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**Report of the technical assessment of the forest management  
reference level submission of Slovenia submitted in 2011**

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## **I. Introduction and summary**

### **A. Overview**

1. This report covers the technical assessment (TA) of the submission of Slovenia on its forest management reference level (FMRL), submitted on 15 April 2011 in accordance with decision 2/CMP.6. The TA took place (as a centralized activity) from 23 to 27 May 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. N. H. Ravindranath (India), Mr. Robert Waterworth (Australia), Mr. Walter Oyhantcabal (Uruguay), Ms. Naoko Tsukada (Japan), Mr. Lucio Santos (Colombia) and Ms. Marina Vitullo (Italy). Mr. N. H. Ravindranath and Mr. Robert Waterworth 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 Slovenia, which provided comments that were considered and incorporated, as appropriate, into this final version of the report.

### **B. Proposed reference level**

3. Slovenia proposed two FMRL levels for the period 2013–2020: one including harvested wood products (HWP) assuming first-order decay and another assuming instantaneous oxidation of HWP. The effect of force majeure events was not introduced into the projections.

4. The FMRL assuming instantaneous oxidation of HWP is proposed as an average for the period 2013–2020, and is calculated as a net sink of –3.033 million tonnes of carbon dioxide equivalent (Mt CO<sub>2</sub> eq). The FMRL assuming first-order decay of HWP is proposed as –3.171 Mt CO<sub>2</sub> eq. The inclusion of HWP increases the net removals by approximately 4.5 per cent. The FMRL assuming first-order decay of HWP is also developed on an annual basis.

## **II. General description of the reference level**

### **A. Overview**

5. Slovenia has elected forest management for reporting under Article 3, paragraph 4, of the Kyoto Protocol. For 2009, Slovenia reported net removals from forest management activities equal to –10.297 Mt CO<sub>2</sub> eq.

6. The FMRL was developed by projecting historical data on the area under forest management and the annual increment in the volume of wood, and by incorporating assumptions on harvesting rates from the 2007 National Forest Program. The data, assumptions and methods for calculation are well documented and the historical data are consistent with Slovenia’s national greenhouse gas (GHG) inventory, with the exception of the exclusion of some pools and GHG sources. It is assumed that the forest management area will remain constant. The annual volume increment is estimated to grow by 17 per cent between 2013 and 2020. This is consistent with the historical data provided by the

Slovenian Forestry Institute (SFI) and the Slovenia Forest Service (SFS). In addition, Slovenia assumes a rapid increase in the harvesting rates – from 49 per cent of the total increment in 2009 to 75 per cent as an annual average of the period 2013–2020. In response to the questions posed by the expert review team (ERT) on the validity of this increase, Slovenia provided additional information showing that the increase was the result of existing policies and a gradual increase in harvesting rates from 2011 to 2020 (see annex). The ERT notes Slovenia’s explanation and suggests that more detailed information on projected harvesting rates be included in any future submission.

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

**1. Historical data from greenhouse gas inventory submissions**

7. Slovenia’s national forest inventory and forest statistics provide the historical data used for the Party’s GHG inventory and for the calculation of the FMRL. The FMRL is consistent with the GHG inventory except for the differences noted in the section on pools and gases (see paras. 14–17 below). Slovenia’s FMRL submission presents historical data on areas and removals and emissions from forest management since 1990 on a five-yearly basis.

**2. Age-class structure**

8. The FMRL was constructed taking into account the age-class structure of Slovenian forests. The information was prepared by SFI and SFS, and includes age-class structure information disaggregated for eight types of forest land. Currently, more than 50 per cent of trees are in the 101–120 year class or older. This is significant given the average harvest cycle of 130–150 years used in Slovenia. At the other extreme, young trees account for a small proportion, and middle-age trees, which grow faster, represent about 47 per cent. With this age-class structure, Slovenia estimates that the annual increment in the volume of living biomass is expected to grow from an average of 6.96 m<sup>3</sup> ha<sup>-1</sup> for the period 2000–2007 to 8.14 m<sup>3</sup> ha<sup>-1</sup> for the period 2011–2020.

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

9. This is achieved by the provisions for factoring out (see para. 28 below).

**4. Other elements**

Forest management activities already undertaken

10. Forest management activities undertaken in Slovenia must be in accordance with the National Forest Program, with management plans developed through a participative process. Under Slovenian forest policy, allowable cuts for ten-year periods are established for every management plan in each region and unit. Forest owners have the right to cut up to this threshold in order to ensure sustainability. The ERT notes that a new forest plan is to be established in the near future for the period 2011–2020, and that this forest plan is not part of the ‘business as usual’ scenario.

11. The submission states that private owners would not accept felling less than 75 per cent of the allowable quantity. The ERT notes that the relatively high proportion of mature and old trees is consistent with the goal of increasing harvesting rates to rates similar to the annual increment.

12. Slovenia states that it has considered the forest management activities already undertaken. This was done on the basis of annual records of activities carried out by SFI and SFS. The ERT finds that the description provided is rather general and recommends that Slovenia increase transparency by further documenting what activities have already been undertaken.

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

13. The submission states that the projections represent continuity with the treatment of forest management in the first commitment period.

## **C. Pools and gases**

### **1. Pools and gases included in the reference level**

14. Slovenia included only two pools, above- and below-ground biomass, in the calculation of the FMRL, and it did not include any GHG sources.

### **2. Consistency with inclusion of pools in the estimates**

15. In Slovenia's national GHG inventory, removals were reported for above- and below-ground biomass and dead wood pools. Emissions are reported from biomass burning only. Slovenia's FMRL includes only above- and below-ground biomass pools and does not include emissions from biomass burning.

16. In response to the queries of the ERT regarding this inconsistency, Slovenia explained that the dead wood pools were excluded as they will not be a source (see annex). However, the ERT notes that this is not a conservative assumption when using a projected FMRL and may lead to bias. In particular, the exclusion of dead wood (which is an increasing sink in the GHG inventory), may represent an underestimation in the gains and consequently an underestimation of the net removals. The ERT therefore recommends that, to limit potential bias and to ensure consistency between the GHG inventory and the FMRL, the dead wood pools be included in the FMRL in the future.

17. Slovenia did not provide in the submission a clear explanation for the exclusion of GHG emissions from fertilization, drainage of soils, liming and biomass burning). In response to the queries of the ERT, Slovenia noted that drainage of soils and fertilization of forest soils and liming do not occur in the country. While the ERT notes that not including these emissions in the FMRL is conservative, it recommends that Slovenia maintains consistency by including emissions resulting from biomass burning in the calculation of the FMRL as a technical correction in the future.

## **D. Approaches, methods and models used**

### **1. Description**

18. The estimates are based on areas, tree growth and harvesting data gathered by SFI and SFS, adjusted through successive national forest inventories.

19. Methods used to estimate carbon stock changes are in line with the Intergovernmental Panel on Climate Change *Good Practice Guidance for Land Use, Land-Use Change and Forestry* (equations 3.2.2 and 3.2.3). Methods to estimate first-order decay of HWP follow the *2006 IPCC Guidelines for National Greenhouse Gas Inventories* (hereinafter referred to as the 2006 IPCC Guidelines), volume 4, chapter 12.

## **2. Transparency and consistency**

20. The submission is generally transparent. As expressed above, the ERT has concerns regarding the assumption made by Slovenia in relation to the projected average harvesting rate used in the calculation of the FMRL. Slovenia provided a response to the ERT showing that the rate of increase is the result of a continual increase in the harvesting rates rather than a drastic change (see annex).

21. The time series data used for the estimation of the FMRL are consistent with the GHG inventory but the reporting of pools and sources is not (see paras. 15 to 17 above).

## **E. Description of the construction of the reference level**

### **1. Area under forest management**

22. The FMRL assumes a total area under forest management of 1,186,104 ha. The submission presents historical data on areas under forest management since 1990 on a five-yearly basis. Complete time series for the area under forest management can be found in the GHG inventory. The ERT considers that the assumption that no further significant changes in the area under forest management is envisaged in the period 2013–2020 is consistent with the historical data. The ERT suggests that Slovenia provides data on an annual basis and not every five years.

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

23. Forest land remaining forest land reported under the Convention represent 1,243,426 ha (2011 national inventory report (NIR)), while areas under forest management represent 1,185,648 ha. As Slovenia reports that all its forests are managed and the forest definition is the same for the Convention and the Kyoto Protocol, the area under forest management should be equal to the area of forest land remaining forest land plus the land converted to forest land minus the area afforested under Article 3, paragraph 3, of the Kyoto Protocol. However, the ERT finds a discrepancy of 100,000 ha between the area calculated in such a way (1,298,011 ha) and the area reported as being under forest management in the FMRL submission (1,186,104 ha). In its 2011 NIR, Slovenia states that these data are not comparable because of methodological differences in data acquirement. The ERT raises the concern that the area value selected by Slovenia to calculate the FMRL might not be conservative, leading to underestimation of the FMRL. The ERT notes that it may be more conservative to use the higher area value. The ERT recommends that Slovenia further describe the reason for this discrepancy and that any technical issues in calculating the area under forest management be resolved in the near future.

### **3. Forest characteristics**

24. Age-class structure, increment and rotation length are presented with adequate detail for different forest types. Slovenian forests are characterized by long rotations and age-class structures with relatively few young trees and a significant presence of mature trees and old trees.

### **4. Historical and assumed harvesting rates**

25. The ERT notes that according to the latest reported data, historical harvesting rates are around 49 per cent of the increment. The FMRL submission assumes a significant increase of the harvesting rate of an annual average of 75 per cent of the increment for the period 2013–2020. The ERT notes that achieving this goal over the 2013–2020 period as an

average would require increasing from the lower historical levels (close to 49 per cent) to levels close to 100 per cent by 2020. In other words, the ERT notes that the Slovenian forestry sector should be prepared to almost double the harvesting rate and the amount of wood processed or exported (for HWP and energy) in the short term. This projected change looks ambitious and will require from the demand side the capacity to absorb the expected increase in supply of wood. On the supply side, the infrastructure to extract so much wood, even from the thousands of small properties of less than 2 ha, would need to expand. Based on the above-mentioned issues, the ERT requested Slovenia during the TA to provide further information on the policies which will drive the increase in harvesting rates projected in the submission. In response, Slovenia provided further information, including references to the European Union rural development programme and Government policy to support forest sector investment with a focus on wood products as a green product (see annex).

## **5. Harvested wood products**

26. The reference level for HWP was constructed using the 'business as usual' approach, taking national data on inflows in the period 2004–2009, with the exception of sawn wood and pulp. The methods used are those set out in the 2006 IPCC Guidelines, volume 4, chapter 12, and are appropriate. The current estimates do not include exports. Slovenia plans to adopt first-order decay functions with default half-lives of two years for paper and paperboard, 25 years for wood panels and 35 years for sawn wood.

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

27. The submission identifies major disturbances in the past due to biotic and abiotic factors and fires. Data are provided on the area of forests and volume of wood affected by disturbances. The ERT notes that the information presented seems to indicate that the identified events had little effect on the area of forest and its carbon stocks.

## **7. Factoring out**

28. Use of a projected reference level which 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<sub>2</sub> concentrations and indirect nitrogen deposition are considered to be approximately the same in the reference level and in the commitment period, and therefore they can be assumed to factor out.

# **F. Policies included**

## **1. Description of policies**

29. The main instrument of the forest policy of Slovenia is the National Forest Program, which was approved by the Parliament in 2007, and has never been amended. The ERT notes that every ten years this programme is revised through updated regional plans. The period for the establishment of the FMRL, 2013–2020, is covered by the regional plans to be approved for the period 2011–2020.

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

30. The original submission does not provide enough detail to assess how policies were taken into account in the construction of the FMRL. The ERT encouraged Slovenia to provide further details on how the implication of policies is considered in the construction of the FMRL. In response, Slovenia provided some additional information on these policies (see annex). However, given the importance of these policies in the construction of the

FMRL, the ERT recommends that Slovenia provide further information in order to increase transparency.

### III. Conclusions and recommendations

31. Slovenia has calculated an FMRL on a generally transparent basis, taking into account the requirements of decision 2/CMP.6.

32. In the course of the technical assessment, the ERT formulated some recommendations for the sake of consistency, conservativeness and completeness. The ERT recommends that in the future, as a technical correction, Slovenia:

- (a) Include the dead wood pool in the FMRL calculation;
- (b) Include non-CO<sub>2</sub> emissions from biomass burning in the FMRL calculation;
- (c) Explain more thoroughly the forest management policies and activities undertaken and planned for the period of the FMRL.

33. The ERT noted that Slovenia assumes a significant increase in the harvesting rate of an annual average of 75 per cent of the increment for the period 2013–2020, compared with historical data. Slovenia provided additional information showing that the increase is the result of ongoing increases in harvesting (see annex) and details of the policies leading to these rates (see annex). The ERT thanks Slovenia for this additional information and given the importance of these projections in determining the FMRL, recommends that this be included in any future submission.

34. The ERT also noted that there is a discrepancy (close to 100,000 ha) between the values for the area under forest management and the forest areas reported under the Convention. This discrepancy has technical causes identified by Slovenia, but may lead to an underestimation of the FMRL. The ERT suggests that Slovenia provide further information to show that this discrepancy does not lead to an overestimation of emissions in the FMRL.



## Annex

### Documents and information used during the technical assessment

#### A. Reference documents

Submission of information on forest management reference levels by Slovenia, 15 April 2011. Available at [http://unfccc.int/files/meetings/ad\\_hoc\\_working\\_groups/kp/application/pdf/awgkp\\_slovenia\\_2011.pdf](http://unfccc.int/files/meetings/ad_hoc_working_groups/kp/application/pdf/awgkp_slovenia_2011.pdf).

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

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

FCCC/ARR/2010/SVN. Report of the individual review of the annual submission of Slovenia submitted in 2010. Available at <http://unfccc.int/5687.php>.

Resolution on National Forest Program of Slovenia (2008). Forest Act of Slovenia (1996). Available at [http://www.mkgp.gov.si/fileadmin/mkgp.gov.si/pageuploads/GOZD/NFP\\_RS.pdf](http://www.mkgp.gov.si/fileadmin/mkgp.gov.si/pageuploads/GOZD/NFP_RS.pdf).

Boncina and Cavlovic (2009) Perspectives of forest management planning: Slovenian and Croatian experience. *Croatian Journal of Forest Engineer*. 30(1): pp.77–87.

#### B. Additional information provided by the Party<sup>1</sup>

##### 1. Pools and gasses reported

Slovenia generally agrees to include in the FMRL all those pools that are part of GHGI, especially dead wood and biomass burning, although it is difficult to predict their development in quantitative sense. On the other hand, we understand that underestimation of net removals that would be expected with exclusion of dead wood pool should not be a problem in the context of the UNFCCC commitments.

Drainage of soils and fertilisation of forests do not take place in Slovenia and have never been reported as carbon emission activities.

##### 2. Increase in harvest rates used in FMRL projection

In view of increasing transparency in relation to the projected average harvest rate used, we have examined development of the allowable cut, as determined in the past decade<sup>2</sup>. Table 1 shows that the allowable cut has been increasing by 4,3 percent annually, meaning that the projected harvesting rates actually mean a continuity in development rather than a drastic change, as might be understood from our submission document for FMRL of March 2011.

<sup>1</sup> Reproduced as submitted by the Party.

<sup>2</sup> Annual Reports on Forests by Slovenia Forest Service.

**Table 1:**

Development of annual allowable cut as determined in the forest management units (FMU) plans in the period 2001–2010

Year	Allowable cut (m <sup>3</sup> ) of management plans of FMU	Index of growth
2001	3.608.250	1,035
2002	3.792.732	1,051
2003	3.996.523	1,054
2004	4.162.662	1,042
2005	4.316.098	1,037
2006	4.516.993	1,047
2007	4.791.066	1,061
2008	4.930.176	1,029
2009	5.126.609	1,040
2010	5.310.952	1,036
Average	4.455.206	1,043

Targeting the Harvesting/Increment Ratio of 75 percent as stipulated in the National Forest Programme, the index of growth for projected allowable cut has been increased only slightly from 4,3 percent in the period 2001-2010, which can be considered as BAU scenario, to 4,8 percent in the period 2011-2020, as shown in Table 2. Projected removal by the living forest biomass pool would be only slightly greater than originally proposed.

**Table 2:**

Projected development of annual allowable cut in Slovenia in the period 2011-2020

Year	Projected allowable cut (m <sup>3</sup> )	Projected increment (m <sup>3</sup> )	Harvesting/Increment Ratio	Projected removal (tCO <sub>2</sub> )
2011	5.565.878	9.306.363	0,60	-4.698.050
2012	5.833.040	9.376.161	0,62	-4.450.160
2013	6.113.026	9.446.482	0,65	-4.186.821
2014	6.406.451	9.517.331	0,67	-3.907.265
2015	6.713.961	9.588.711	0,70	-3.610.686
2016	7.036.231	9.660.626	0,73	-3.296.240
2017	7.373.970	9.733.081	0,76	-2.963.043
2018	7.727.920	9.806.079	0,79	-2.610.167
2019	8.098.861	9.879.624	0,82	-2.236.639
2020	8.487.606	9.953.722	0,85	-1.841.441
Average 11-20	6.935.694	9.626.818	0,72	-3.081.538
Average 13-20	7.244.753	9.698.207	0,75	-3.380.051

### 3. Policies leading to increased harvesting rates

Based on the data presented in Tables 1 and 2, we cannot share the concern of the ERT that the value selected by Slovenia to calculate the FMRL might not be conservative, leading to underestimation of the FMRL. Nevertheless certain adjustment of the FMRL to the above figures would not be questionable.

Policies, which will drive the increase in harvest rate projected in the submission, are especially:

- Subsidising investments into forest infrastructure and machinery according to the EU rural development programme 2007–2013;

- Supporting investments into forest industry and establishing forest-wood chain is one of priorities of the Government;
- Wood is given priority in green public procurement policy.

Growing demand for wood is observed in Italy and especially in Austria reflecting in substantial increase of exports of round wood from Slovenia in these two EU countries.

Further details of how implication of policies is considered in the construction of the FMRL are mainly presented in Table 2. It can be seen that the growth of harvesting rate is projected to be gradual and will in the period 2013–2020 on average represent 75 percent of increment, following the guideline of the National Forest Programme of 2007.

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