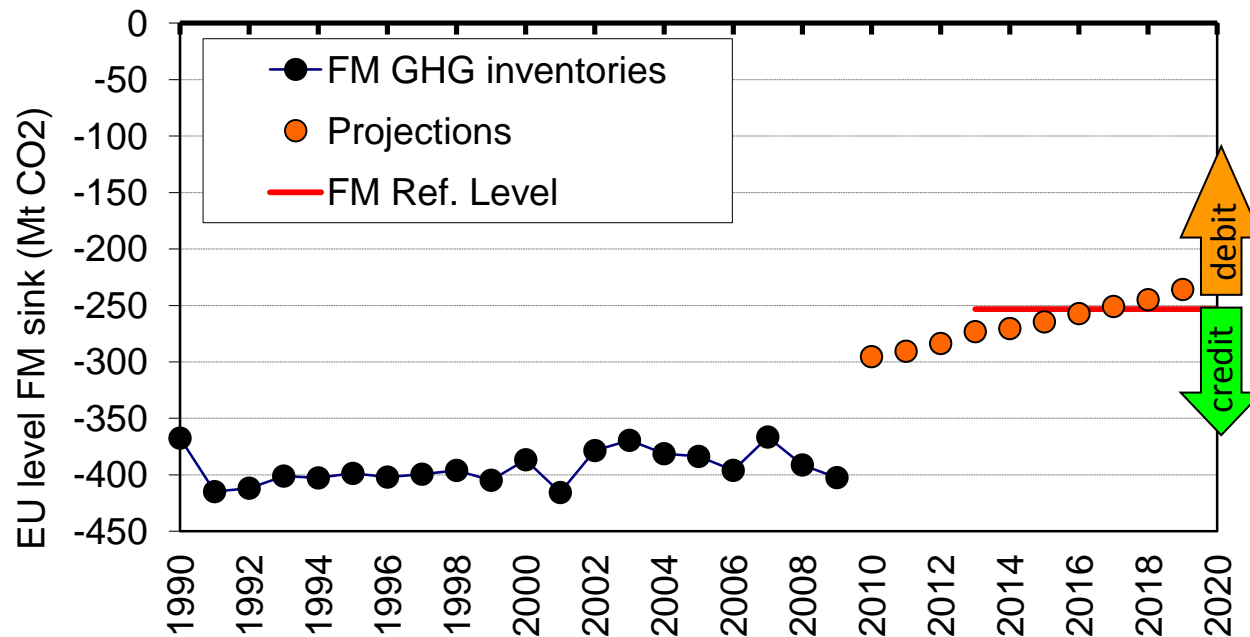


# Forest Management Reference Level (FMRL): methodological consistency and technical corrections

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The FMRL is a value of average annual net emissions and removals from FM in the 2nd CP, against which the net emissions and removals reported for FM during the 2nd CP will be compared for accounting purposes.



The guidance on how to construct the FMRL is provided by the Appendix II to the Decision 2/CMP.6 and is not repeated in the IPCC KP supplement.

This presentation covers:

- Short overview of approaches/methods used and elements considered for FMRL (this information provides the basis for assessing the methodological consistency)
- Methodological consistency related to the FMRL (Section 2.7.5)
  - Technical Corrections (Section 2.7.6)

## APPROACHES AND METHODS USED FOR FMRLs

38 Parties submitted FMRLs with following **approaches**:

- 1) FMRLs based on projections under a 'business as usual' (BAU) scenario. This includes two **methods**:
  - (a) model-based projected BAU, with country-specific methodology, or common methodological approach (JRC-IIASA-EFI).
  - (b) projections based on the elaboration (average/extrapolation) of historical data from GHG inventories, assumed as proxy for a BAU
- 2) Historical FMRL based on the single year 1990
- 3) FMRL equal to zero

## Modeling approaches used:

- **Forest growth models:** based on forest inventory data (or sometimes remote sensing data), simulate the dynamics of increments and the impact of harvest

NFI data by forest types:

- Forest area by age classes
- Volume
- Increment, etc.

Other data:

- Silvicultural treatments
- Natural disturbances
- Historical/future harvest rate



**MODEL**

C stock change in biomass,  
dead wood, litter and soil

- Age class distribution
- ...

- **IPCC gain-loss method** (based on historical data of forest characteristics + assumed future harvest rates)

## ELEMENTS CONSIDERED FOR FMRLs

- Pools and gases
- Area under Forest Management
- Historical data from greenhouse gas inventory
- Forest characteristics and related management
- Historical and assumed harvesting rates
- Harvested wood products
- Natural disturbances
- Factoring out
- Policies included

## METHODOLOGICAL CONSISTENCY

Consistency is a key principle in GHG inventories.

2006 IPCC Guidelines (GL): consistency means that an inventory should be internally consistent in all its elements over a period of years (*time-series consistency*), i.e. the same methodologies and consistent data sets used for all years. Under certain circumstances an inventory using different methodologies for different years can be considered to be consistent if it has been recalculated in a transparent manner, and if potential inconsistencies are minimized in accordance with 2006 IPCC GL and GPG-LULUCF.

2006 IPCC GL describes **situations in which time series consistency may not be achieved**, e.g.:

- (i) Recalculations due to methodological changes / refinements;
- *Methodological change*: a switch to a different tier (or to a different method, e.g. from Stock-Difference to Gain-Loss, or from inventory-based to process-based method), often driven by the development of new and different data sets.
  - *Methodological refinement*: same tier used, but different data source, model version or level of aggregation.
- Both methodological changes and refinements over time are an essential part of improving inventory quality.
- (i) Adding new categories (including new C pools and gases).



In the context of FMRL methodological consistency refers to the need of consistency, during the CP, between the **methodological elements** used in the construction of FMRL (as reported in the FMRL submission) and those used in the reporting of FM, i.e.:

- (i) *Method* used for FMRL (models or aver./extrap. of historical time series);
- (ii) *Historical data* used for FMRL, e.g. forest area, harvest, increment, age structure, forest characteristics and management, net emissions and related estimation parameters, etc.;
- (iii) Other elements used for FMRL, e.g.: pools and gases, treatment of HWP, natural disturbances, climate and other parameters used by models;

**A change in methodological elements used in the construction of FMRL triggers a methodological inconsistency, to be addressed through a **Technical Correction****

By contrast, a deviation in policy assumptions under business-as-usual scenario (as reported in the FMRL submission) from those assumed in constructing the FMRL *does not represent a methodological inconsistency* → no Technical Correction.

Policy assumptions include economic assumptions or responses (e.g. harvesting decisions), assumptions on future FM area, on future management of forest, on forest characteristics, on harvesting rates (including variations in harvesting rates as compared to historical period) or amounts, on HWP (including the assumptions about the quantities of HWPs produced in the major categories, i.e. sawnwood, panels, paper).

For projected FMRLs, it is *good practice*:

- To provide information on main factors generating the accounted quantity (FM - FMRL), e.g., that a higher (or lower) sink during the CP as compared to what assumed in the BAU FMRL is quantitatively consistent with the observed lower (or higher) harvest rate, and/or to provide evidence of other major factors involved. The aim of this information is to show that estimates in the 2nd CP can be explained as deviations in policy assumptions (e.g., harvest rate) compared to FMRL.
- To show that model-based calculations used for FMRL reproduce the data for FM or FL-FL for the historical period reported in the FMRL submission (i.e. period not affected by deviations from policy assumptions under BAU).

## FM area

In the event of change in FM area during the CP, it is *good practice* to document transparently that this is not a result of change in FM activity definition, but rather a result of newly implemented policies not included in the FMRL submission.

## C pools included

Once a pool has been included in the FMRL, for consistency reasons this pool is required to be reported and accounted also during the CP, irrespective of the pool being a sink or a source.

## TECHNICAL CORRECTIONS

If methodological inconsistency exists between the FMRL and the FM reporting during the CP, to ensure consistency, Parties are required to apply a Technical Correction.

The Technical Correction (TC) is a net value of emissions /removals, which is added at the time of accounting to the original FMRL to ensure that accounted emissions / removals will not reflect the impact of methodological inconsistencies

**Technical Correction =  $FMRL_{corr} - FMRL$**

## CHECK LIST TO DETECT METHODOLOGICAL INCONSISTENCIES AND NEED FOR TC

Criteria		Action
<b>1 The method used for GHG reporting of FM or FL-FL changed after the adoption of FMRL</b>		Calculate FMRL <sub>corr</sub> ensuring consistency between reported FM and FMRL
<b>2. Any of the following methodological elements used for FMRL (as reported in the FMRL submission) changed after adoption of FMRL</b>		
Element	Addition /modification in GHG inventory	
a) Pools and gases	New pools or gases	
b) Area under FM	Recalculated historical data* on area	
c) Historical data for GHG inventory	Recalculated historical data* for FL-FL or FM.	
d) Forest characteristics and management	Recalculated historical data*	
e) Historical Harvesting rates	Recalculated historical data*	
f) Climate data assumed by models for projecting FMRL	Different observed climate data as compared to what assumed in FMRL	
g) Harvested wood products	New/recalculated data and/or methods	
i) Natural disturbances	New/recalculated data and/or method; inclusion of submitted (in 2015) or revised (later) background level and margin with assumptions different from FMRL	
<b>3. Other possible methodological inconsistencies, e.g., the FMRL model's outputs are not capable of reproducing the historical data* reported for FM or FL-FL.</b>		

\* data for the time period used in the construction of the FMRL

## EXAMPLES OF CASES WHICH MAY LEAD TO METHODOLOGICAL INCONSISTENCY BETWEEN FMRL AND REPORTING OF FM DURING THE 2ND CP

### Case 1:

At the time of FMRL submission:

- The GHG inventory used a *Stock-Difference* or *Gain-Loss* (i.e. not a model)
- The FMRL was constructed using model X

*Can this country apply a different method in GHG reporting during the 2<sup>nd</sup> CP?*

Yes, but this will create a methodological inconsistency, which triggers a TC.

*Can this country apply the model X in GHG reporting?*

Yes, this will ensure consistency between the FMRL and FM.

*Can this country apply a new model Y in GHG reporting?*

Yes, but this will create a methodological inconsistency, which requires a TC. In this case, a possible way to address the inconsistency is using the new model Y also for calculating the  $FMRL_{corr}$  as part of the TC process.

## EXAMPLES OF CASES WHICH MAY LEAD TO METHODOLOGICAL INCONSISTENCY BETWEEN FMRL AND REPORTING OF FM DURING THE 2ND CP

### Case 2:

At the time of FMRL submission:

- The GHG inventory used model X
- FMRL was constructed using model X

Can this country use a new model Y (or new version of model X) in GHG reporting?

Yes, this will create a methodological inconsistency, which may be addressed by using the new model Y (or new version of the model X) also for calculating the FMRLcorr as part of a TC process.



## EXAMPLES OF CASES WHICH MAY LEAD TO METHODOLOGICAL INCONSISTENCY BETWEEN FMRL AND REPORTING OF FM DURING THE 2ND CP

### Case 3:

At the time of FMRL submission:

- The GHG inventory used data from NFIs representing the years 1995 and 2005
- FMRL was modelled using historical input data for the period 2000-2009, where 2000-2005 were based on the two NFIs and 2006-2009 were extrapolated using existing NFI-data.

In the year 2012, a new NFI was finalized resulting in a recalculation of data for the period 2006-2009. This triggers a recalculation of the GHG inventory, and consequently a TC has to be applied. The new time series for 2000-2009 including historical data for 2000-2005 and recalculated historical data for 2006-2009 are used for calculating the FMRLcorr. Only data representing the same years as the data used to calculate the initial FMRL shall be used to calculate the FMRLcorr.

## HOW TO PERFORM AND DOCUMENT THE CALCULATION OF $FMRL_{CORR}$

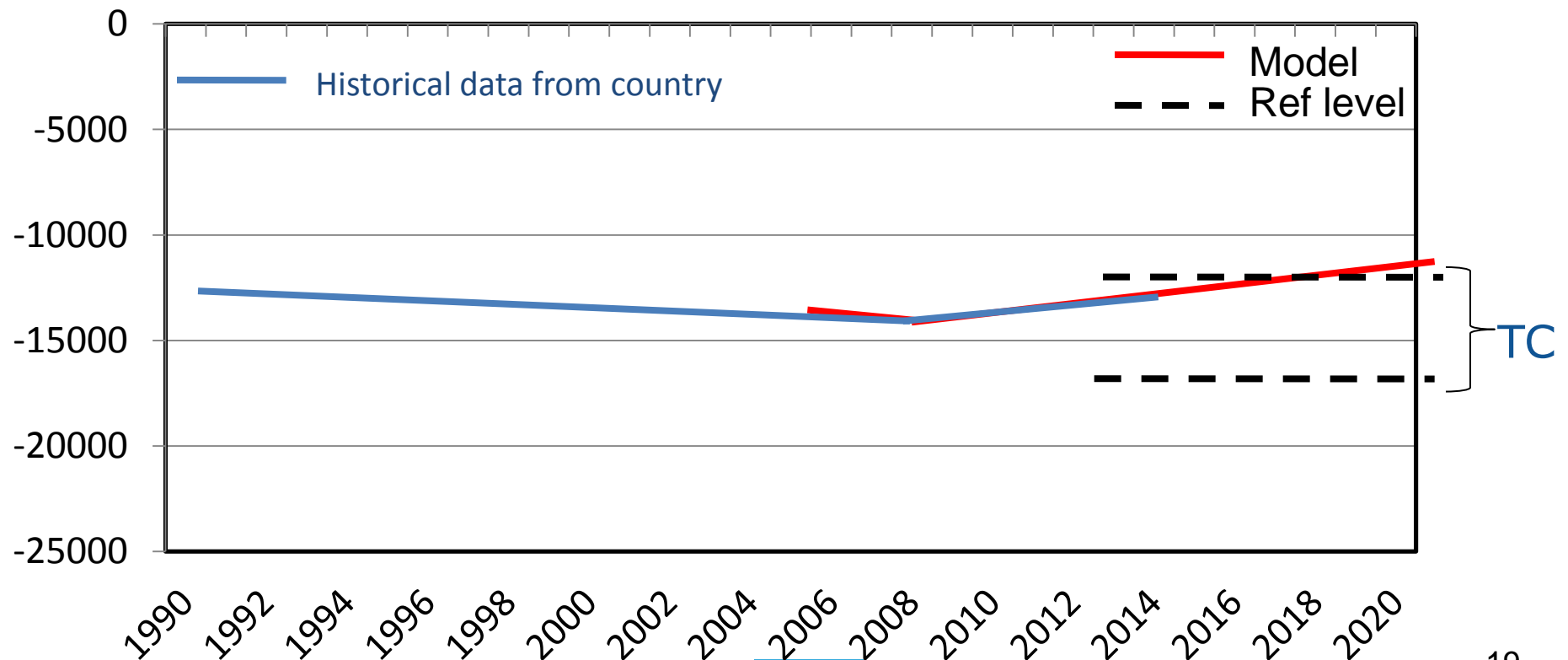
Several methods possible, depending on the approach used for FMRL, the cause of the inconsistency and the data available.

It is *good practice* to provide information that the method used avoids the expectation of net credits / debits linked to any inconsistency between  $FMRL_{corr}$  and reporting for FM during the CP.

In the case of projected FMRLs,  $FMRL_{corr}$  may be calculated by, e.g., a new model-based projection using new historical data. *It is essential to keep all the policy assumptions of the FMRL submission unchanged.*

It is *good practice* to show that the new model-based calculations used for  $FMRL_{corr}$  are capable of reproducing the data for FM or FL-FL for the historical period reported in the FMRL submission (or to provide any explanation if it is not the case).

If the need for a TC has been identified, but a new model run cannot be done, time-series consistency may be ensured by using one of the methods by 2006 IPCC GL, including the “overlap” between models results and data for the historical period (before the FMRL submission).



It is *good practice* to complement any TC with transparent information on:

- Rationale for calculating FMRL<sub>corr</sub>;
- Methods used to calculate FMRL<sub>corr</sub>;
- Results (i.e. the FMRL<sub>corr</sub>) and discussion of the differences between FMRL<sub>corr</sub> and FMRL.

#### EXAMPLE OF SUMMARY TABLE WHEN PERFORMING A TECHNICAL CORRECTION

	Emissions and Removals
FMRL	-10,000 [Gg yr <sup>-1</sup> ]
FMRL <sub>corr</sub>	-10,500 [Gg yr <sup>-1</sup> ]
Difference in per cent = $100 \bullet [(FMRL_{corr} - FMRL) / FMRL] \%$	5%
Technical Correction = $FMRL_{corr} - FMRL$	-500 [Gg yr <sup>-1</sup> ]
FM reported during the commitment period	-12,000 [Gg yr <sup>-1</sup> ]
Accounting Parameter = reported FM – (FMRL + Technical Correction)	-1,500 [Gg yr <sup>-1</sup> ]

**TABLE 4(KP-I)B.1.1. SUPPLEMENTARY BACKGROUND FOR LAND USE, LAND-USE CHANGE AND FORESTRY**

**ACTIVITIES UNDER THE KYOTO PROTOCOL**

**Article 3.4 activities: Forest management**

**Additional information: Forest management reference level (FMRL) and technical correction**

PARTY  
Inventory year  
Submission year

Approach applied for FMRL <sup>(1)</sup>	Value inscribed in the Appendix to the annex to decision 2/CMP.7 <sup>(2)</sup>	Technical correction <sup>(3)</sup>
	(kt CO <sub>2</sub> eq/yr)	
<b>Drop-down list</b>		
<b>Business-as-usual projection</b>		
<b>Base year</b>		
<b>Zero at 1 January 2013</b>		

**Documentation box**

Parties should provide detailed explanation on the land use, land-use change and forestry sector in the relevant annex of the NIR: Supplementary information on LULUCF activities under the Kyoto Protocol. Use this documentation box to provide references to relevant sections of the NIR if any additional details are needed to understand the content of this table.

<sup>(1)</sup> Provide additional information consistent with Box 2.7.3 in the *IPCC 2013 Revised Supplementary Methods and Good Practice Guidance arising from the Kyoto Protocol* in the NIR.

<sup>(2)</sup> The value inscribed in the appendix to the annex of decision 2/CMP.7 is here reported in kt CO<sub>2</sub> eq/yr. Provide information in the documentation box on how HWP is included under FMRL (either instantaneous oxidation, first-order decay function, or country-specific.)

<sup>(3)</sup> Detailed information on the technical corrections should be provided in the NIR (see sections 2.7.5 and 2.7.6 in the *IPCC 2013 Revised Supplementary Methods and Good Practice Guidance arising from the Kyoto Protocol*), including information on the technical corrections made in previous submissions and how these have been taken into account in the most recent technical correction.

## WHEN TO APPLY TECHNICAL CORRECTION

Technical Correction shall be applied when accounting.

Information on technical corrections and methodological consistency shall be reported as part of the *annual* GHG inventories and inventory reports. To this aim, it is *good practice* for Parties to assess annually the need for TC, i.e. checking the criteria set in Table 2.7.1, and to report transparent information on this in the annual NIR.

Dec. 2/ CMP.8 specifies that “Parties shall include the FMRL submission and the corresponding technical assessment report as annexes to the **initial report**. Any technical corrections resulting from recommendations in the technical assessment report shall be reported in the inventory submission for the first year of the CP2”

**THANKS!**