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Report of the technical assessment of the forest management reference level submission of the United Kingdom of Great Britain and Northern Ireland submitted in 2011

Contents

I. Introduction and summary

A. Overview

1. This report covers the technical assessment (TA) of the submission of the United Kingdom of Great Britain and Northern Ireland on 8 April 2011 on its forest management reference level (FMRL) in accordance with decision 2/CMP.6. 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 (LULUCF) experts from the UNFCCC roster of experts: Mr. Aquiles Neuenschwander (Chile), Ms. Oksana Butrim (Ukraine), Mr. Mamadou Khouma (Senegal), Mr. Kyeong-hak Lee (Republic of Korea), Mr. Doru Irimie (Romania) and Ms. Anke Benndorf (Germany). Mr. Neuenschwander and Ms. Butrim 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 Government of the United Kingdom, which provided comments that were considered and incorporated, as appropriate, into this final version of the report.

B. Proposed reference level

3. The United Kingdom proposed an FMRL of –8.268 million tonnes of carbon dioxide equivalent (Mt CO_2 eq) per year. This consists of net emissions of –3.442 Mt CO_2 eq per year assuming instantaneous oxidation of harvested wood products (HWP) plus net removals of –4.826 Mt CO_2 eq per year in HWP.

II. General description of the reference level

A. Overview

4. The FMRL of the United Kingdom was constructed to reflect the expected level of emissions and removals in forest management areas reported under Article 3, paragraph 4, of the Kyoto Protocol during the period 2013–2020 under a 'business as usual' scenario with regard to forest policies implemented after mid-2009. The FMRL projections are based on the methodology used for the greenhouse gas (GHG) inventories in the period 1990–2008 (using the C-Flow carbon accounting model).

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

5. The United Kingdom currently uses a carbon accounting model, C-Flow, driven by historical planting data, to estimate forest carbon stock changes for GHG inventories. In the model, standard management scenarios are assumed for coniferous and broadleaf woodland. Regular thinning was also assumed, with harvesting occurring at the time of maximum increment based on yield tables, followed by restocking with the same woodland

type. Emissions from wildfires were also included, and it was assumed, based on the country's experience, that wildfires do not result in a permanent loss of forest cover. Following wildfires, burnt areas will undergo replanting or natural regeneration. The projections for the FMRL take account of the inventory data, age-class structure and current management practices. No allowance was made for additional use of bioenergy. The HWP estimates were made using the first-order decay function approach and half-lives as proposed in document FCCC/KP/AWG/2010/18/Add.1 (chapter II, annex I, para. 27).

2. Age-class structure

6. The age-class distribution of forests was an input to the C-Flow model used to calculate the carbon stock dynamics in the pools considered by the model. Table 3 of the United Kingdom submission provides data on planting year classes for the United Kingdom forests as a whole. Figure 1 in the submission refers to conifer and broadleaf planting in forest management areas, and to areas planted from 1990 onward, which, when affecting non-forest land, should be considered as afforested/reforested lands. The C-Flow model is driven by the more detailed data available in the United Kingdom for planting of new forests established since 1921, as areas planted before 1921 are assumed to be in dynamic equilibrium. In response to the request by the expert review team (ERT) during the TA, the Party provided information on the age-class structure of both conifers and broadleaf species for 2010 and 2020 (see the table in the annex). The disaggregated age-class structure figures provided suggest an increase in harvesting rates by 2020, due to an increasing share of older age classes for both broadleaf species and conifers. The data provided in the table in the annex is an output from the C-Flow model in the form requested by the ERT; the input to C-Flow is the planting pattern shown in figure 1 of the United Kingdom's FMRL submission dated 2 March 2011. This is consistent with tables 2 and 3 in the submission, and with the table in the annex.

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

7. According to the United Kingdom's submission, C-Flow models the response of forests to management practices and therefore implicitly factors out the removals referred to in paragraph 1(h) of decision 16/CMP.1.

4. Other elements

Forest management activities already undertaken

8. In the United Kingdom, harvesting takes place through periodic thinning and felling at the time of maximum mean annual stem volume increment. When estimating removals, it was assumed that coniferous harvesting occurs at 59 years (average harvest age of Sitka spruce) and broadleaves harvesting occurs at 92 years (average harvest age of beech). No allowance was made in the projections for changes in management practice due, for example, to increased demand for bioenergy (which may imply shorter rotations) or wider application of continuous forest management (which may imply longer rotations).

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

9. A 'business as usual' policy scenario is assumed as the guiding principle for developing projections, as "standard management regimes are rolled forward and do not take account of any policies implemented after mid-2009" (page 12 of the FMRL submission).

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

10. The United Kingdom reported forest management activity in the 2008–2012 commitment period, and has indicated that projected estimates rely on the methodology used to estimate historical removals.

C. Pools and gases

1. Pools and gases included in the reference level

11. The FMRL includes living biomass, dead organic matter, mineral and organic soils and biomass burning. Fertilization and liming are reported as not occurring and the drainage of forest soil is not estimated. HWP estimates are added to the FMRL.

2. Consistency with inclusion of pools in the estimates

12. The inclusion of pools and gases in the FMRL is consistent with the coverage of pools and gases in the 2011 national inventory submission.

D. Approaches, methods and models used

1. Description

13. The current reporting methodology used by the United Kingdom in its NIRs is the basis for the FMRL estimates. Trends of growth and levels of production of the representative conifer and broadleaf species that are monitored in the national network of permanent plots are used to construct forest growth and yield models. These models were used as input to C-Flow to estimate the net change in living biomass, litter and soil. Standard management assumptions were made for both coniferous and broadleaf woodland, and their growth characteristics and harvesting age were assimilated to those of Sitka spruce and beech, respectively. As pre-1921 forest is assumed to be in dynamic equilibrium and not modelled explicitly, it was assumed that deforestation occurs on forest management land, whose applicable area was adjusted to reflect those losses. The resulting area was then multiplied by the implied factor of carbon stock changes per unit area to give the total carbon stock changes. As wildfires affect only a very small forest area, all emissions from wildfires are reported under the forest management activity. The projections up to 2020 assume a constant level of afforestation at the 2009 rate and a rate of deforestation developed using an autoregressive model fitted to the 1990–2009 data.

2. Transparency and consistency

14. The submission of the United Kingdom and the complementary information received in response to questions raised prior to and during the week of the TA provide comprehensive information with regard to the approaches, methods and models used to develop the FMRL. The modelling approach is consistent with the methodology used in the Party's latest NIRs.

E. Description of the construction of the reference levels

1. Area under forest management

15. The FMRL assumes a total forest area subject to forest management activity of 1,375 thousand hectares (kha) for the latest GHG inventory year (2009), which is projected to gradually decrease to 1,366 kha in 2020. The forest management area was compiled

using the record of afforestation since 1921, adjusted to take account of deforestation since 1990. The area of about 1,182 kha of forests established before 1921, assumed in the current GHG inventory to have overall zero net carbon stock change, is not included under forest management. The ERT notes that following recommendations from a previous expert review (see document FCCC/ARR/2010/GBR, para. 75), and as indicated by the additional information presented by the Party during the TA, the United Kingdom is undertaking a review of assumptions underlying LULUCF projections as a whole, including the assumption that carbon pools associated with pre-1921 forests are in dynamic equilibrium. As indicated by the Party, these results should start to become available in mid-2011.

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

16. The forest management area considered by the United Kingdom in both the KP-LULUCF tables and the FMRL submission is the area converted to forest land between 1921 and 1989, from which losses due to deforestation from 1990 to 2008 are subtracted, giving a total of 1,375 kha in 2009. The remaining 1,182 kha is forest existing before 1921, which is assumed to be in long-term dynamic equilibrium (see para. 15 above) and consequently not included in the estimation of the FMRL. A new reporting structure was introduced in the 2009 inventory (applied for the time series 1990–2009), which assumes a 20-year period of transition between land converted to forest land and forest land remaining forest land. These, together with the decreasing rate of afforestation after 1990, and the current higher rate of afforestation compared with deforestation, explain the different figures and trends between the forest land remaining forest land area and the area under forest management.

3. Forest characteristics

17. Most of the forests in the United Kingdom are conifer and broadleaf plantations established in the past 150 years, with a peak in the mid-twentieth century. As the average rotation considered in the carbon stock change estimates is 59 years for Sitka spruce and 92 years for beech, and as the approximate ratio of conifers to broadleaves is about 3:1, many of the established forests have already been restocked. Increment and harvesting figures presented in table 4 of the submission show relatively stable figures from 1990 to 2010, with harvesting rates about half the annual increment. Increment figures are also projected to remain stable from 2010 to 2020.

4. Historical and assumed harvesting rates

18. Total figures of wood harvest reported to the Forestry Commission presented in table 4 of the submission range from 8.0 million cubic metres (m^3) in 1990 to 10.5 million m^3 in 2010 (including the bark). The projected figures of HWP presented in table 5 of the submission increase from 7.359 million m^3 in 1990 to 14.781 million m^3 in 2010, and up to 18.307 million m^3 in 2020. The differences between the two sources with regard to the harvesting figures in 2010 were explained in the additional information provided by the Party. The total figures for wood harvest provided in table 4 and those in table 5 are based on different values. The values in table 4 are for individual years, whereas the values in table 5 are averages for five-year periods (quinquenniums), with the central year quoted for the period. Furthermore, the values in table 5 are expressed in cubic metres of felled volume, whereas the values in table 4 are expressed in cubic metres of standing volume (i.e. the volume standing before it was harvested, therefore including stumps and other elements of conversion loss). In addition, the data in table 5 are fully comparable with the GHG inventory estimates, whereas the table 4 data result from surveys of United Kingdom wood processors and are best regarded only as a cross-check. Data provided by the Party show

that when reduced to the same basis the estimates agree within 6 per cent or better for historical quinquenniums. There is a 24 per cent difference for 2010, for which the quinquennium is not yet complete. The ERT recommends that the United Kingdom review these differences as part of the ongoing development work and make a technical correction to the HWP estimates if necessary.

5. Harvested wood products

19. The estimated annual change in HWP in the United Kingdom is 4.826 Mt CO_2 eq per year, representing the average of the total removal estimates for the years 2013–2020 in table 5 of the FMRL submission. The C-Flow model was used to calculate future harvesting rates, and the Party adopted a first-order decay function with default half-lives differentiated according to wood product. Table 5 also includes the amount of carbon assumed to be instantaneously oxidized, including wood for bioenergy use. Table 5 does not refer to HWP from forests established before 1921, which is consistent with the GHG inventory approach. The table does not include the HWP data for the period before 1990, which were taken into account in developing HWP projections. As explained in the submission, statistics for wood utilization are not available for the years before 1994, and therefore were extrapolated using the 1994–1998 values. In response to an inquiry from the ERT the Party provided details about the drivers used for the extrapolation. The ERT noted that the FMRL submission makes no reference to international statistics (e.g. United Nations Economic Commission for Europe, FAOSTAT database) that include information on HWP for European countries dating back to the 1960s. This is because these data do not distinguish between forest areas established pre- and post-1920, as required by C-Flow.

6. Disturbances in the context of force majeure

20. Force majeure disturbances in the United Kingdom may include weather-related damage, biotic damage and wildfires. There has been no major storm nor insect outbreak in the United Kingdom causing damage exceeding 2 million m^3 or 2,000 ha since 1990, and these factors are not included in the FMRL. Emissions from wildfires are estimated on the basis of a statistical model driven by forest fire data from 1990 to 2004, and are included in the FMRL.

7. Factoring out

21. The United Kingdom uses the C-Flow accounting model based on yield tables that implicitly assume constant weather and management conditions to estimate forest carbon stock changes for GHG inventories. Work has been undertaken to model the impact of climate change and other natural factors on the carbon balance in terrestrial ecosystems, and, to date, the results suggest that interactions between these factors are small and the effects of the environmental factors are additive.

F. Policies included

1. Description of policies

22. Policies are briefly presented in section 4 of the FMRL submission, and references to several regulations are also provided.

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

23. As indicated in the submission, current forest policies and standard management regimes form the basis of the projections for the period up to 2020, and the projection of the FMRL does not take into account changes to policies implemented after mid-2009.

III. Conclusions and recommendations

24. The United Kingdom has calculated projections (2013–2020) for an FMRL consistent with the methodology used for the current estimates of emissions and removals from the forest management activity. This report is based on the United Kingdom's submission and on complementary information provided in response to questions raised by the ERT prior to, during and following the TA. The reviewers presumed the methodological assumptions indicated by the Party and concentrated on assessing the methodology and data used in the construction of the FMRL proposed in relation to forest management estimates.

25. The ERT notes that the United Kingdom has responded to requests to provide the information needed to assess transparency and consistency and believes that the projections are consistent with the historical inventory data and with continuance of established policies without, for example, intensified bioenergy use. The ERT encourages the Party to complete the ongoing work referred to in paragraph 15 above, which will allow the dynamics in forest areas established before 1921 to be taken into account.

Annex

Documents and information used during the technical assessment

A. Reference documents

Submission of information on forest management reference levels by United Kingdom of Great Britain and Northern Ireland in accordance with Decision 2/CMP.6, 8 April 2011. Available at <http://unfccc.int/files/meetings/ad_hoc_working_groups/kp/application/pdf/uk_frml.pdf>.

Submission of information on forest management reference levels by Hungary and the European Commission on behalf of the European Union, 13 April 2011. Available at <http://unfccc.int/5896.php>.

National greenhouse gas inventory of United Kingdom of Great Britain and Northern Ireland submitted in 2010. Available at <http://unfccc.int/5270.php>.

National greenhouse gas inventory of United Kingdom of Great Britain and Northern Ireland submitted in 2011. Available at <http://unfccc.int/5888.php>.

FCCC/ARR/2010/GBR. Report of the individual review of the annual submission of the United Kingdom of Great Britain and Northern Ireland submitted in 2010. Available at <http://unfccc.int/documentation/documents/advanced_search/items/3594.php?rec=j&priref=600006227#beg>.

B. Additional information provided by the Party[1]

Age class data projected for 2010 and 2020 provided by the Party.

Age class data consistent with the FMRL is implicit in the planting patterns indicated in fig 1 of the UNITED KINGDOM's submission. We have projected out the information in the form requested for the base years of 2010 and 2020:

For 2010:

Age class	*0-20*	*21-40*	*41-60*	*61-80*	*81-100*	*>100*
Coniferous (kha)	148	587	489	0	0	0
Broadleaves (kha)	0	27	56	43	24	0
Total (kha)	148	615	544	43	24	0

For 2020:

Age class	*0-20*	*21-40*	*41-60*	*61-80*	*81-100*	*>100*
Coniferous (kha)	297	339	576	0	0	0
Broadleaves (kha)	19	16	36	52	31	0
Total (kha)	316	355	612	52	31	0

[1] Reproduced as received from the Party.