these activities, including thinning, are implemented or where any additional activity is to be implemented to enhance sustainable forest management in the future. In doing this, the narrow approach provides continuity with the first commitment period.

27. This does not constitute a relevant element for other Parties. However, some Parties recalled if they had elected forest management or not for the first commitment period of the Kyoto Protocol.

C. Pools and gases

28. The inclusion of pools and gases in the FMRL is generally consistent with what is included in Parties' NIRs. For those pools assumed to remain constant or that were also excluded from the GHG inventories, Parties were asked to elaborate on their assumptions during the TA.

29. In some cases, inconsistencies identified between pools excluded from the FMRL and those reported in the GHG inventories were reported and addressed (e.g. the exclusion of mineral soils emissions by Italy or dead organic matter by Slovenia, or the inclusion of non-carbon dioxide (CO₂) gases in Ukraine's interim revised estimate). Sometimes the omissions were considered by the ERTs as conservative (e.g. Belarus's exclusion of methane and nitrous oxide (N₂O) emissions from the burning of forest biomass and N₂O emissions from the drainage of forest organic soils).

30. For some Parties, the ERTs recommend 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 be revised accordingly. For example, the exclusion of some carbon pools and other problems noted in France's NIR were transferred to the construction of the FMRL. This, together with some irregularities regarding the effect of a wind-storm event and other assumptions, prompted a recommendation by the ERT to consider technical corrections. Likewise, the treatment of the soil organic carbon pool in mineral soils by Slovakia is not consistent in the FMRL and the most recent GHG inventory submission and not enough information is provided to support the supposition that dead organic matter and soil carbon pools are not a source of emissions; the ERT therefore recommends that the Party is consistent in the inclusion of the dead organic matter pool and mineral soils in its FMRL and commitment period calculation.

31. The ERTs also note in the TARs the adequacy and soundness of pools assumed to remain constant. They note, for example, that net changes to non-biomass pools and other GHG sources are kept constant in the FMRL of the 14 EU member States using the JRC approach at the level of the average values reported in the GHG inventory (2000–2008).

32. In some cases, though a carbon pool is neither included in the GHG inventory nor in the FMRL, the ERT notes the possibility of including it using tier 1 methods (e.g. Belarus).

33. Concurring with the ERTs, several Parties noted that they would undertake a technical revision or correction of the FMRL as soon as national estimates of additional pools (e.g. those currently assumed to be in equilibrium or insignificant) are available, or to incorporate higher-tier modelling. The EU would also update any corrections applied to its FMRL.

D. Approaches, methods and models used

1. Description

34. As noted in paragraphs 4 and 8 above, of the 38 Parties submitting FMRLs, 18 used country-specific projections, 14 used a common approach (the JRC approach), one proposed a historical average, three proposed historical FMRLs, and one proposed an FMRL of zero (see table 2 above). In addition, two proposed an extrapolation approach in the EU common submission.

35. Most of the country-specific approaches are based on national forest inventory (NFI) data and statistics used with a mix of approaches ranging from projections based on age-class structure and projected future demand for timber, partial equilibrium models, scenario analysis, and historical extrapolation. Details on each approach and on the models used are found in the submissions and in the individual TARs.

36. For the 14 EU member States which follow a common approach, JRC of the European Commission developed projections in collaboration with two modelling groups. The models, G4M,⁵ from the International Institute for Applied Systems Analysis (IIASA), and EFISCEN,⁶ from the European Forestry Institute, project annual estimates of emissions and removals for forest management until 2020 for the above- and below-ground biomass carbon pools.⁷ To calculate the FMRL, the emissions and removals estimated using the models for the time series 2000–2020 were calibrated or adjusted using historical data from the country in question for the period 2000–2008.

37. The G4M model referred to in paragraph 36 above relies on spatial data and has used European-wide forestry maps and data sources. In some cases, the inaccuracy of these European maps compared with a national-level map can be around 10 to 20 per cent, mainly due to the degree of forest cover and errors in classification. In response to comments of the ERT during the TA, and in order to increase the consistency with data reported in GHG inventories, the EU re-ran the G4M model by adjusting the original spatial data to match the forest management area used in GHG inventories for all Parties where the area difference was greater than 4 per cent (all except Bulgaria, Estonia, Latvia, the Netherlands). Other forestry and forest management parameters (e.g. age-class structure, increment) were taken from national forest inventories, maps or country statistics.

⁵ The G4M model relies on spatial data. These data may or may not have been provided by Parties. Other forest and forest management parameters (e.g. age-class structure, increment and historical harvest) were taken from NFIs or other national statistics.

⁶ EFISCEN uses as data input the forest area data from national forest inventories 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 (stem wood volume, increment, age-class structure, as well as carbon in forest biomass and soil).

⁷ The G4M and EFISCEN models use outputs from GLOBIOM (the Global Biosphere Management Model) 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 for the projections as this was considered to be insignificant up to 2020. 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. The model uses as input data global macroeconomic variables (e.g. Gross Domestic Product (GDP), population growth), bioenergy projections from the PRIMES (country-specific for the European Union) and POLES models (for the rest of the world) and historical roundwood removals from FAOSTAT and other member States' data. These data are used to project the national level of total wood production and timber and land prices that will be used by the next models.

38. The extrapolation approach proposed by Cyprus and Malta uses net emission historical data (1990–2008), from submissions regarding the European Union GHG monitoring mechanism, to construct the FMRLs.

39. Revising its FMRL, Greece proposed a historical average entailing the use of average removals under the forest land remaining forest land category from the 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 yield the best estimate available to calculate its FMRL, as the G4M model could not project a credible FMRL due to the lack of sufficient data on age-class structure.

40. Three Parties (Belarus, Norway and the Russian Federation) proposed the use of a historical FMRL based on 1990 data. These Parties provided in their submissions, and during the TA, additional information resulting from a variety of approaches to calculate the FMRL (from projected data to the Intergovernmental Panel on Climate Change (IPCC) default methodologies) to allow a comparison with the value reported for 1990 in the latest GHG inventory.

41. Japan proposed an FMRL of zero, noting that this is equivalent to gross-net accounting using the narrow approach suggested by the IPCC in its 2003 *Good Practice Guidance for Land Use, Land-use Change and Forestry*. An explanation of this approach, as provided to the ERT during the TA, is given in Japan's TAR.

2. Transparency and consistency

42. In all cases, the ERTs note that the construction of the FMRLs presented during the TA was sufficiently transparent and thus fulfils most of the required assessment criteria outlined in the TA guidelines under decision 2/CMP.6. Approaches are generally consistent with the latest reporting, including for Parties proposing a historical value. Some discrepancies appear or projections are confounded in part by a lack of periodic forest inventory data and/or modelling capacity. These inconsistencies are highlighted and generally acknowledged both by the Party and by the ERTs. Parties show an understanding of the need for consistency between the GHG inventory and the FMRL and contemplate updating the FMRL as new data/information becomes available. (See recommendations in paras. 70–72 below.)

43. For example, for Parties using the JRC approach, 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 (such as with regard to forest management area, increment, rotation length, and age-class structure for some EU member States). During the TA, these Parties provided revised FMRL values obtained after new runs of their models. The changes made to FMRL values, following the initial recommendations made by the ERT, covered the following:

(a) Consistency in the forest management area, by making forest management data used by EFISCEN consistent with data reported in 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-class structure data (Belgium);

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

(d) Corrected or updated harvest information. Mistakes were corrected (Belgium) or new country-specific historical harvest data were used (Hungary and Italy).

44. For the two EU member States using the extrapolation method, the ERTs consider this to be a consistent and transparent methodology to project net emissions since limited information is available.

E. Description of the construction of the reference levels

1. Area under forest management and the relationship of the forest land remaining forest land category with the forest management activity reported previously under the Convention and the Kyoto Protocol

45. In the construction of their FMRL, most Parties used the same area basis, and sometimes the same definition, as that reported as managed in the forest land remaining forest land category in their national GHG inventories. Most discrepancies between these two were clarified in the course of the TA. For example, the EU member States using the JRC approach corrected their data discrepancies (due to the use of different input areas for two models) by re-running the models and revising their FMRLs. Ukraine provided an interim revised estimate that addressed inconsistencies related to a previous exclusion of overripe and mature forests. Sometimes the areas under forest management in the FMRL submission are different from those reported in NIR because of the use of a 50-year transition period, where land converted to forest land is moved into the forest land remaining forest land category after 50 years (this is a common feature of many reporting Parties).

46. In some cases, those Parties who did not elect forest management in the first commitment period (e.g. Australia and Iceland) identified the lands that will be subject to forest management in their FMRL submission. These were also compared by the ERTs with the area reported in NIRs as forest land remaining forest land. In these cases, extensive additional information was provided by the Parties in response to queries by ERTs, details of which are found in the individual TARs.

47. Parties also had to clarify how the area used in the construction of the FMRL relates to the area accounted for as subject to deforestation and afforestation or reforestation activities under Article 3, paragraph 3, of the Kyoto Protocol. As noted by ERTs in several instances, the exclusion or inclusion of these areas resulted in conservative assumptions. Still, the ERTs recommend distinguishing these Article 3, paragraph 3, lands from the forest management lands in the future.

48. In some cases, discrepancies remain however, and these are identified in the individual TARs.

49. Australia adopted a narrow approach to define the area under forest management, which corresponds to about 10 per cent of the total forest area reported in the NIR. While the area of multiple-use forests and pre-1990 plantations will remain constant in the reporting period, the total forest management area is expected to increase over time as new areas of private native forests are harvested. Australia acknowledged that the national inventory methods and the data used in the forest land remaining forest land category should be updated to reflect the approach adopted for the purpose of developing the FMRL; that is, that the information in future NIRs will be fully comparable with the forest sub-categories adopted in the FMRL submission.

50. New Zealand indicated that, consistent with the flexible land use rule, it is proposing under the Ad Hoc Working Group on Further Commitments for Annex I Parties under the Kyoto Protocol, its projected harvest includes activities to harvest pre-1990 forests in its FMRL, which result in land-use change for that particular location (deforestation) where an equivalent forest is established elsewhere. New Zealand indicated that an adjustment to the FMRL would be applied if the flexible land-use rule, currently under negotiation, is not

agreed upon. (New Zealand has provided the ERT with the amount of emissions included in its FMRL that result from the harvesting of pre-1990 planted forests that are subject to land-use change and replanting elsewhere.)

51. As a consequence of using the narrow approach, the area of forest management for Japan will increase over time as the specific practices are implemented in new areas, and new areas are identified by the sampling approach. Forest land accounted for using the narrow approach, other forest land remaining forest land (i.e. not accounted for using the narrow approach) and forest land accounted for under Article 3, paragraph 3, of the Kyoto Protocol make up the total area of forest land in Japan.

2. Forest characteristics

52. Forests referred to in the submissions present a large range of ecosystems and are subject to various regimes. Increments are dependent on tree species, forest characteristics, past and present forest management as well as climatic and environmental conditions. The rotation lengths also vary with tree species, legal framework, intended timber use, etc.

3. Historical and assumed harvesting rates

53. Many Parties assume the future rate of harvest to be consistent with recent levels given the lack of policies in place as at December 2009. For example, Canada provided projections where the harvesting rate for the period 2013–2020 is equal to the average of the harvesting data for the period 1990–2009; Iceland chose the current harvest rate of 2010 as the ‘business as usual’ scenario.

54. Based on macroeconomic drivers (e.g. GDP, population), timber price scenarios, growing stock and other variables, future harvest demand (2013–2020) is projected to be higher than the historical harvest rate in several cases. For example, the EU member States using the common approach project an 8 per cent increase in future harvest demand; in Australia, the volume of harvest is predicted to increase in the period 2013–2020 by 7 per cent in multiple-use forests and by 4 per cent in private harvested native forests, as compared with the period 2000–2009; in Austria, the harvesting rate projection is expected to exceed the value of the increment, which explains the reduction of the forest as a net sink from the current -7.3 Mt CO₂ eq to the level submitted as the reference level, that is, -2.12 Mt CO₂ eq; Switzerland’s FMRL assumes an increase of 25 per cent in energy costs and one of 35 per cent in harvested trees.

55. Possible inconsistencies in calculating the harvesting rate are noted by the ERTs. In the case of New Zealand, for example, the ERT notes that both the underestimation of harvested areas and the high share of forest areas of over 32 years of age among those projected as harvested, for 2009–2011, determined a higher availability of harvestable area at maturity for 2012–2020 and therefore a potential overestimation of emissions included in the FMRL.

56. Most Parties proposing 1990 as their FMRLs used the 1990 historical harvesting rate reported in the latest NIR; no information on projected harvesting rates was provided.

4. Harvested wood products

57. Many Parties presented estimates of the contribution of HWP to the FMRL on the three-time constant basis set out in document FCCC/KP/AWG/2010/18/Add.1, chapter II, annex I, paragraph 27, with annual production data, specific half-lives for product types, the application of the first-order decay function IPCC 2006GL equation 12.1 with default half-lives of two 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. Parties also presented alongside these estimates, values for the contribution of HWP assuming

instantaneous oxidation. Most estimates are since 1990, but a few Parties (Canada and Australia for information purposes) also provided calculations of the HWP pool starting in 1900. While the HWP estimate of the EU does include exports.

58. Other Parties did not include HWP in the submission or just assumed that instantaneous oxidation occurred (see table 1 above). Two Parties (the Russian Federation and Switzerland) included HWP in their submissions for information purposes only, it was not used in the calculation of their FMRLs.

59. The Russian Federation provides an estimate of the carbon budget of managed forest land in 1990 with the HWP pool, which includes emissions from products produced and consumed within the country, based on national data on domestic production and export of wood products. Additional information on how the production of HWP relates to domestic harvest (which is the main component for estimating losses in carbon pools) would significantly increase transparency.

60. Switzerland provides estimates of the HWP since 1900 using an IPCC tier 2 country-specific method with annual production data and specific half-lives for different uses of wood, with instantaneous oxidation assumed for wood in solid waste disposal sites, and not including exports.

61. The ERTs recommend a technical adjustment to the FMRLs when final agreement on HWP estimation is obtained by Parties.

5. Disturbances in the context of force majeure

62. Most Parties did not consider disturbances in the context of force majeure explicitly in the construction of their FMRLs, often, they explained, because of the lack of a definition for such events. Most Parties also noted the low frequency of such events. The effect of past disturbances is incorporated in the FMRL through the methodologies used.

63. Australia presented FMRLs for a range of possible scenarios related to disturbances in the context of force majeure, based on data from wild-fires in multiple-use forests between 1990 and 2009. Australia also included foregone removals, that is, the expected loss of removals that may occur because of the excision of emissions and removals on land that has been affected by fire under force majeure provisions. The ERT suggests that Australia either ignores the foregone removals at this stage but includes this issue in a future technical correction to the FMRL once the exact area affected is identified, or revises its FMRL values and provides a future technical correction to the FMRL based on observed data of fires in the reporting period.

64. Canada explained that its FMRL includes a constant 'background' level of natural disturbances consisting of wild-fires only, and noted that the effect of this background level of wild-fires would cancel out when comparing the FMRL with future reporting. Projections for 2013–2020 also include large delayed emissions from all natural disturbances that occurred during the period 1990–2009. During the TA, Canada clarified that no additional area is assumed to be affected by insects for the period 2010–2020 and stated that, due to the complex impact of disturbances on the dynamics of emissions and removals, it is not possible to reconstruct a time series starting from 1990, which may be meaningfully compared with the proposed FMRL. More detailed information is provided in Canada's TAR.

65. For those EU member States using the JRC approach, the application of the post adjustment meant to ensure consistency between historical net emission rates and the projections seems not to take into account the extreme fluctuation in the data for some Parties. This fluctuation could be due to exceptional events or the quality of the data available for periods of time. The ERT recommends that historical trends used in the

calibration exclude outliers from Parties' data when these are due to extreme events. The ERT notes that depending on the decision of the CMP on the treatment of disturbances, Parties should make technical corrections to ensure consistency between their FMRLs and the accounting rules if necessary, and that the FMRL of the EU should be adjusted accordingly.

66. In the Russian Federation, the contribution to the total CO₂ emissions from destructive fires and other reasons for the mortality of tree stands was not considered to be a year with disturbances over the average level according to the land area and volume of trees burned (the estimate includes both direct CO₂ emissions from fires and indirect post-fire emissions during consecutive years). Owing to national circumstances and the approach used, the estimated CO₂ emissions from destructive fires and other reasons for the mortality of trees in the base year is relatively high compared with data from national GHG inventories of other Annex I Parties. Direct CO₂ emissions from forest fires in 1990 comprised only approximately 3.9 per cent of the total national emissions in the base year, which is comparable with some other Annex I Parties.

67. Forest fires are also the main natural disturbance to forest management for several Parties. In the case of Portugal, fires are directly related to seasonal droughts. Annual burning rates are highly variable, and the contribution of forest fires to emission figures is significant in some years. Thus, the reference level scenario of 1.357 Mt CO₂ eq for forest fires was constructed by averaging the past values reported in annual GHG inventories, excluding the two highest years (2003 and 2005) and the two lowest (2007 and 2008).

68. For Switzerland, the effects of disturbances from two major storms are part of the boundary conditions for projecting forest carbon stocks. The exceptional harvesting amounts in these years, however, are not included in the projected future harvest amounts since this would lead to an overestimation of harvest levels.

6. Factoring out

69. Parties did not explicitly consider factoring out in their FMRLs. The models used to construct the FMRLs generally assume that there is no effect from elevated CO₂. The ERTs note that the use of a projected FMRL means that removals resulting from elevated CO₂ concentrations above the pre-industrial level and indirect nitrogen deposition will be factored out when subtracting the FMRL from net emissions or removals that occur during the commitment period. Similarly, the dynamic effects of differing age-class structures across the forests resulting from past activities and practices and natural disturbances are included in both the construction of the FMRL and the estimation of net emissions during the reporting period.

70. In the case of historical FMRLs, the ERTs note that, given the present state of scientific knowledge, the effects of elevated CO₂ concentrations and indirect nitrogen deposition are considered to be approximately the same in the FMRL and in the commitment period estimates, and therefore they can be assumed to factor out. The dynamic age-class effects will remain over any given commitment period but may eventually be removed from accounting by being cancelled out over successive commitment periods.

71. The Swiss submission provides scientific evidence that the effects of elevated CO₂ are insignificant for Switzerland, and that elevated nitrogen deposition may decrease growth.

F. Policies included

72. In their submissions, most Parties elaborated on the policies and measures implemented by 2009 that are included in the FMRL. These generally aim to guarantee the stability of forest cover and maintain the productivity, regeneration capacity and vitality of forests.

73. Overall, the 'business as usual' scenario applied by Parties proposing projected FMRLs assumes that policies in place as of December 2009 will remain constant for the 2013–2020 period. These are mainly reflected in the projections for harvesting rates. New or changed policies adopted and implemented after December 2009 have not been taken into account.

74. A few Parties also clarified the effects of policies related to biofuel or the use of biomass as a renewable source in the calculation of their FMRLs.

75. Parties proposing historical FMRLs based on 1990 do not take into account policies and measures since that year.

III. Conclusions and recommendations

76. The ERTs note that FMRLs have been calculated and reported on a transparent basis. Some discrepancies found in the process of the TA were in many cases promptly addressed, including through a re-run of the models. As a result, several Parties have already revised their FMRLs, and others have expressed their intention to do so in the near future.

77. There are, however, some consistency issues that need to be addressed. Often these are related to the pools included, or to the comparability of areas or data considered in the FMRL or used as input into the models used to construct it, and that reported in the GHG inventories. Where this is the case, the ERTs make specific recommendations on how the problem could be addressed.

78. General recommendations by the ERTs include the following:

(a) Technical corrections should be made as soon as new estimates for pools, gases and/or forest areas are available, or when future recalculations of the time series of the forest management area are undertaken;

(b) Technical corrections should be applied when pools not included in the construction of the FMRL become a source in the future;

(c) Technical corrections will be needed when a decision on the treatment of natural disturbances is made; the corrections will have to address the incorporation of extreme events or disturbances in the construction of the FMRL;

(d) Parties should provide a technical adjustment for the HWP component of their FMRL, if needed, when final agreement on HWP estimation is arrived at;

(e) Consistency between the forest land remaining forest land category area reported in the GHG inventories and the data used for the construction of the FMRL data should be maintained.

79. Some findings that should or could be considered by Parties in the context of their national circumstances include the following:

(a) For the EU, the ERT recommends a first update to the FMRL submission on the basis of consistency with individual member States' FMRLs and one to the sum of them

in the form of the FMRL of the EU, and to ensure that its FMRL is always consistent with any changes or updates to each member State's FMRL;

(b) For EU Parties following a common approach, historical trends used in calibration in the JRC approach should be consistent with the approach to disturbances, once agreed, and a technical correction applied if necessary. The FMRL of the European Union should be adjusted accordingly;

(c) The ERT further recommends that EU member states clarify further how policies and measures enacted at the EU level apply directly to individual Parties and how this is then incorporated into their FMRLs;

(d) Regarding Australia's FMRL, the ERT notes that the estimation of the 'foregone removals' added to the FMRL values is based on a number of assumptions difficult to assess at this stage. For this reason, the ERT recommends that Australia either ignore the foregone removals at this stage but include this issue in a future technical correction to the FMRL once the exact area of land burned is identified, or, alternatively, provide a future technical correction to the FMRL based on observed data of fires in the reporting period. The ERT also recommends that Australia provide additional information to justify the high emissions included in private harvest native forests, including information on the forest types and management involved in the harvest of this sub-category and a quantification of the sink due to the re-growth in the areas of private native forests harvested since 1990. Australia has indicated that it will present this data when it provides a revised submission;

(e) In the case of France, the ERT notes that a technical correction may be needed when improved methodologies and more accurate data become available for the overseas territories, since the assumption made by France of equilibrium of the carbon stocks in the second commitment period for these territories (in particular French Guiana) is not fully consistent with previous reporting for all years in the historical time series. In addition, the ERT recommends that France clarify the reasons for the considerable difference between the projected and the reported forest management data and that it ensures a consistent use of harvesting rates, since the proposed FMRL is not consistent in itself and the scenario used is not the 'business as usual' scenario;

(f) Regarding Germany's FMRL, the ERT notes that the documentation and explanation of the predicted harvesting rates from the model used (WEHAM) are insufficient to allow a thorough assessment of the results. The ERT therefore recommends that Germany provide further information in any revised submission on the calibration and validation of the model and on the assumptions applied for predicting harvesting rates in the period 2013–2020. The ERT also recommends Germany to include further information in any revised submission on the policies that were in place as at December 2009, which form the basis of the FMRL;

(g) Given Greece's change of approach, the ERT encourages Greece to resubmit an FMRL that is consistent with the 2011 NIR, and to document and resubmit information (including age-class structure, increment, rotation age, assumed harvesting rates and HWP) used in constructing the revised FMRL in accordance with the TA guidelines;

(h) In the case of Iceland, the ERT considers the current natural birch forest biomass projections to be underestimated and, therefore, not conservative. The ERT recognizes the lack of inventory information and modelling approaches to provide an accurate assessment of biomass increment for this forest category. Iceland has indicated that information that will be available for a technical correction of the FMRL will reflect more accurate and consistent estimates of the biomass stock changes for the natural birch forest category;

(i) Regarding New Zealand's FMRL, the ERT notes that a technical correction for the 'flexible land use rule' components of the FMRL will be made by New Zealand if these rules are not agreed for a second commitment period of the Kyoto Protocol (see paragraph 50 above). The ERT also notes that New Zealand's FMRL does not disaggregate gains and losses for biomass, unlike in its GHG inventory submissions, because the model used (FOLPI) is not able to provide this data. The ERT considers that this is a weakness in the FMRL and encourages New Zealand to make efforts to disaggregate gains and losses. The ERT also recommends that the Party provides further information on how forest owners will be able to move from historical or current harvesting practice to the longer rotation length projected in the FOLPI model. The ERT notes that the difference in both harvested areas⁸ and harvesting age as calculated by FOLPI vis-à-vis their corresponding observed data could be explained in more detail, and encourages New Zealand to compare the results provided in its submission with a re-run of the FOLPI model in which the harvesting of overmature forests (over 32 years of age) is constrained, and to modify its FMRL accordingly if necessary;

(j) In the case of the Russian Federation, the ERT recognized inconsistencies between the FMRL proposed in the submission and the corresponding reporting under the Convention and the Kyoto Protocol (2011 NIR and common reporting format tables). These inconsistencies were to do with the treatment of the estimate of the shrub land area and the estimate of non-CO₂ emissions from forest fires. To address these inconsistencies, the Russian Federation provided a recalculated estimate of the FMRL, which was found to be consistent with the forest management estimate for 1990 contained in its 2011 NIR. The ERT therefore recommends that the Russian Federation revisit the calculations of the submitted FMRL and that this revised estimate become its proposed reference level. The ERT also recommends that the Russian Federation continue its work on HWP and provide a revised estimate of the FMRL, including the HWP pool as necessary, once the methodology has been agreed internationally;

(k) Regarding Slovakia's FMRL, the ERT recommends that more information be provided to support the projected impact of forest policy on the projection of the harvesting rate, along with an explanation of the policy elements facilitating the increase in the harvesting rate and how this is linked to the forest health problem. The ERT also recommends Slovakia assess whether the forest health problem is a temporary disturbance that lead to a temporary increase in harvest that does not correspond to the normal forest harvesting rate driven by forest management and wood demand;

(l) In the case of Ukraine, the ERT welcomes research undertaken and encourages Ukraine to complete this research and produce a revised estimate that is fully internally consistent and consistent with its GHG inventory, proposing a technical correction when this has been done. If this were not possible, or in the meantime, one other option suggested by the ERT is to use an average value of biomass increment, suitable for the entire area under forest management for 1990, derived by averaging values reported by comparable countries with similar climate conditions and forest types, using the whole forest area reported for 1990 in the forest land remaining forest land category in their 2011 GHG inventories.

⁸ The FOLPI harvested area is 30 per cent and 24 per cent lower than observed for 2009 and 2010 respectively.

Annex

Documents and information used during the technical assessments

A. Reference documents

The following reference documents are included on the UNFCCC website:

National inventory reports submitted in 2011, including common reporting formats and supplementary information. Available at <<http://unfccc.int/5888.php>>.

National inventory reports submitted in 2010, including common reporting formats and supplementary information. Available at <<http://unfccc.int/5270.php>>.

Submissions by Parties of their forest management reference levels in accordance with decision 2/CMP.16. Available at <<http://unfccc.int/5896.php>>.

Fifth national communications of Parties. Available at <<http://unfccc.int/4903.php>>.

Technical assessment reports for individual Parties. Available at <<http://unfccc.int/5896.php>>.

B. Additional information provided by individual Parties

Any supplementary information provided by a Party is reproduced in the annex to the relevant technical assessment report.
