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Report of the technical assessment of the forest management reference level submission of Czech Republic 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 Czech Republic on its forest management reference level (FRML), submitted on 18 April 2011 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 experts from the UNFCCC roster of experts: Mr. Zhang Xiaoquan (China) and Mr. Richard Volz (Switzerland), Ms. Tuija Lapveteläinen (Finland), Mr. Hector Ginzo (Argentina), Mr. Sandro Federici (San Marino) and Mr. Justin Goodwin (United Kingdom of Great Britain and Northern Ireland). Mr. Zhang Xiaoquan and Mr. Richard Volz 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 Czech Republic, which provided comments that were considered and incorporated, as appropriate, into this final version of the report.

B. Proposed reference level

3. The Czech Republic, in its official FMRL submission, proposed an FMRL of –5.566 million tonnes of carbon dioxide equivalent (Mt CO_2 eq per year applying the first-order decay function from the Intergovernmental Panel on Climate Change (IPCC) *2006 IPCC Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the 2006 IPCC Guidelines) for harvested wood products (HWP) and –3.577 Mt CO_2 eq assuming instantaneous oxidation of HWP**.** The FMRL consists of net removals of –5.071 Mt CO_2 eq per year from living biomass, plus net emissions of 1.494 Mt CO_2 eq per year from non-biomass pools mainly caused by controlled burning and net accumulation of 1.989 Mt CO_2 eq in the HWP pool. The Czech Republic, responding to the draft TA report, submitted new data.[1] Net removals from living biomass changed to –4.191 Mt CO_2 eq per year, reducing the FMRL to –4.686 Mt CO_2 eq per year and to –2.697 Mt CO_2 eq per year assuming instantaneous oxidation of HWP**.**

4. The values of the FMRL and of the HWP pool in paragraph 3 above include a correction[2] to those values contained in the official FMRL submission by which the HWP account applying the first-order decay function changed from –1.999 to –1.989 Mt CO_2 eq per year in accordance with an official communication sent by the Party.

[1] See annex.

[2] The correction was required because in the model version used for the calculation of the HWP pool an equation related to non-coniferous industrial round wood was not applied correctly owing to a shifted cell in the calculation matrix.

II. General description of the reference level

A. Overview

5. The Czech Republic is one of the 15 member States of the European Union (EU) for which the Joint Research Centre (JRC) of the European Commission developed projections in collaboration with two EU modelling groups. The models, G4M (Global Forestry Model)[3] (from the International Institute for Applied Systems Analysis) and EFISCEN (European Forest Information Scenario Model)[4] (from the European Forest Institute), project annual estimates of emissions and removals for forest management until 2020 for the above- and below-ground biomass carbon pools. To estimate the FMRL, the emissions and removals estimated by the models for the time series 2000 to 2020 were calibrated/adjusted using historical data from the Party for the period 2000–2008.[5]

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 gases inventory submissions

6. The Czech national forest inventory (NFI) and forest statistics provide the historical data used for the Czech greenhouse gas (GHG) inventory and for the calculation of the FMRL. The historical data, including supplementary data for forest management under Article 3, paragraph 4, of the Kyoto Protocol for the year 2008, were used to calibrate the models. This ensures that historical data form the basis of expected emissions and removals in the future.

2. Age-class structure

7. Age-class structure modelled by EFISCEN show slightly less than 20 per cent for the age classes 41–60, 61–80 and 81–100 years with small changes during the period 2000 to 2020, the age class 1–20 years increases from 10 per cent to more than 20 per cent and the age class 21–40 years decreases from around 20 per cent to 15 per cent. Age classes older than 100 years contribute about 15 per cent with a slight decrease from 2000 to 2020. Age-class data from national sources showed similar distribution to that produced by EFISCEN with the exception of a higher percentage in the 1–20 years class.

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

8. This is achieved by the provisions of factoring out (see chapter II.E. 7).

[3] 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 NFIs or other country statistics.

[4] 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.

[5] 2008 forest management data are taken as provided by the Party in its 2010 greenhouse gas inventory submission.

4. Other elements

Forest management activities already undertaken

9. The Czech Republic indirectly takes into account forest management activities already undertaken through the use of the latest available forest time-series data on harvesting and increments from NFIs and national statistics. These data incorporate the impact of all the policies and measures that the Czech Republic has undertaken in relation to its forest management activities and the use of the age-class structure for projecting future trends. The Czech Republic's post-calibration process also ensures that the FMRL accurately reflects the forest management activities already undertaken.

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

10. The estimation of future harvest demand up to 2020 is based on macroeconomic drivers and the application of policies implemented in the EU member States by April 2009.

C. Pools and gases

1. Pools and gases included in the reference level

11. Above- and below-ground biomass pools, the HWP pool, CO_2 emissions from liming and GHG emissions from biomass burning have been included. CO_2 emissions from liming and GHG emissions from biomass burning for the period 2000–2008 are assumed to be constant over the second commitment period. Dead wood, litter and soil organic matter have been assumed in equilibrium, consistent with IPCC tier 1 practice.

2. Consistency with inclusion of pools in the estimates

12. The pools included in the FMRL are consistent with the 2008 GHG inventory submitted by the Czech Republic.

D. Approaches, methods and models used

1. Description

13. Model results (see para. 5 above) are adjusted in a post-calibration process. A constant offset is added for 2000–2020 based on the average historical data for the period 2000–2008. This ensures consistency with national historical data in terms of the absolute level of emissions and removals and coverage of pools and gases.

14. Future harvest demands under a 'business as usual' scenario was derived from macroeconomic drivers (gross domestic product (GDP), population) and policies enacted in the Czech Republic up to April 2009. This information is used as data input to the GLOBIOM (Global Biomass Optimization Model), which projects demand for timber. The demand for bioenergy is estimated using the EU model PRIMES.

15. The underlying methodological approach of these models could provide useful future trends for the Czech Republic. However, the quality of timber demand projections will be dependent on how well macroeconomic variables can predict timber demand for the Czech Republic.

16. Dead organic matter and soil organic matter pools, and emissions from liming and biomass burning, have been projected assuming constant net emissions/removals for the period 2009–2020, equivalent to the historical average net emissions/removals reported for

the period 2000–2008. This is not a conservative assumption for accounting a pool when stock changes are increasingly positive (i.e. net removals) or decreasingly negative (i.e. net emissions); in such cases trend affects whether the estimate is conservative or non-conservative.

17. Emissions from biomass burning amount to 1.490 Mt CO_2 eq per year in the period 2000–2009 and are mainly due to controlled burning. The expert review team (ERT) noted that emissions from controlled burning have been estimated by expert judgment and that these emissions have been annually revised in the GHG inventory submissions from 2007 to 2010. The ERT noted a significant increase of about 60 per cent from the 2007 to the 2008 submission but no suitable documentation explaining the increase. Following questions from the ERT, the Czech Republic provided additional information explaining the increase in GHG inventory submissions from 2008 to 2010. The ERT is also concerned that the currently increasing demand for bioenergy could have an effect on the emissions from controlled burning in the future.

2. Transparency and consistency

18. The Czech Republic's FMRL submission plus the replies received to questions posed during the TA are transparent. The models and methods are described in the submission and the sources of the main parameters and characteristics as used in the models are provided.

19. The main forest parameters and characteristics used by the models and the GHG inventory are provided in table 11 of the FMRL submission. The models and the GHG inventory do not consistently use the same parameters. This inconsistency is reflected as differences in levels of biomass in model predictions and data reported in the GHG inventory. However, this should not have any impact on trends.

20. Data provided in the FMRL submission deviate notably between the EFISCEN and the G4M model and the resulting data from both models differ from the historical data in the GHG inventory. Following questions from the ERT, the models parameters were examined by national experts and the modelers from JRC and corrected to match the data used for the GHG inventory. The Czech Republic submitted new data based on the new run of the models which agree better with the historical data. The estimated trends of the two models show the same direction but differ considerably in magnitude. This is explained by the fact that G4M is mainly driven by economic factors whereas EFISCEN is driven by silvicultural parameters. The estimates are highly sensitive to harvesting rates; a change of +10 per cent or –10 per cent in harvesting rates could result in different values ranging from –82 to –4.610 Mt CO_2 eq per year in the average of the period 2013–2020 (HWP not included).

E. Description of the construction of the reference levels

1. Area under forest management

21. In the FMRL submission, the forestry management area used by G4M differed by more than 10 per cent from that shown in the GHG inventory. The area used by the EFISCEN model agreed well with the GHG inventory. Following questions from the ERT, the same initial forestry management area as that in 2011 GHG inventory submission was used for the new run of the models and the Party submitted new area data. The two models use the same deforestation rate as that estimated by the G4M model.

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

22. In the 2010 GHG inventory submission, the area under forest management is identical to the area of forest land remaining forest land. The Czech Republic considers the entire forest area as managed and includes it under forest management in the FMRL. The projected deforestation area up to 2020 is distinctly smaller than 1 per cent of the entire forest area.

3. Forest characteristics

23. The Czech forests consist of 74.4 per cent coniferous trees. The share of deciduous trees has increased since 1990 by 3.5 per cent. The main species are spruce, pine, beech and oak. See also chapters II.B.2 (age-class structure) and II.E.4 (rotation length).

4. Historical and assumed harvesting rates

24. Five-year averages for 2000 and 2005 are provided as historical harvest data. Data for 2020 are estimated by applying the PRIMES and GLOBIOM models for bioenergy use and timber, respectively. The applied rotation lengths of the main tree species are between 110 and 130 years. Data between 2008 and 2020 are linearly interpolated. The assumed harvesting rate for 2013–2020 is 11 per cent higher than the five-year average of 2005.

5. Harvested wood products

25. The estimated annual accumulation of 1.989 Mt CO_2 eq per year in HWP pools included in Czech Republic's FMRL is estimated using the approach proposed 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, and application of the first-order decay function using equation 12.1 from the 2006 IPCC Guidelines 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. United Nations Economic Commission for Europe data are available starting from 1992. Historical data dating back to 1900 are taken into account and assumed to be constant to the value of the 1992–1996 average. The estimates include exports. Data calculated from 1990 to 2009 show an annual gain, increasing from 0.505 to 2.830 Mt CO_2 eq per year. The projected annual gain from 2010 to 2020 increases from 1.942 to 2.004 Mt CO_2 eq per year.

6. Disturbances in the context of force majeure

26. No emissions or removals have been taken out from historical data because of force majeure. The Party has reported historical data on disturbances. The post-calibration procedure described in paragraph 13 above automatically incorporates the average rate of past disturbances (for the period 2000–2008) into the projections. If any future threshold selection for force majeure indicates that an event in the period 2000–2008 has to be considered as force majeure, the impact of the event should be removed from the historical emissions /removals. The Czech Republic informed the ERT during the TA that the high losses in 2007 from living biomass and from controlled burning were caused by a windstorm. Its effect will have to be checked in order to ascertain whether it exceeds a defined threshold of force majeure.

7. Factoring out

27. Use of a projected reference level that includes age-class structure is considered to factor out dynamic age-class effects. With the present state of scientific knowledge, the

effects of elevated CO_2 concentrations and indirect nitrogen deposition occur in the reference level period and in the estimated period (i.e. the commitment period), and therefore they can be assumed to factor out.

F. Policies included

1. Description of policies

28. Current national and EU policies are reflected in the actual emissions and removals from forests.

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

29. Fitting model parameters to historical data, which embody implicitly the actual effects of the Czech Republic's forestry policy, and including GDP and population growth corresponds to 'business as usual'. No new specific country policies are included in the projection. Bioenergy demand is included from the baseline scenario of the EU energy system model PRIMES. The 2020 renewable target and the 20 per cent GHG reduction targets are not included in this baseline. It can be concluded that the policies and measures included in the FMRL submission are those implemented by April 2009, plus the legislative provisions adopted by April 2009 that are defined in such a way that there is almost no uncertainty regarding how they should be implemented in the future.

III. Conclusions and recommendations

30. The Czech Republic has submitted an FMRL using the common approach implemented by a team of research groups coordinated by the JRC. The method is transparent and can be used as a basis suitable for consideration by the Conference of the Parties. The ERT recommends that the Czech Republic propose technical corrections of the FMRL:

(a) With regard to including estimates for dead organic matter or other pools in the GHG inventory as recommended by the ERT reviewing the 2010 GHG inventory submission;

(b) In particular, a technical correction of the HWP component of the FMRL, which may be needed after final agreement on HWP is achieved for the second commitment period;

(c) If force majeure is to be included as a modality and the Party decides to apply it, especially if the effect of the windstorm of 2007 exceeds any fixed threshold.

Annex

Documents and information used during the technical assessment

A. Reference documents

Submission of information on forest management reference levels by the Czech Republic, 18 April 2011. Available at <http://unfccc.int/files/meetings/ad_hoc_working_groups/kp/application/pdf/awgkp_czech_republic_2011.pdf>.

National greenhouse gas inventory of the Czech Republic submitted in 2007. Available at <http://unfccc.int/3929.php>.

National greenhouse gas inventory of the Czech Republic submitted in 2008. Available at <http://unfccc.int/4303.php>.

National greenhouse gas inventory of the Czech Republic submitted in 2009. Available at <http://unfccc.int/4771.php>.

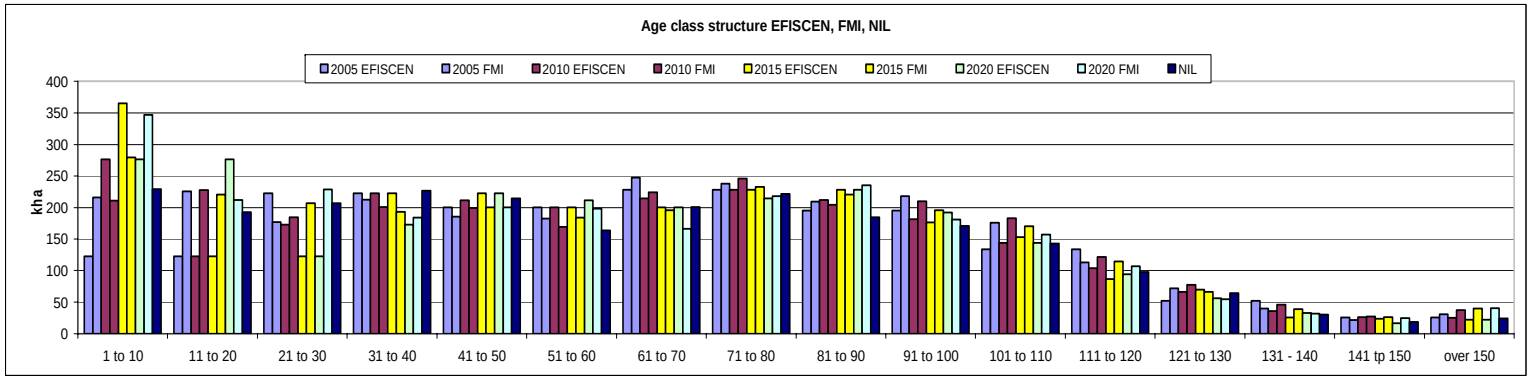
National greenhouse gas inventory of the Czech Republic submitted in 2010. Available at <http://unfccc.int/5270.php>.

National greenhouse gas inventory of the Czech Republic submitted in 2011. Available at <http://unfccc.int/5888.php>.

B. Additional information provided by the Party[1]

Cienciala, E., Exnerova, Z., Schelhaas, M.J., 2008. Development of forest carbon stock and wood production in the Czech Republic until 2060. Annals of Forest Science 65, 603.

[1] Reproduced as received from the Party.



Graph of age class structure comparing EFISCEN, NFI and data from cadastral forest management plans.

New data submitted

2. Model results:

			av. 2000-2008	2000	2005	2010	2015	2020	av. 2013-2020
Step 1: models' results (only biomass)		EFISCEN (1)	–2902	–3206	–2775	–2652	–1987	–1255	–1762
		G4M	–5164	–7401	–4375	–2729	–1584	–62	–1099
		Average of models	–4033	–5304	–3575	–2691	–1785	–659	–1431
Step 2: ex-post processing	Offset (2)	biomass	–2760						
		non–biomass pools and GHG sources	1494						
		total offset	–1266						
		Calibrated average of models (3)	–5300	–6570	–4841	–3957	–3052	–1925	–2697
Sensitivity analysis (4)		+10% harvest				–2791	–420	703	–82
		-10% harvest				–6018	–4936	–3828	–4610

(1) Efiscen does not estimate data for all countries for 2000 and 2005. When data were missing, backward extrapolation was applied as follow: sink in 2005 = sink in 2010 x ratio of harvest 2010/2005; this approach assumes that in the short term harvest is the main factor determining the sink. Estimates were extrapolated for the following countries: Bulgaria, Czech Republic, Estonia, Hungary, Italy, Latvia, Lithuania, Netherlands.

(2) The "offset" is distinguished between:

- Biomass: calculated as difference between [average of country's emissions and removals from biomass for the period 2000-2008] and [average of models' estimated emissions and removals from biomass for the period 2000-2008]

- Non-biomass pools and GHG sources: calculated as the sum of non-biomass pools and GHG sources as reported by the country for the period 2000-2008.

(3) The calibrated average of models, which is used for the setting of reference level, is obtained by adding the offset to the models' average.

(4) Preliminary simulation of the impact of +/-10% harvest as compared as BAU harvest on the emissions and removals from FM. Data are calibrated averages of models' results.

3. Area and increment:

Czech Republic	**AREA of FM in 2008**			
	from 2011 GHG inventories	used by models	difference % models vs. GHG inventories	**AREA of FM in 2020 used by models**

	area (kha)	source	G4M (6)	EFISCEN	G4M	EFISCEN	G4M (7)	EFISCEN (8)
	2563	(1)	2563	2563	0.0	0.0	2550	2556

(1): area of FM 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 (e.g. (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, from CRF table 5A (2011)

(6): Given the amount of work required 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, Luxembourg, 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

4. Increments as estimated by models (m^3 ha^{-1} yr^{-1}) according with the new run:

Year	2000	2005	2010	2015	2020
G4M	10.8	10.7	10.6	10.4	10.2
EFISCEN	-	-	10.6	10.4	10.2