

Tool for modelling GHG emissions related to forest management in Latvia



JRC technical workshop on reporting LULUCF

27 February – 1 March 2013, Ispra

Joint Research Center (JRC), Via Fermi, conference room 3/36

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- ## Koksnes pieauguma struktūra

management reference level (country specific activity data, coefficients and assumptions should be developed and used).

- The tool – as simple as possible, multiple fields of usage (spreadsheet with transparent functions and activity data structure relevant to the NFI and other data sources).
- The most of work behind:
 - recalculation of historical data (1990-2004) – backward calculation on the base of the NFI data;
 - key innovations – mortality and increment factors.

Structure of the model



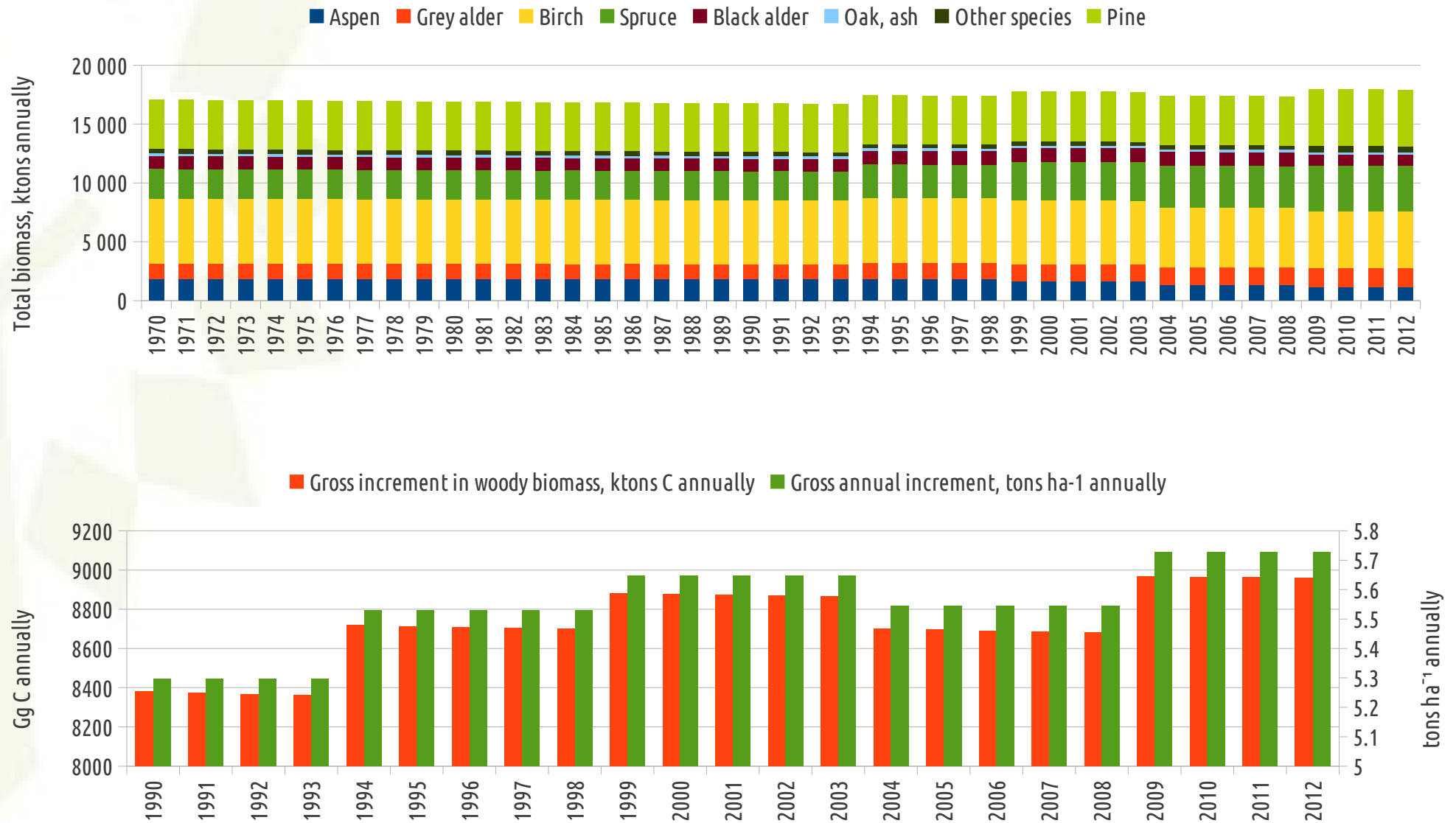
- Living biomass (*gross annual increment of living biomass*).
- Mortality (*natural reduction of number of trees and decay*).
- Commercial harvesting (*decay of harvesting residues, fractions of incinerated and extracted biomass*).
- Harvested wood products (*JRC FMRL method, only locally produced HWP considered*).
- Emission from organic soils (*Tier 1*), mineral soils considered CO₂ neutral, except drained soils (N₂O).
- Fire – incineration of harvesting residues and forest fires.
- Recent additions:
 - deforestation (*living biomass, litter, dead wood, soil*);
 - afforestation (*living biomass, litter, dead wood*).

Gross annual increment of living biomass



- Increment figures on the base of the NFI, historical recalculations (*before 2004*) was done in conjunction with mortality rate estimations (*one of possible scenarios*).
- Species, age and dimensions specific increment equations.
- Species specific wood densities, different *BEFs* for coniferous and deciduous trees (*will be improved*).
- Some facts about living biomass:
 - average gross increment in 2011 – $9.1 \text{ m}^3 \text{ ha}^{-1}$, in 1990 – $8.4 \text{ m}^3 \text{ ha}^{-1}$ (*much better than previously used, because of significant changes in forest management practice*);
 - better mortality equations than those in forestry text books elaborated on the base of considerably exhausted forests 80 years ago (*selective felling dominated management*).

Increment figures

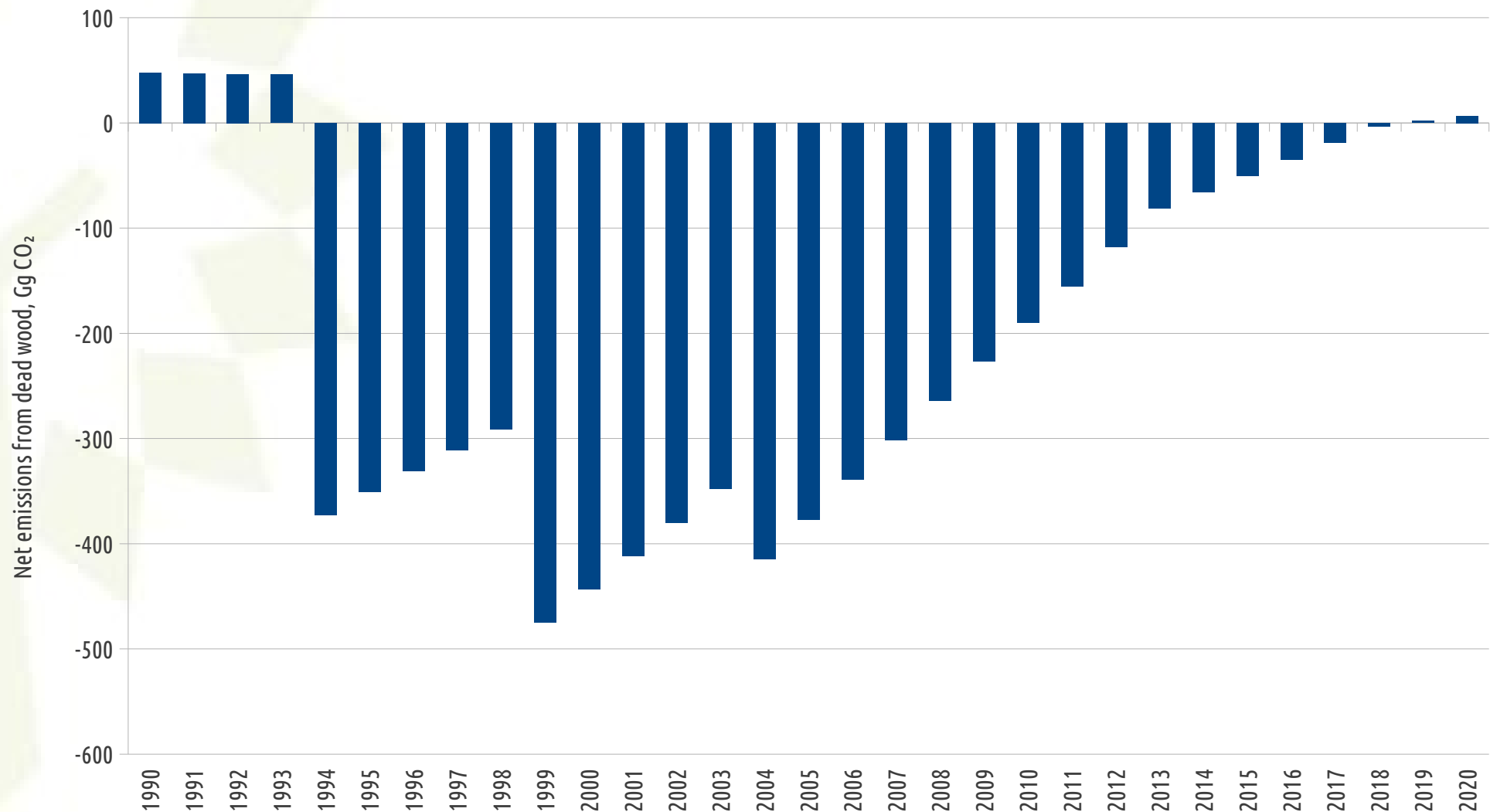


Mortality and decay



- Species specific coefficients of mortality:
 - reduction of number of trees (*do not depend on size of tree*);
 - affecting factors – age of stand and average dimensions of trees,
 - average mortality in 2004-2008 – $1.5 \text{ m}^3 \text{ ha}^{-1}$.
- Calculations on the base of NFI using backward calculation for 5 years period (*complicate to consider commercial thinning due to change of forest practice after 1990*).
- Decomposition period – 20 years (*mortality since 1970 considered as emissions, will be updated*).
- Constant mortality values considered for periods before 1990.

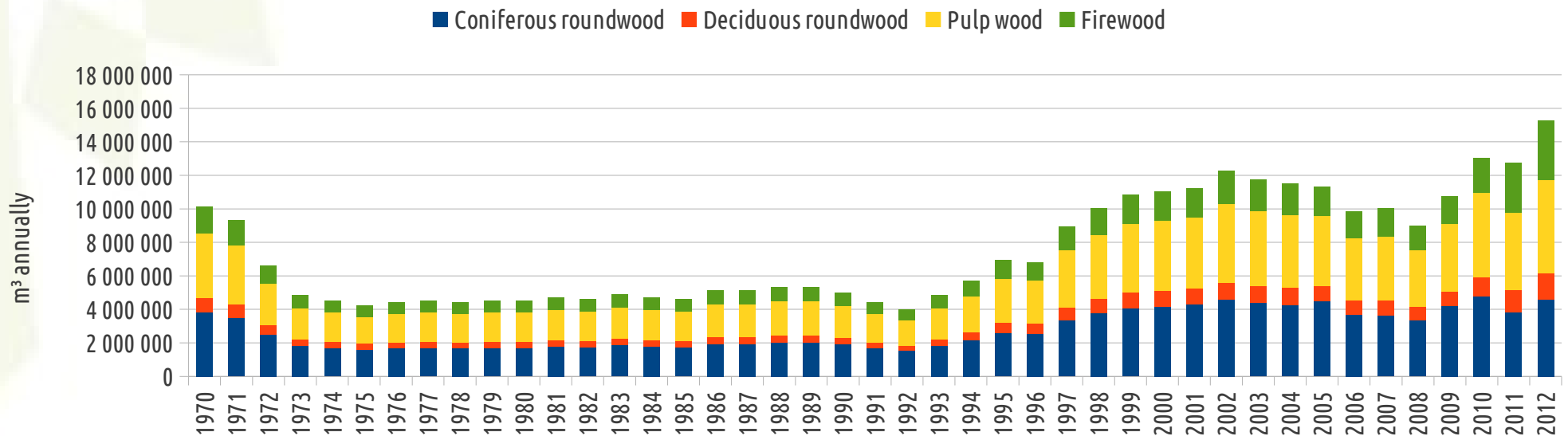
Net emissions due to natural mortality



Commercial felling



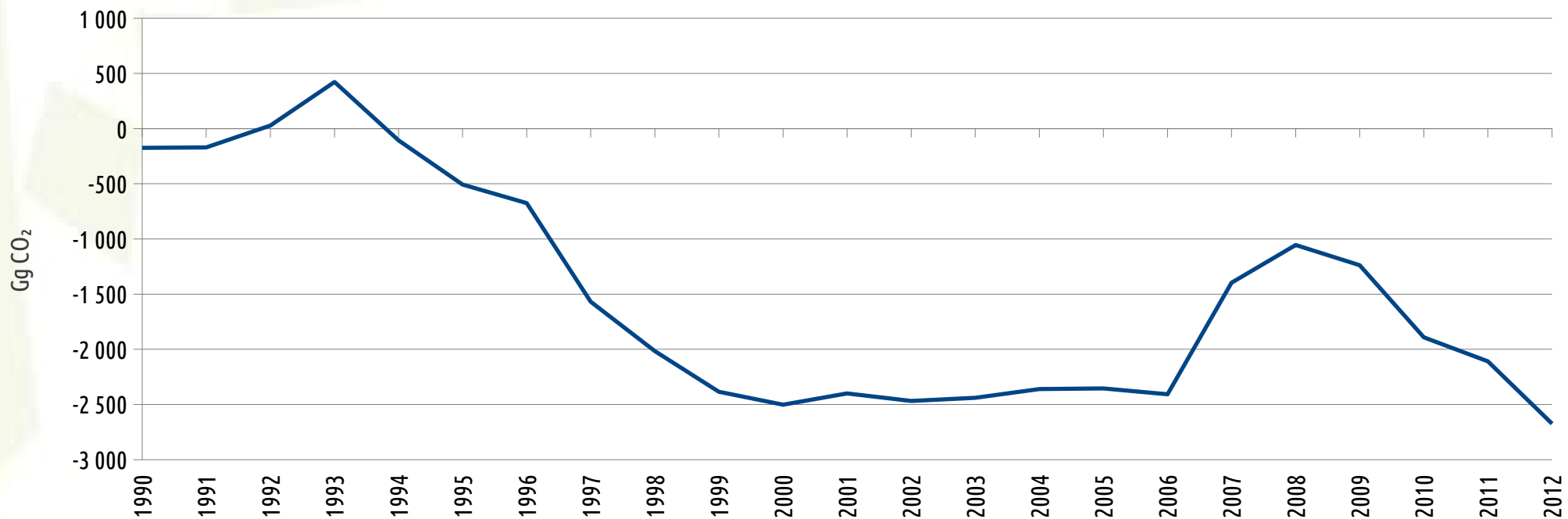
- Dominant species specific harvesting data since 1970 (1990-2011 *Central statistical bureau*, 1970-1989 *research papers*).
- Decomposition of crown and underground biomass – 20 years; species specific wood densities and different *BEFs* for coniferous and deciduous trees (*Tier 1*).



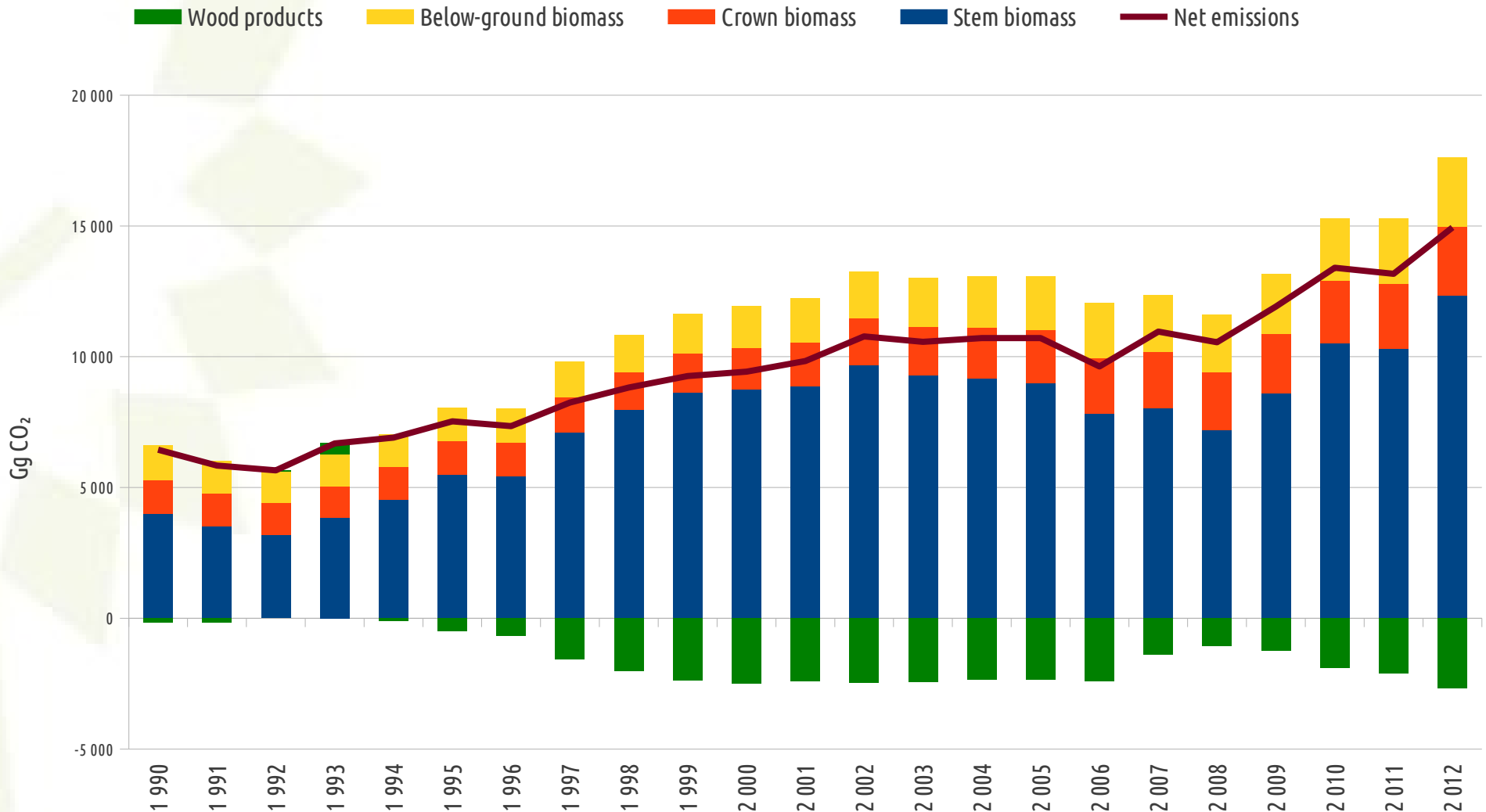
Harvested wood products



- The methodology utilized in Rüter, S., 2011. *Projection of Net-Emissions from Harvested Wood Products in European Countries*, Johann Heinrich von Thünen-Institute, Hamburg.
- Necessary improvements – tree species dependant assortments' distribution (*export should be returned to HWP*).



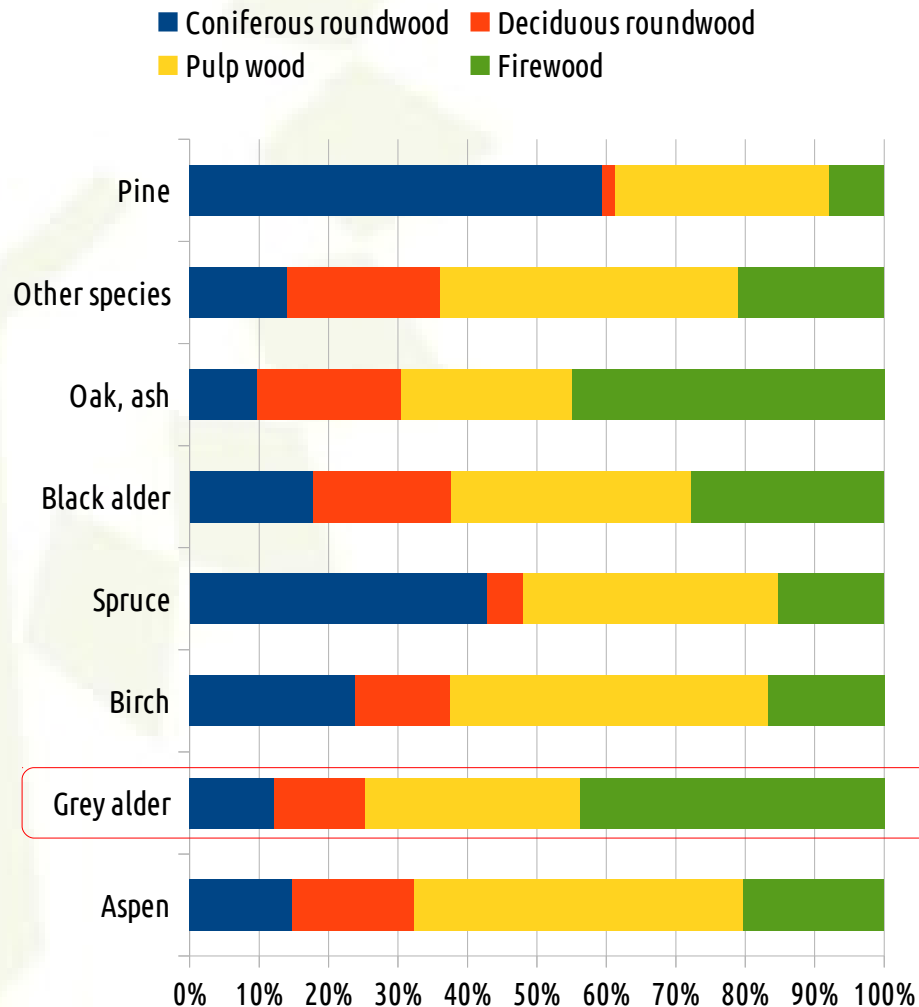
Summary of emissions due to commercial harvesting



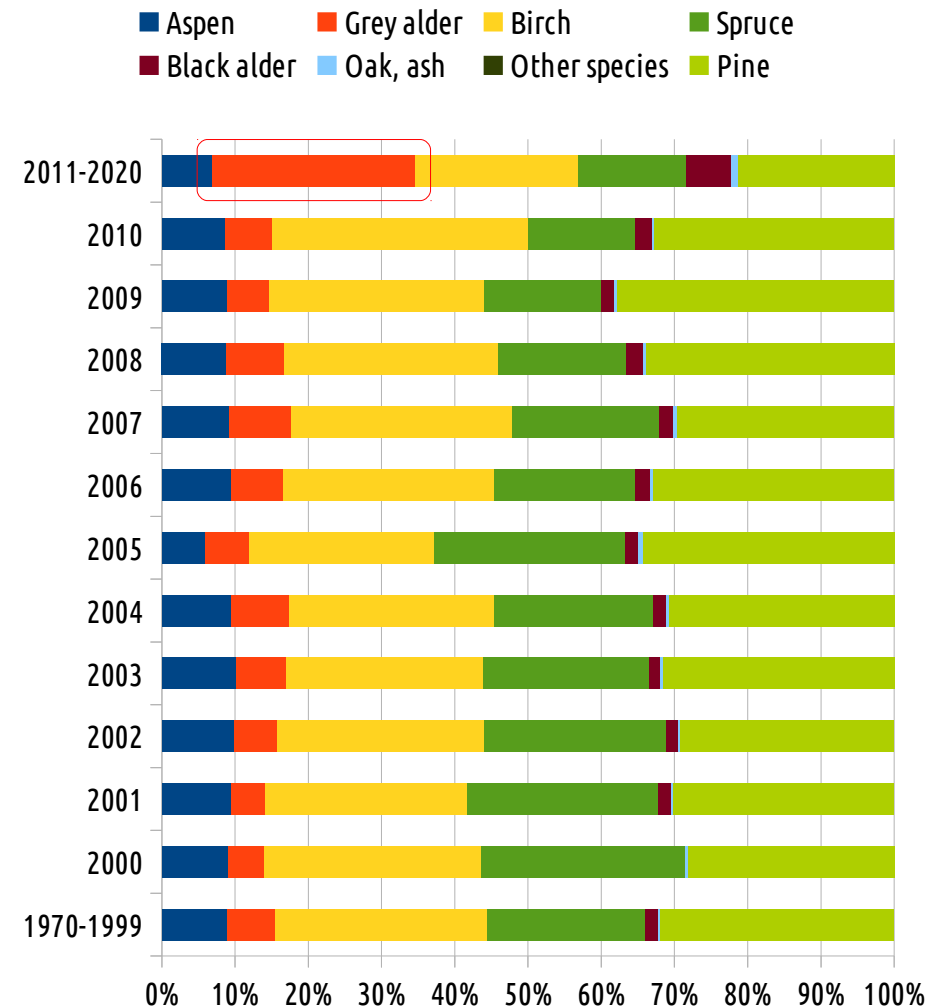
Why dominant tree species are important for HWP accounting



Share of assortments depending from dominant species



Structure of harvesting stock

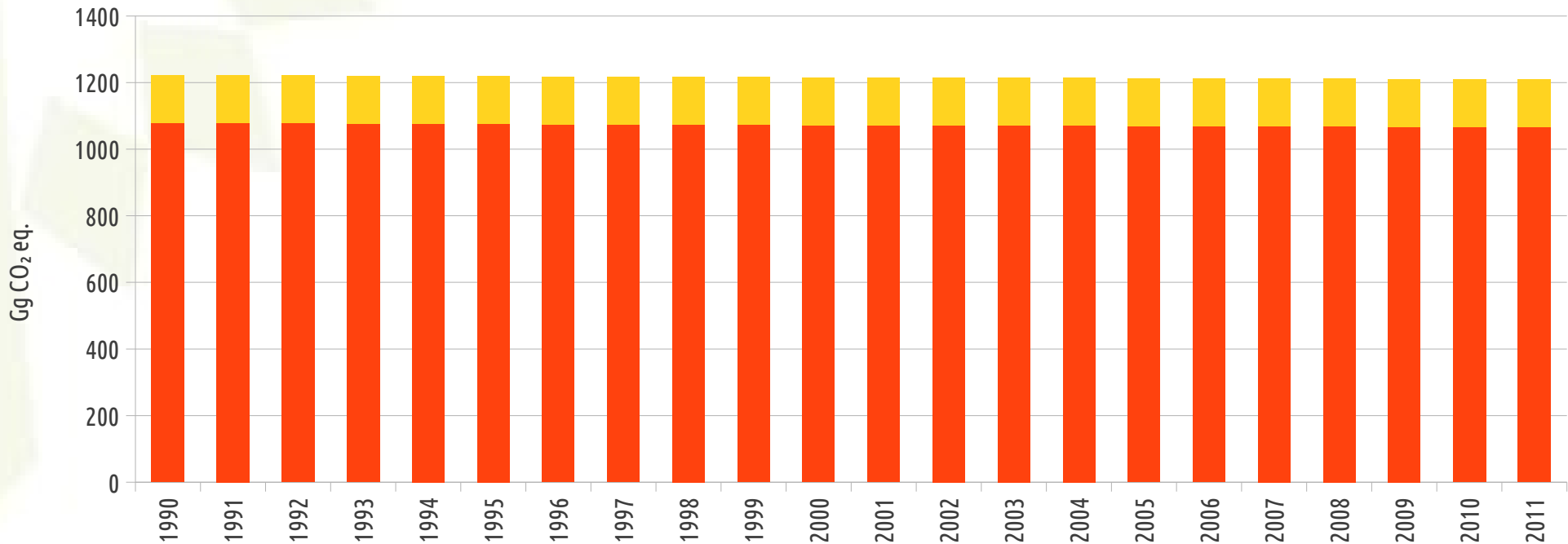


Soil emissions



- Only emissions from drained soils are accounted (*0.68 tons C ha⁻¹ and 0.943 kg N₂O ha⁻¹ annually from organic soils and 0.094 kg N₂O ha⁻¹ annually from mineral soils*).
- Area of organic soils in forest is still overestimated.

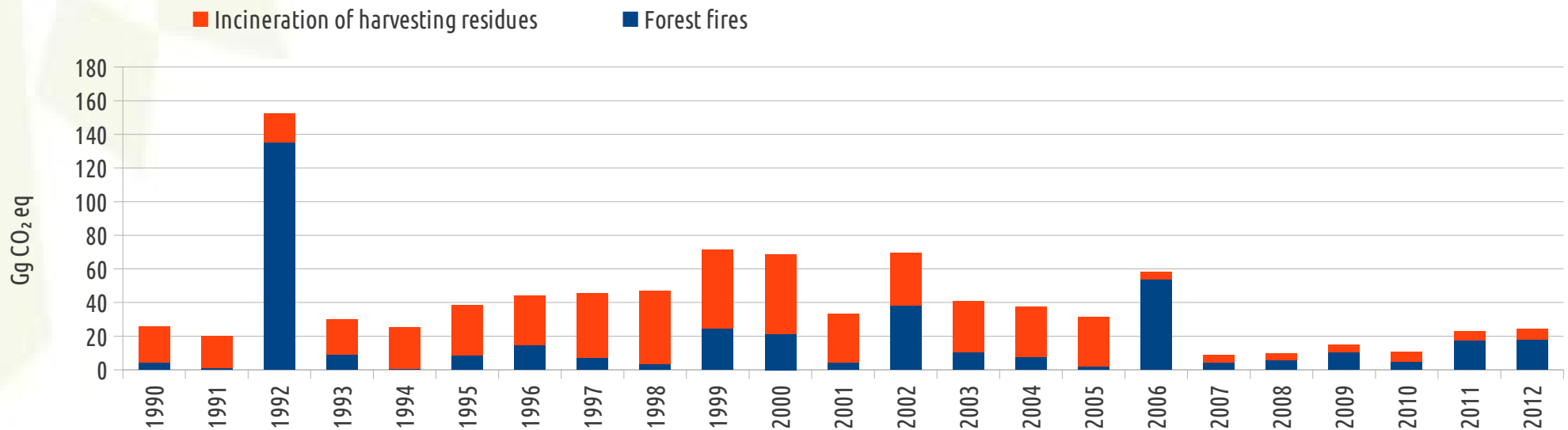
■ CO₂ fro organic soils ■ N₂O from drained soils



Fire



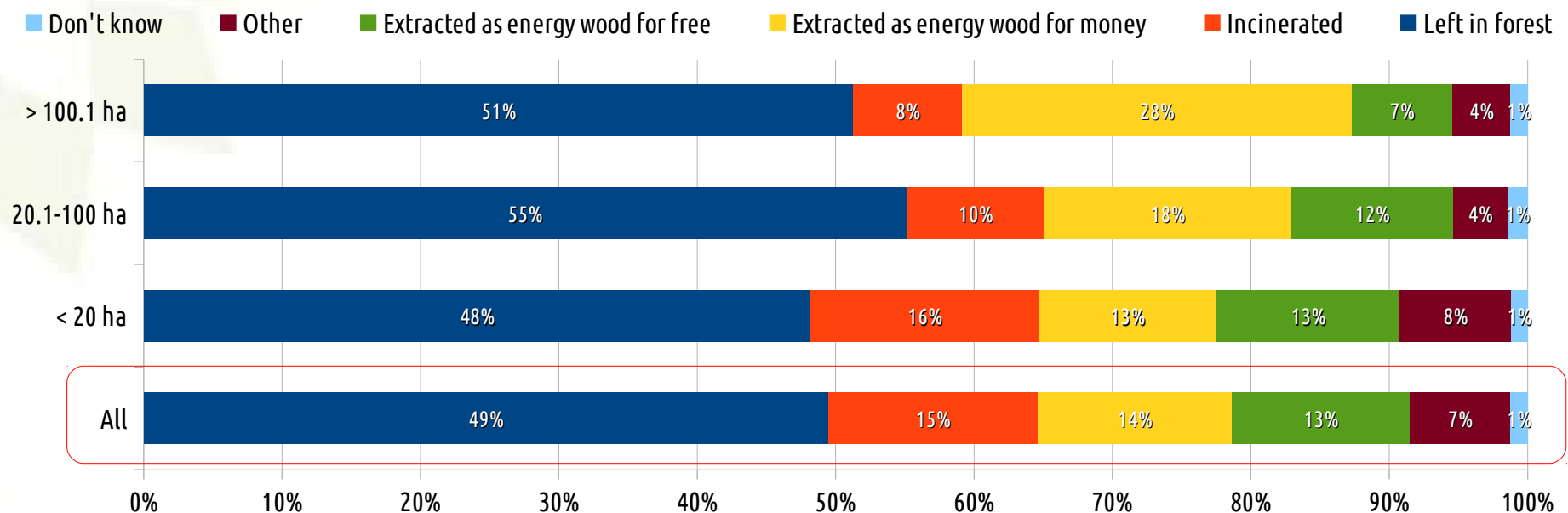
- Forest fires:
 - burnt biomass $19.8 \text{ tons ha}^{-1}$, combustion factor 0.45;
 - forest fires related emissions – **0.1 % of the FM net removals.**
- Harvesting residues:
 - 30 % left for incineration and 60 % of them actually incinerated until 2010 (*since 2011 according to forest owner questionnaire about 7% of residues are left for incineration*);
 - CO_2 accounted under harvesting, the rest is **0.1 % of the FM net removals.**



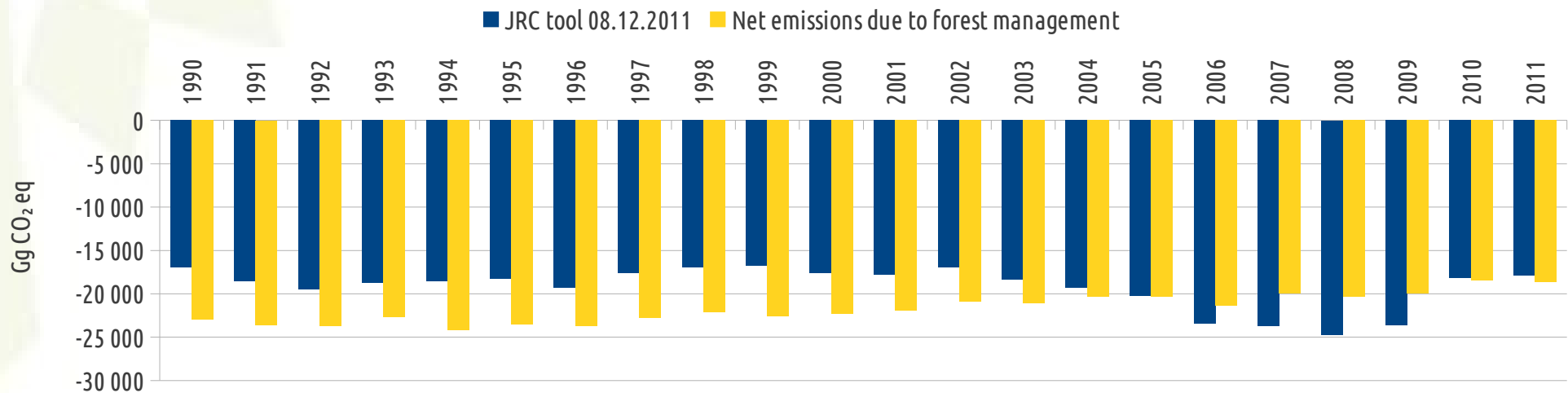
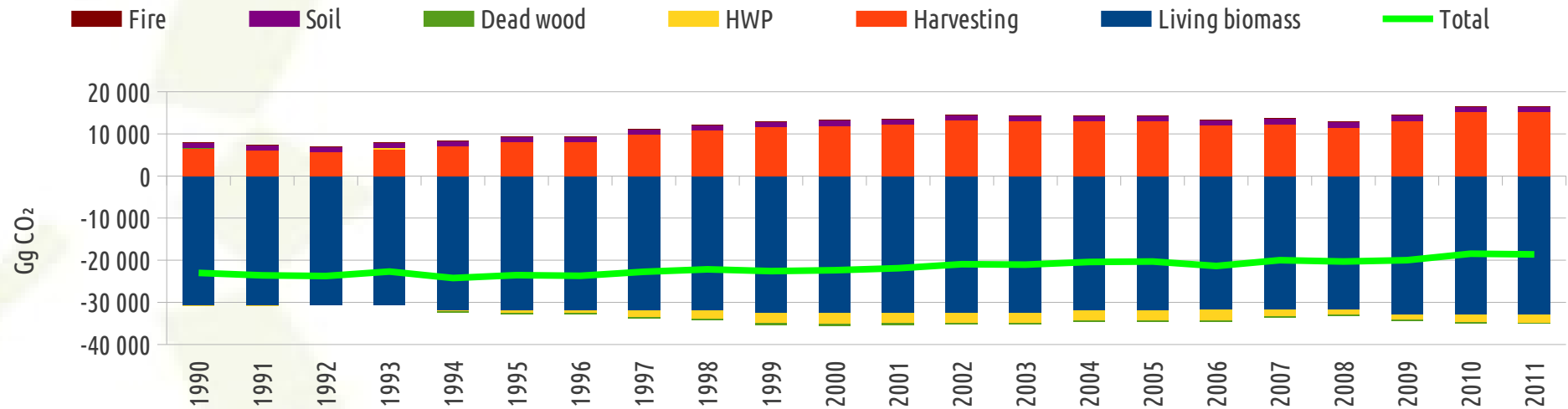
Actual data on incineration of harvesting residues



- In private forests 15 % of harvesting residues were left for incineration during last 3 years, in state forests no harvesting residues are left for incineration.
- *Average = 7 % of harvesting residues, previous overestimation of emissions due to on-site incineration 400 %.*



Summary



Additional conclusions



- National capacity in GHG accounting & projections should be strengthened and prioritized in decision making.
- Reporting & projections (*decision support tools*) should be integrated with **planning as primary target**.
- Many things can be done with limited resources, if climate change mitigation related issues are integrated with ongoing research work.
- We should concentrate on 2013-2020 and beyond instead of patching really complicated issues until 2014.



Comments, questions?

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