



# *Technical corrections for the forest reference levels under the LULUCF regulation (EU) 2018/841*

*Reflections on the concept and examples of possible cases*

Anu Korosuo, JRC

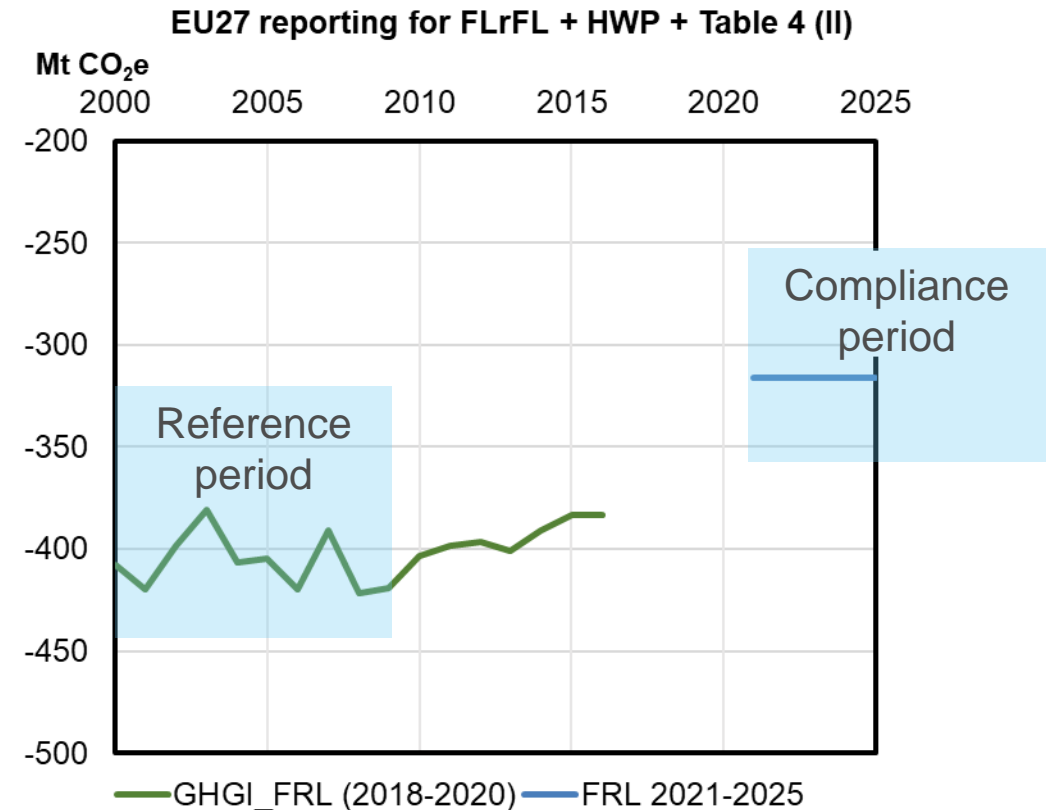
JRC LULUCF Workshop / JRC Ispra  
23 May 2024

# Outline

- Recalling the forest reference levels (FRLs)
- Observations from LULUCF GHG inventories
- Overview of the principles for technical corrections (TC)

# Forest Reference Level (FRL)

- Benchmark for measuring forests' contribution towards the EU climate targets for 2021-2025
- Show what the greenhouse gas emissions and removals from forests would be in each EU Member State in 2021-2025, if forest management continued as it was in 2000-2009
- No assumptions on policy development beyond 2000-2009
- Reported in 2020 as a part of National Forestry Accounting Plans (NFAPs)



# Assessment process



End of 2018

- **Draft NFAPs** by the Member States

Spring 2019

- Technical assessment of the draft NFAPs by the LULUCF Expert Group

June 2019

- Technical recommendations by the Commission

Fall 2019

- Bilateral discussions with the Member States to clarify recommendations
- LULUCF Expert Group meeting to discuss frequently occurring issues

End of 2019

- **Revised NFAPs** by the Member States

Spring 2020

- Assessment of the revised NFAPs by the Commission
- LULUCFEG meeting to discuss findings

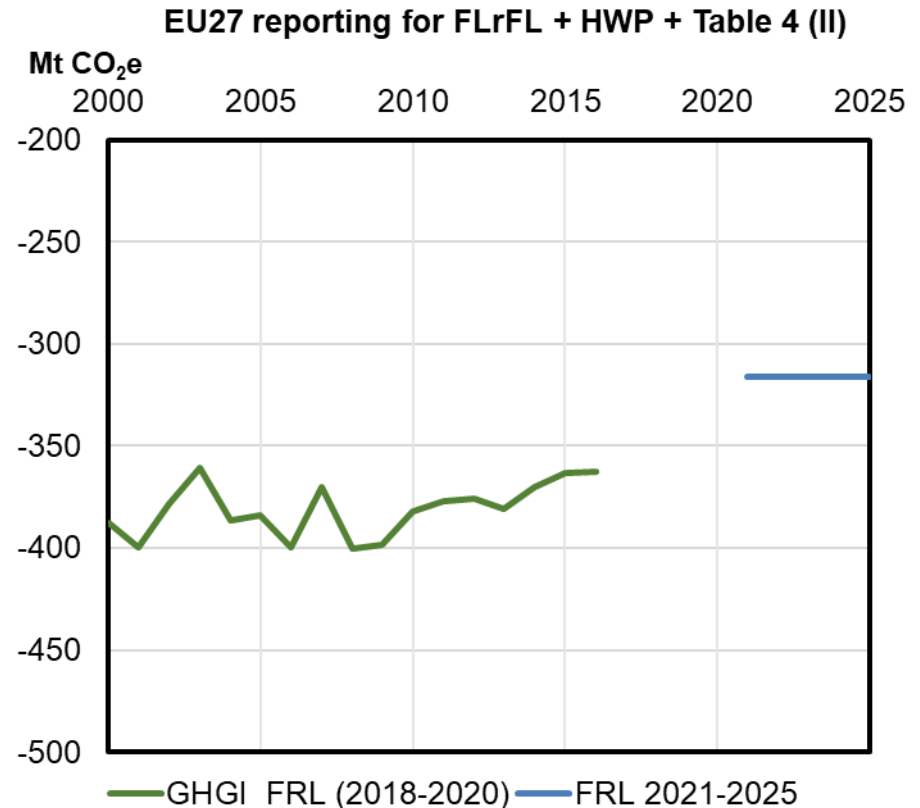
Oct 2020

- Delegated act laying down the FRLs



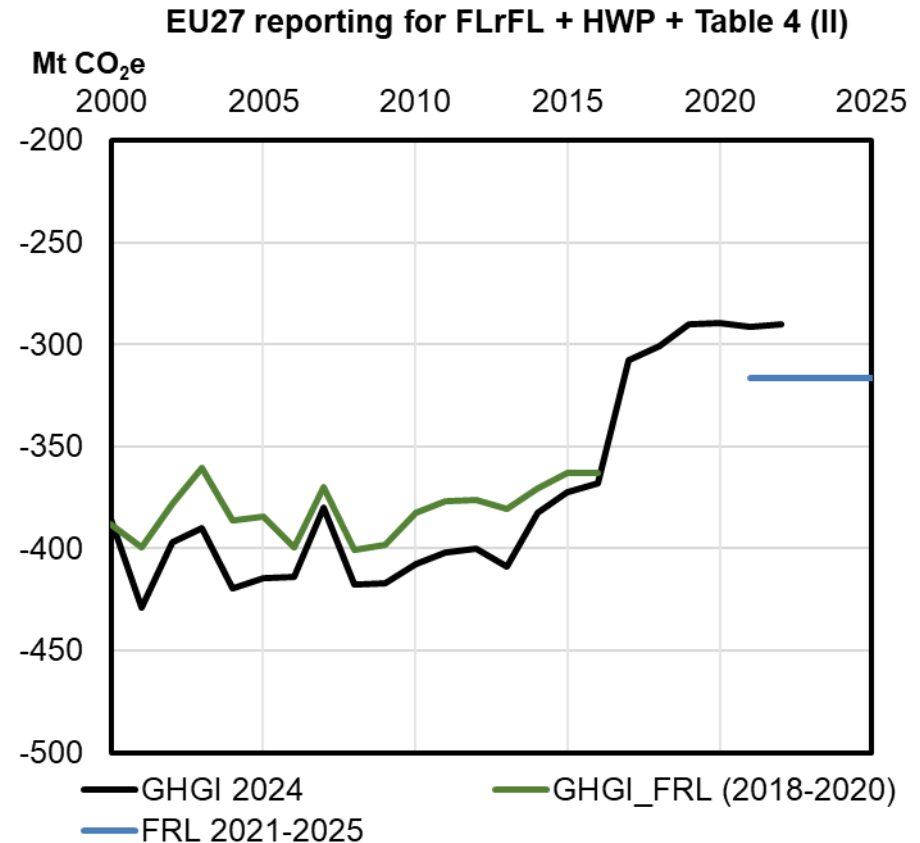
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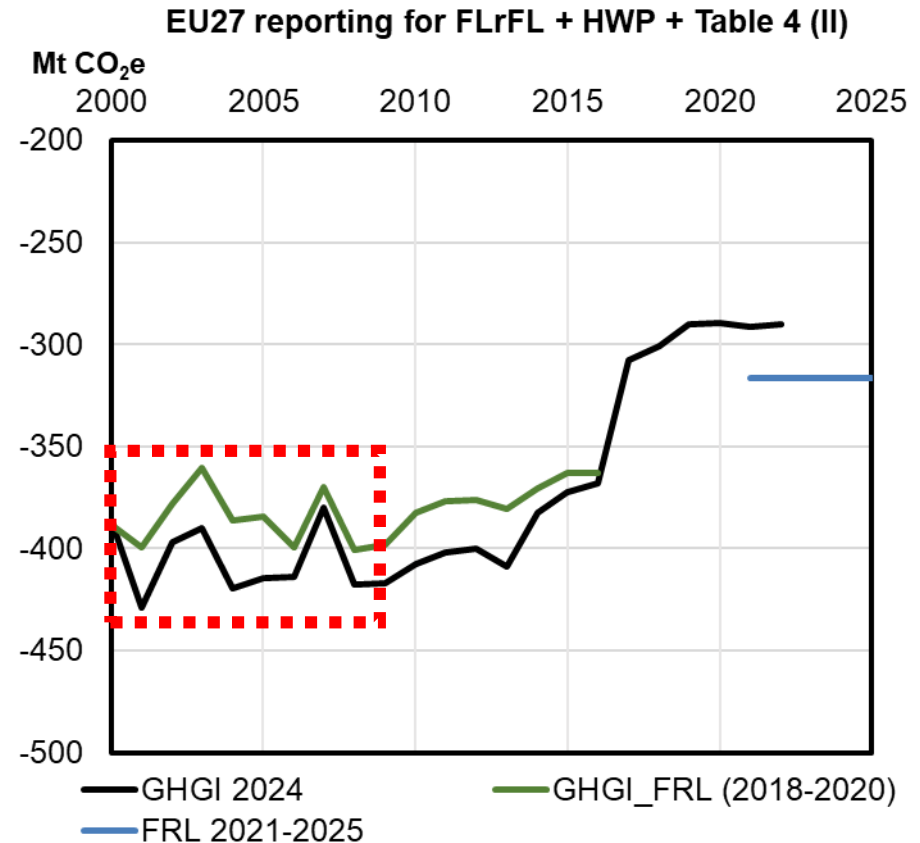


# Forest Reference Level (FRL)

- Is the FRL still comparable with the GHG reporting?

- Are there recalculations in the reference period 2000-2009?

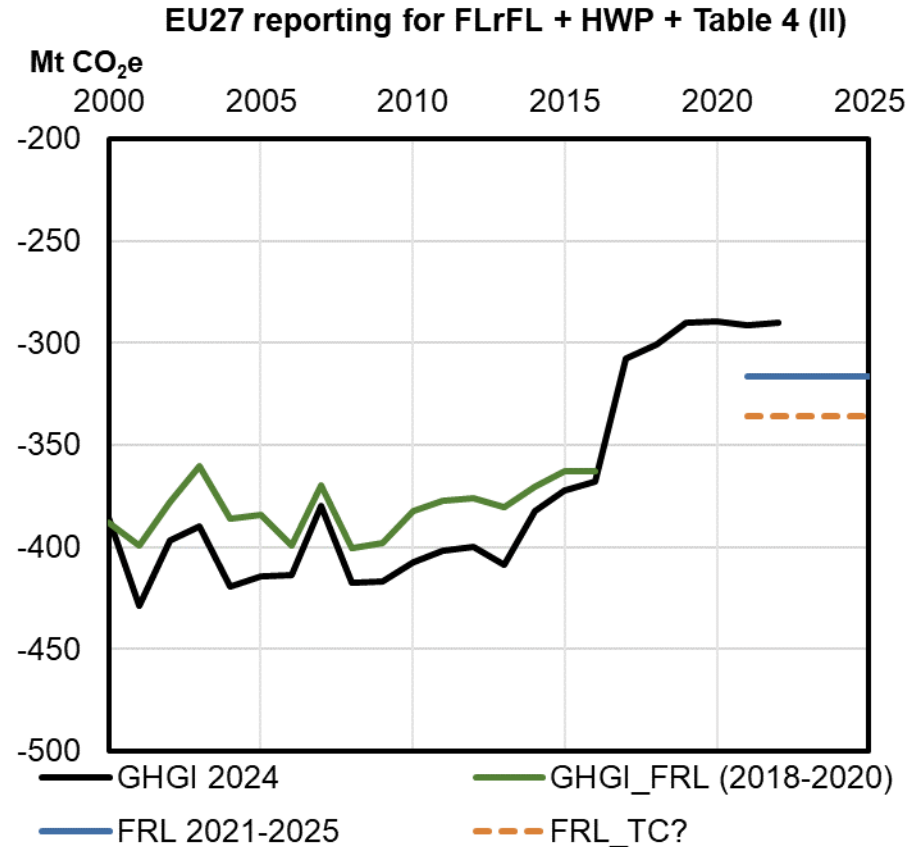
Are the reported pools, gases and managed forest land area reported now the same as when setting the FRL?



# Forest Reference Level (FRL)

- Technical corrections (TC) may be needed to ensure comparability at compliance check (March 2027)

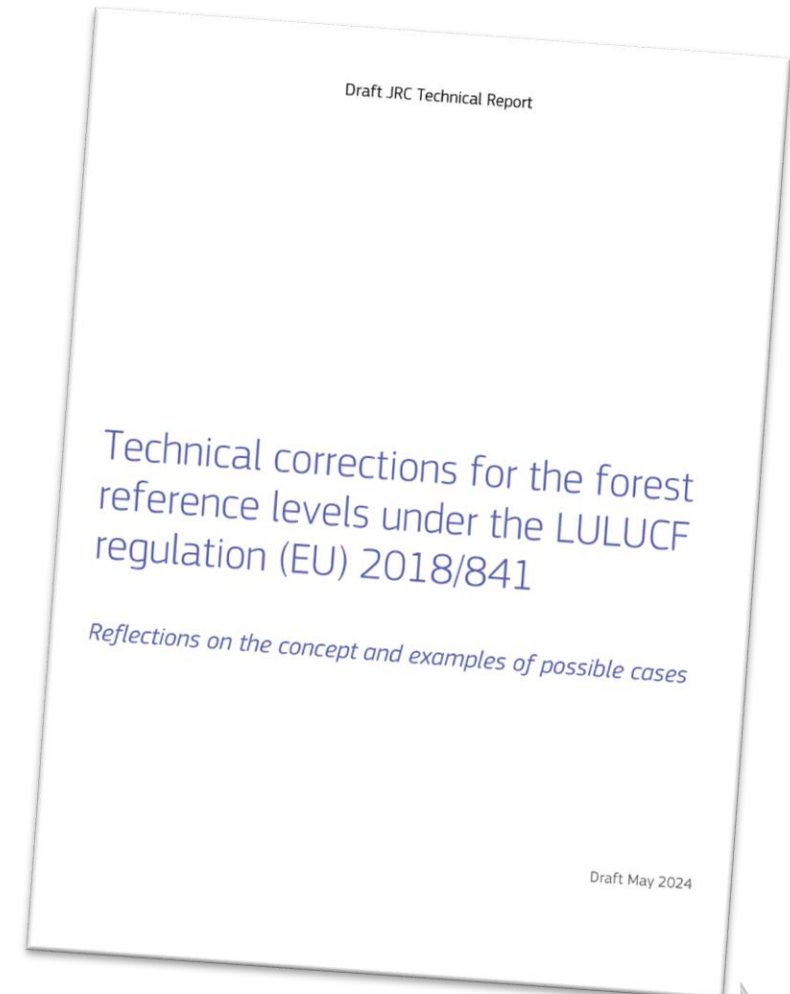
DISCLAIMER: FRL\_TC shown here is based on simple average difference over the reference period, between GHGI 2024 and GHGI used for the FRL. It is for illustrational purposes only and may not reflect the actual TC needs in the MS inventories.





# Draft concept note on the technical corrections

- Circulated to workshop participants on 15 May
- Feedback welcome until 7 June 2024
- Based on FRL guidance (Forsell et al. 2018)
- In broad terms the concept is similar to technical corrections to the FMRLs under the Kyoto Protocol



# When to apply a technical correction?

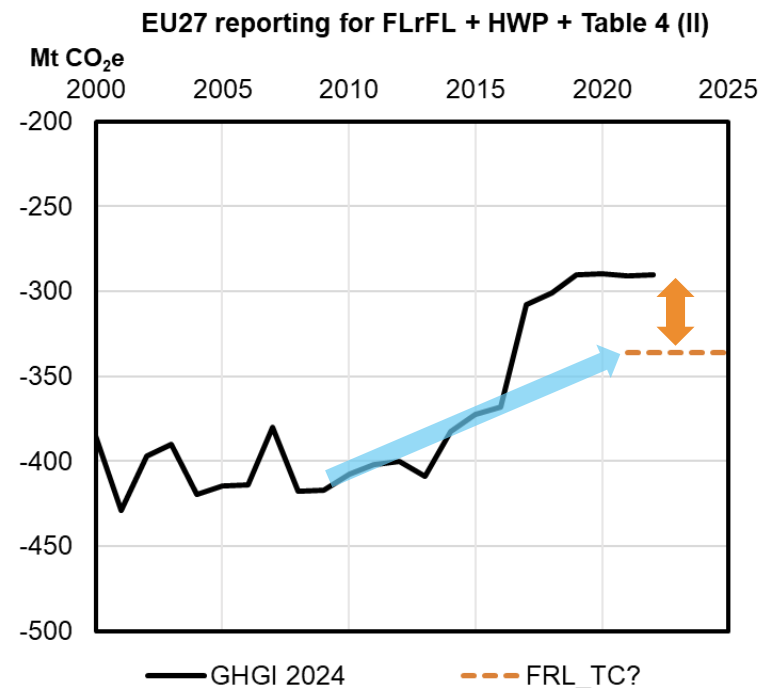
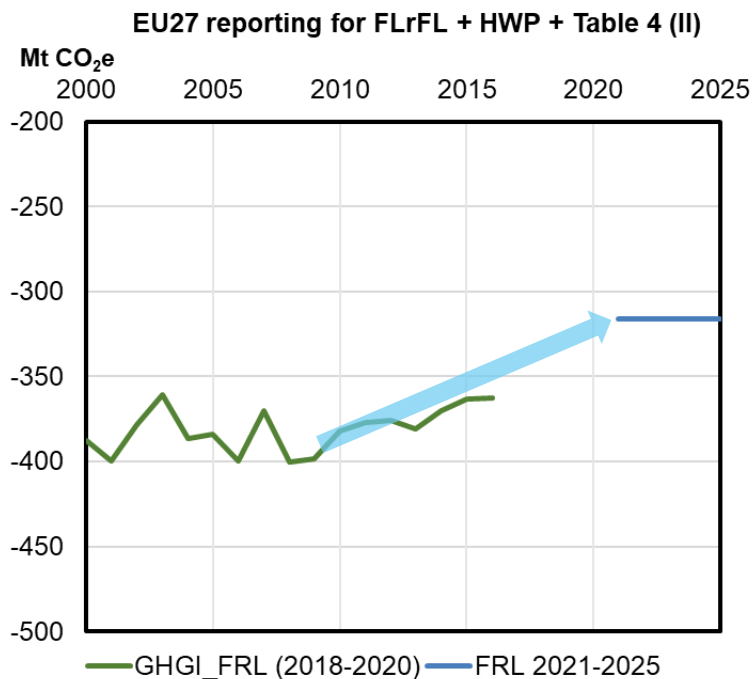
1. There is a **change to a method** used in the GHG inventory since setting the FRL;
2. There is a **change to a component** of the GHG inventory, such as:
  - a) New carbon pools or non-CO<sub>2</sub> gases;
  - b) If FRL was constructed using models that are responsive to climate variability, if climate data observed during the compliance period is different from that assumed by the models used to construct FRL, then a Technical Correction would allow application of actual climate data to the models;
  - c) Recalculated data for natural disturbances, or inclusion of a background level in the FRL;
  - d) Change in area of managed forest land over time;
  - e) Change of historical data for HWP;
  - f) Other types of recalculated historical data that serve as input to the FRL;
3. **Other** kinds of methodological inconsistency.

# When not to apply a technical correction?

- Changes in management since 2000-2009
  - Harvest levels or forest growth was different to what was projected in the FRL
  - HWP quantities or types were different to what was projected
  - Tree species have changed from the FRL projection
- Changes in policies since 2000-2009
  - Management guidelines or incentives have changed
  - Market situation has changed

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# Bottom line: ensure reliable accounting



1. FRL concept **adjusts for age-related development** of forests
2. **Changes in management** will be accounted for

# Clear documentation to ensure transparency

- Rationale for calculating FRL\_TC;
- All updates to methods between the methods used for FRL\_TC and those used to calculate the FRL;
- List and inventory all changes to model parameters or any other aspects described in the NFAPs;
- Results (i.e. FRL\_TC as a total as well as the carbon pools and GHGs it consists of);
- Demonstration of consistency between FRL\_TC and GHG inventory 2027;
- Discussion of the differences between FRL\_TC and the FRL in the delegated act.

# Discussion / comments

Please send your comments on the draft concept note to [anu.korosuo@ec.europa.eu](mailto:anu.korosuo@ec.europa.eu) by 7 June

# Example cases for a TC

**Example 1:** The estimates for living biomass have been changed to use gain-loss instead of stock-difference methodology. This change led to a recalculation of the whole time series for living biomass in the GHG inventory. The FRL was projected using the model “ForestModel”, starting in year 2010.

**Technical correction:** ForestModel needs to be calibrated to the new biomass estimates to be comparable with the GHG inventory reporting. The FRL\_TC projection will use the same starting year (i.e. 2010) and other assumptions as the original FRL projection. Note that FRL\_TC may not take into account changes observed in the GHG inventories after the starting year of the projection.

**Example 2:** At the time of FRL submission, forest growth was estimated with methodology X. The model “ForestModel” used for estimating the FRL was calibrated to methodology X.

The GHG inventory has thereafter employed methodology Y, which has also been considered in the GHG inventory as a recalculation of the time series.

**Technical correction:** needs to be made. The ForestModel will need to be calibrated with the new forest growth estimates from methodology Y to align the FRL\_TC with the GHG inventory.



**Example 3:** A new method for estimating litter was employed in the GHG inventory submitted in 2022. In 2024, the new method was found to be incorrectly implemented, and there was another change, to a new corrected method, in the GHG inventory in 2025.

**Technical correction:** needs to be made, using the corrected methodology as employed from GHG inventory 2025 onwards. There is no need to calculate the implications of changes in GHG inventory 2024, if they are not present anymore in 2027.

**Example 4.** At the time of setting the FRL, only living biomass and HWP were reported in the GHG inventory. The MS has since fulfilled the completeness of reporting required by Art 5(4) of the LULUCF Regulation, and now reports also dead wood, litter and soil organic carbon in mineral soils in its inventory.

**Technical correction:** The new pools now reported in the GHG inventory need to be added to the FRL as a TC. These new pools are estimated to constitute a relatively stable sink over time. For the FRL\_TC, their contribution is therefore assumed to be the same as reported for year 2010 (start of projection). See a numerical example in Table 2.

<b><i>Pools included in the original FRL</i></b>	<b><i>Pools included in FRL_TC</i></b>
Living biomass: -5 000 kt CO <sub>2</sub>	Living biomass: -5 000 kt CO <sub>2</sub>
HWP: -200 kt CO <sub>2</sub>	HWP: -200 kt CO <sub>2</sub>
	Litter: -50 kt CO <sub>2</sub>
	Dead wood: -750 kt CO <sub>2</sub>
	SOCmin: -1000 kt CO <sub>2</sub>
<b>FRL in delegated act: -5 200 kt CO<sub>2</sub>e</b>	<b>FRL_TC: -7000 kt CO<sub>2</sub>e</b>

**Example 5.** Similarly to Example 4, only living biomass and HWP were reported in the GHG inventory at the time of setting the FRL. Since then, the carbon stock changes in litter, dead wood and SOCmin have been added to the GHG inventory, using model estimates from “SoilModel”.

**Technical correction:** The new pools now reported in the GHG inventory need to be added to the FRL as a TC. The FRL needs to be estimated consistently with the GHG inventory, using the results from “SoilModel” as the estimates for litter, dead wood and SOCmin. The starting year for “SoilModel” needs to be the same as for the projection of the living biomass (2010), and use consistent data with the projections for living biomass.

**Example 6.** In the FRL, the MS decided to include a provisional estimate of the background level (plus margin) for natural disturbances. The emissions from wildfires reported for 2001-2017 were used in this estimate. However, at the time of accounting, the MS decides not to apply the natural disturbance provision of Art 10.

**Technical correction:** The provisional background level (plus margin) will be removed from the FRL and replaced by the average reported emissions in 2000-2009 from natural disturbances (in this case only wildfires). See a numerical example in Table 3.

<b><i>Pools included in the original FRL</i></b>	<b><i>Pools included in FRL_TC</i></b>
Living biomass: -9 000 kt CO <sub>2</sub>	Living biomass: -9 000 kt CO <sub>2</sub>
Litter: -200 kt CO <sub>2</sub>	Litter: -200 kt CO <sub>2</sub>
Deadwood: -2400 kt CO <sub>2</sub>	Deadwood: -2400 kt CO <sub>2</sub>
Mineral soils: -4300 kt CO <sub>2</sub>	Mineral soils: -4300 kt CO <sub>2</sub>
HWP: -620 kt CO <sub>2</sub>	HWP: -620 kt CO <sub>2</sub>
Background level for natural disturbances: +350 kt CO <sub>2</sub> e	Emissions from wildfires (average reported in 2000-2009): +420 kt CO <sub>2</sub> e
<b>FRL in delegated act: -16 170 kt CO<sub>2</sub>e</b>	<b>FRL_TC: -16 100 kt CO<sub>2</sub>e</b>

**Example 7:** At the time of FRL submission, the GHG inventory used data from NFIs representing the years 1995 and 2005. FRL 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 2018, a new NFI was finalized resulting in a recalculation of data for the period 2006-2009.

**Technical correction:** 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 FRL\_TC. Only data representing the same years as the data used to calculate the initial FRL will be used to calculate the FRL\_TC; i.e. years 2000-2009.

# Thank you



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