



GHG balance of the Austrian wood chain

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Background

- GHG balance of „Forest Management“ incl. „Harvested Wood Products“ (HWP) is accounted in the 2nd Commitment Period
 - Emissions/removals of substitute products to wood products (product and energetic wood use) are not or not directly assessed in the GHG balance
 - A GHG optimized strategic planning requires a common GHG assessment of all three parts – forest, HWP, substitute emissions compared to the wood products
- **GHG wood chain project**






Goals of the wood chain projects

GHG-balance of the Austrian wood chain based on the Austrian Forests under five different scenarios until 2100:

- GHG-balance in the Austrian Forest (Biomass, dead wood, litter, soil)
 - **Austrian Research Centre for Forests**
- GHG-balance of the HWP-pools based on the harvest in the Austrian Forests
 - **University of Natural Resources and Life Sciences, Vienna, Inst. f. Marketing & Innovation**
- GHG-emissions/removals from substitute products based on other material compared to those of wood products and fuel wood based on harvest from the Austrian Forests
 - **Environment Agency Austria**

Consistent estimates across the three projects

Studied scenarios (defined in a stakeholder workshop)

-  **R** Reference scenario: business as in the last years
-  **1a** Increased demand of wood for energy (+20% until 2100)
-  **1b** Increased demand of wood for products (+20% until 2100)
-  **1c** like 1b, but optimistic import possibility for roundwood (up to 150 % of recent import)
-  **2** reduced harvest/stock increase scenario based on implementation of enhanced nature protection measures

Methods

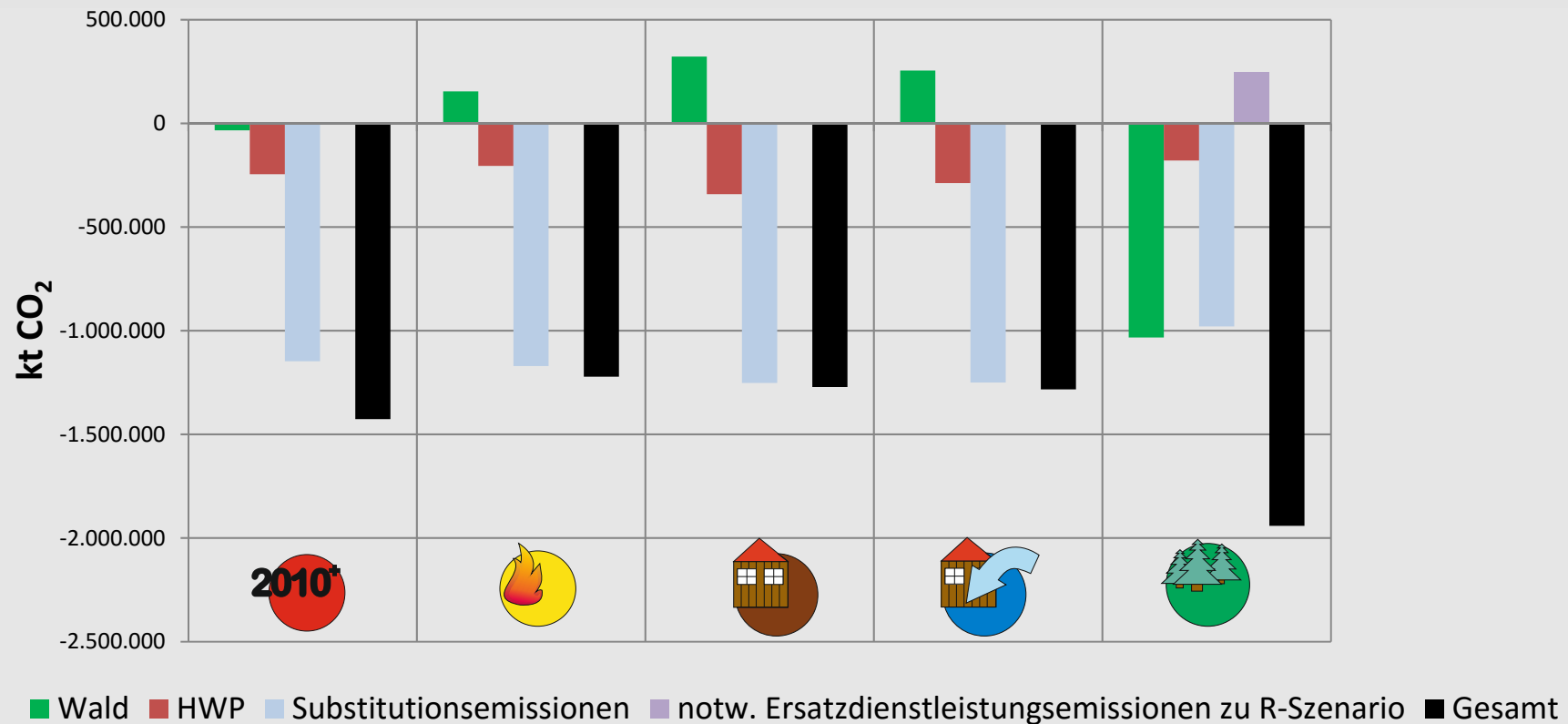
Four models were used:

- CALDIS: Forest Growth and yield model
- YASSO07: Soil C model
- FOHOW: Economic wood products model
- GEMIS: Ecobalance model (total emissions of production/use/disposal for each product)

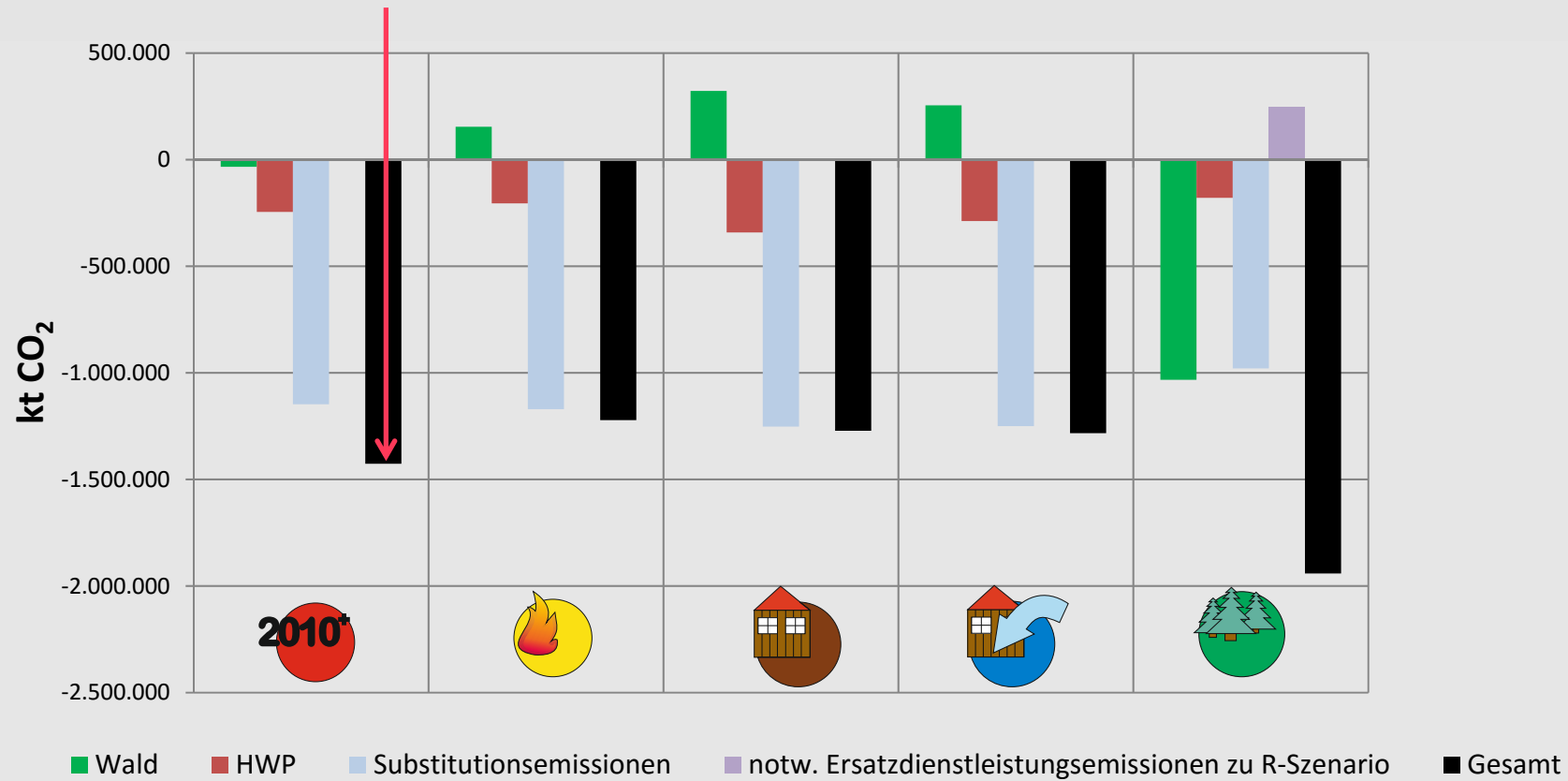
Simulations were started from the current status of the Austrian Forests according to NFI results

Demand according to scenarios and economic framework conditions as well as availability in the forests and framework conditions for forest management determined the harvest

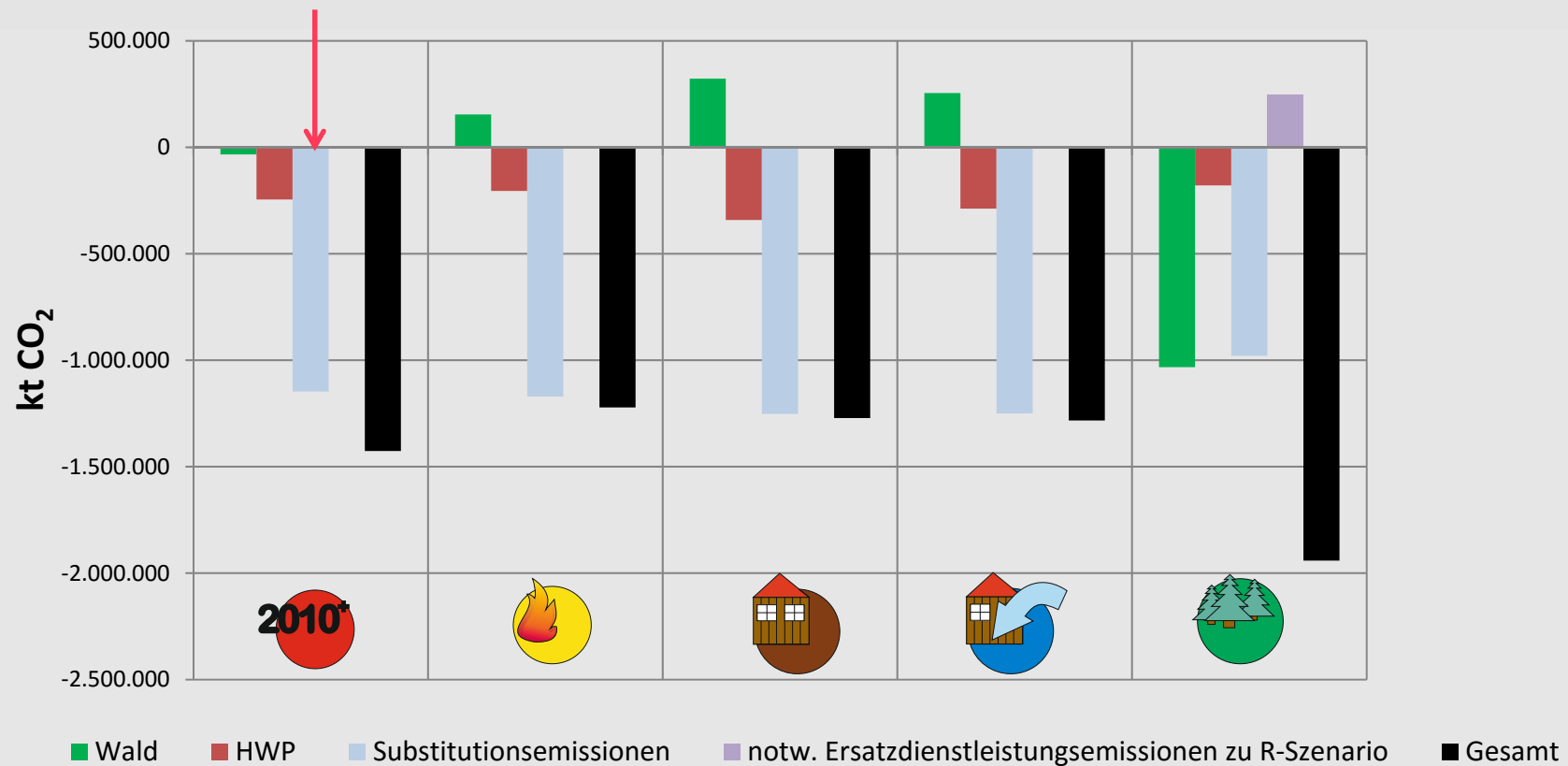
Cumulative removals/avoided emissions (-) or emissions (+) in the different scenarios until 2100



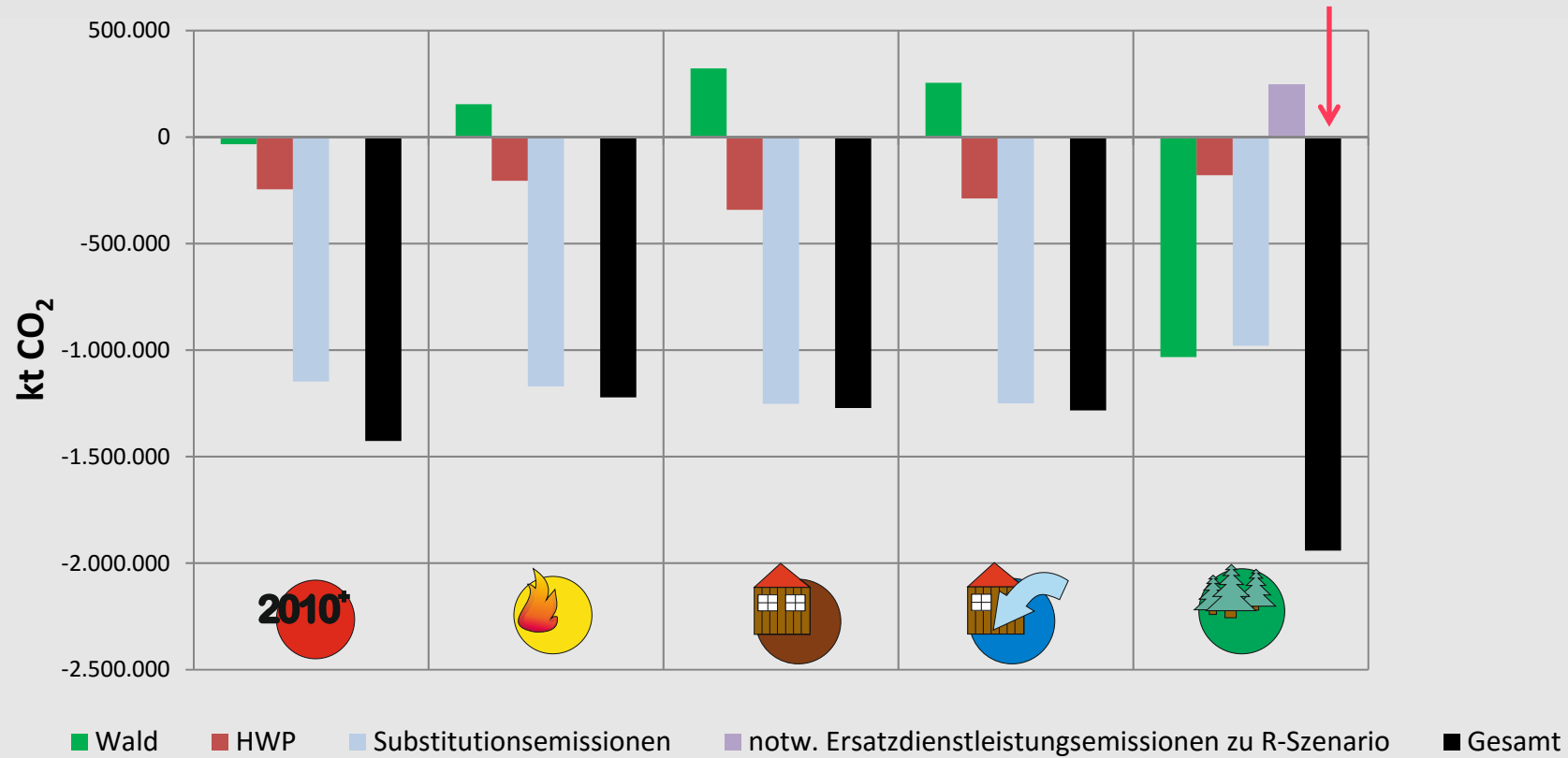
Within 90 years the amount of 20 annual Austrian GHG emissions are avoided/sequestered by the Austrian wood chain



Particularly the avoided emissions by the wood products compared to the substitute products are responsible for this positive effect

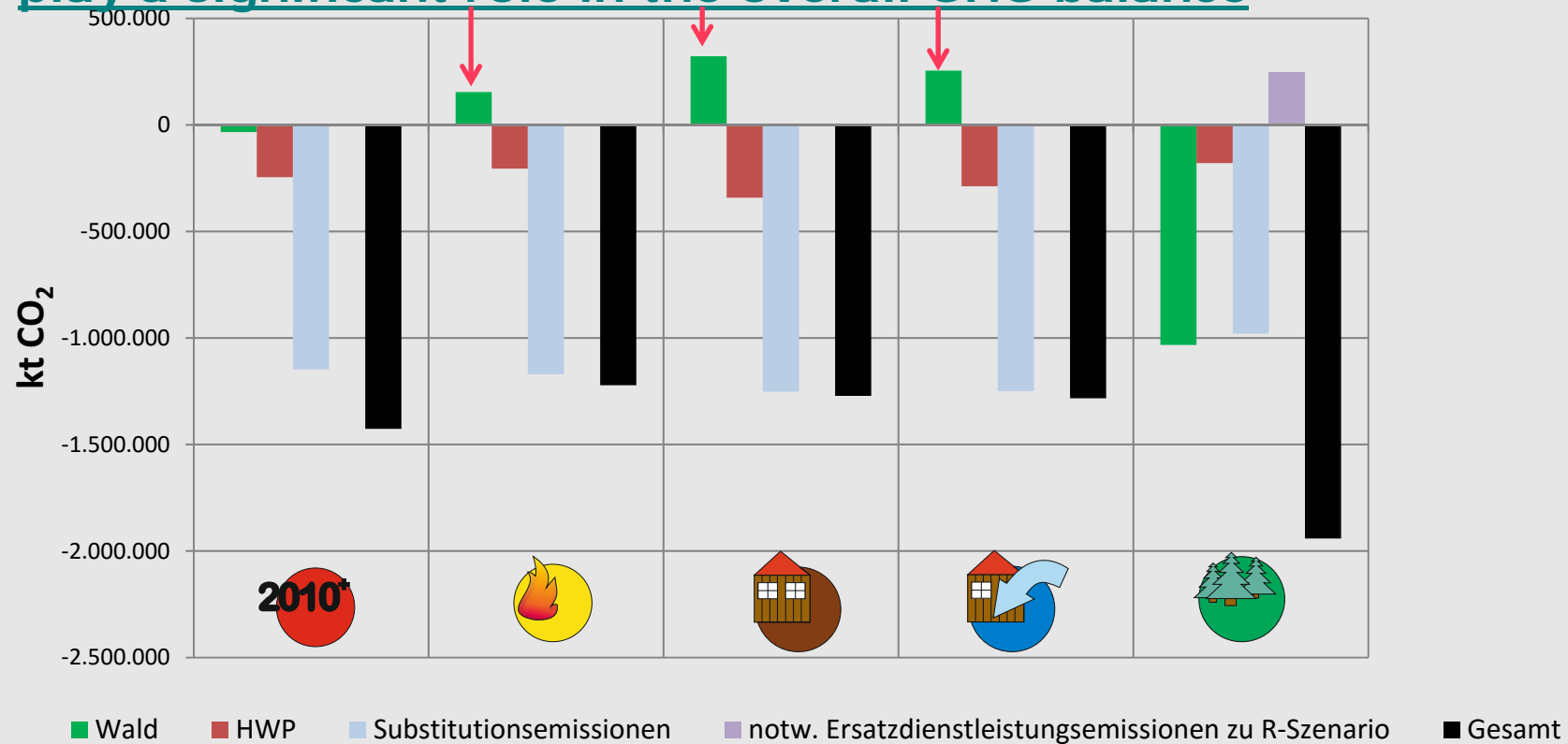


Scenario 2 with the reduced harvest shows the best overall results due to the C stock increase in the forests while hardly reducing the coniferous sawnwood delivery from the forests and therefore sustaining the avoided emissions at a high level



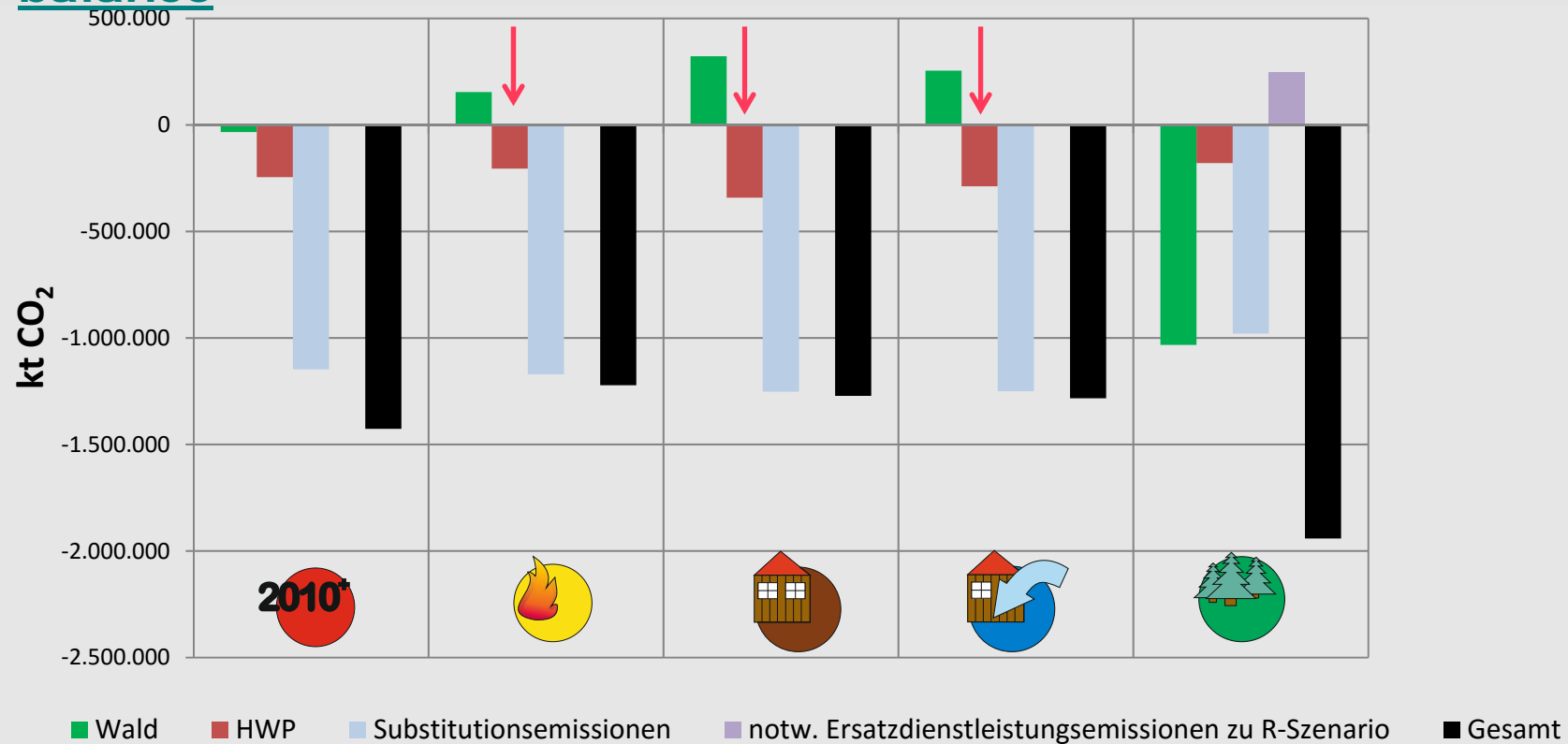
Scenario 1a, 1b and 1c with increased wood demand and C stock reduction in the forests show similar results (also compared to the R Scenario)

The GHG impact of the management operations in the forests play a significant role in the overall GHG balance



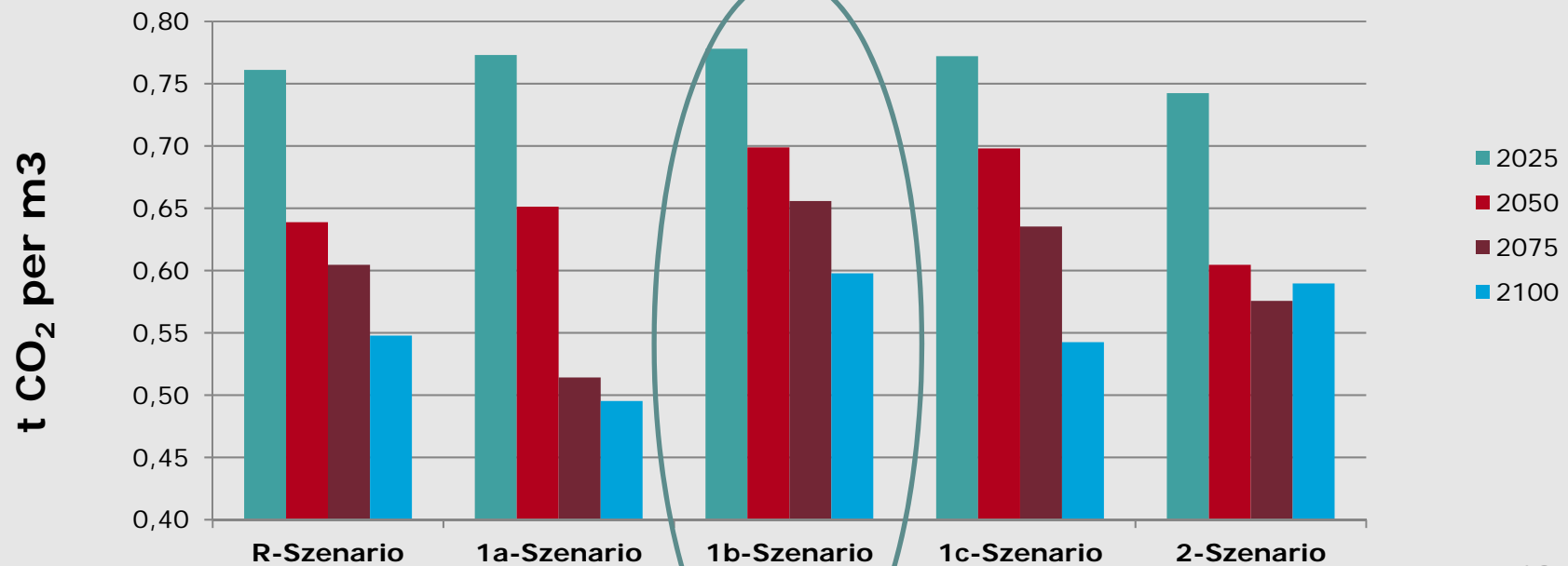
Scenario 1a, 1b and 1c with increased wood demand and C stock reduction in the forests show similar results (also compared to the R Scenario)

And, the purpose of wood use matters in the overall GHG balance



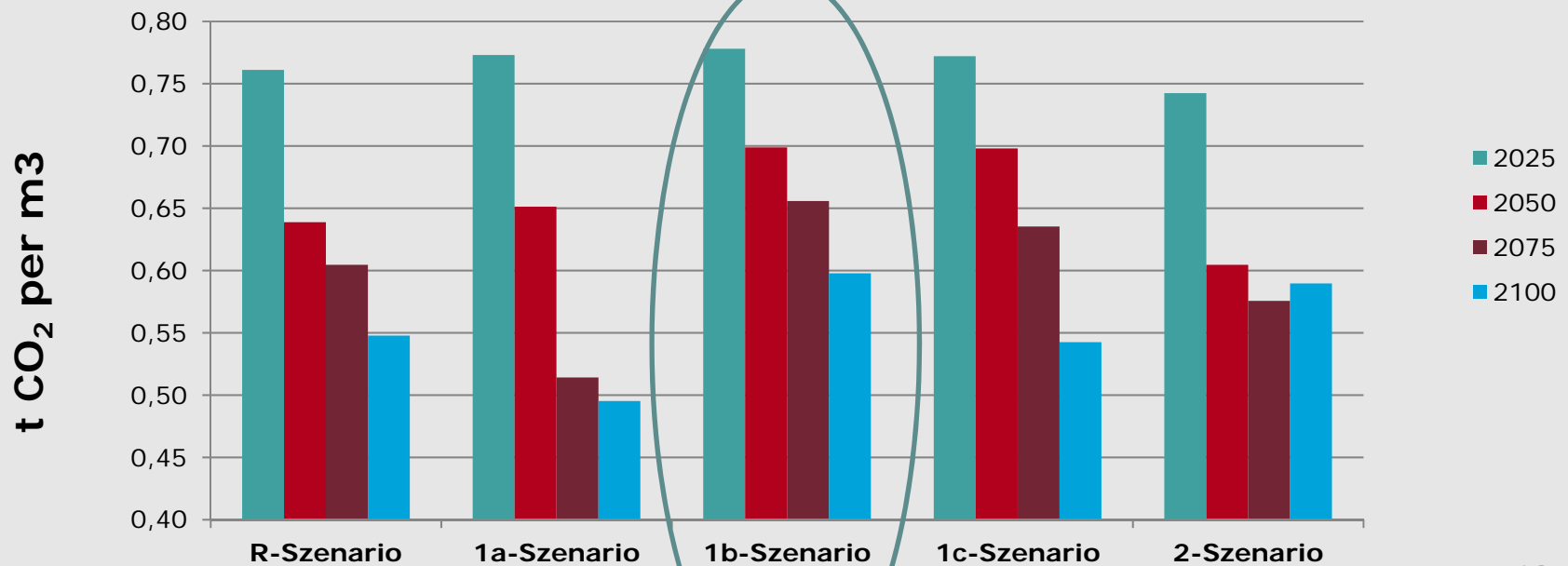
The GHG reduction per m³ harvested wood is best for the Scenario 1b with enhanced wood product use

Avoided GHG emission and HWP sink per harvested m³ wood



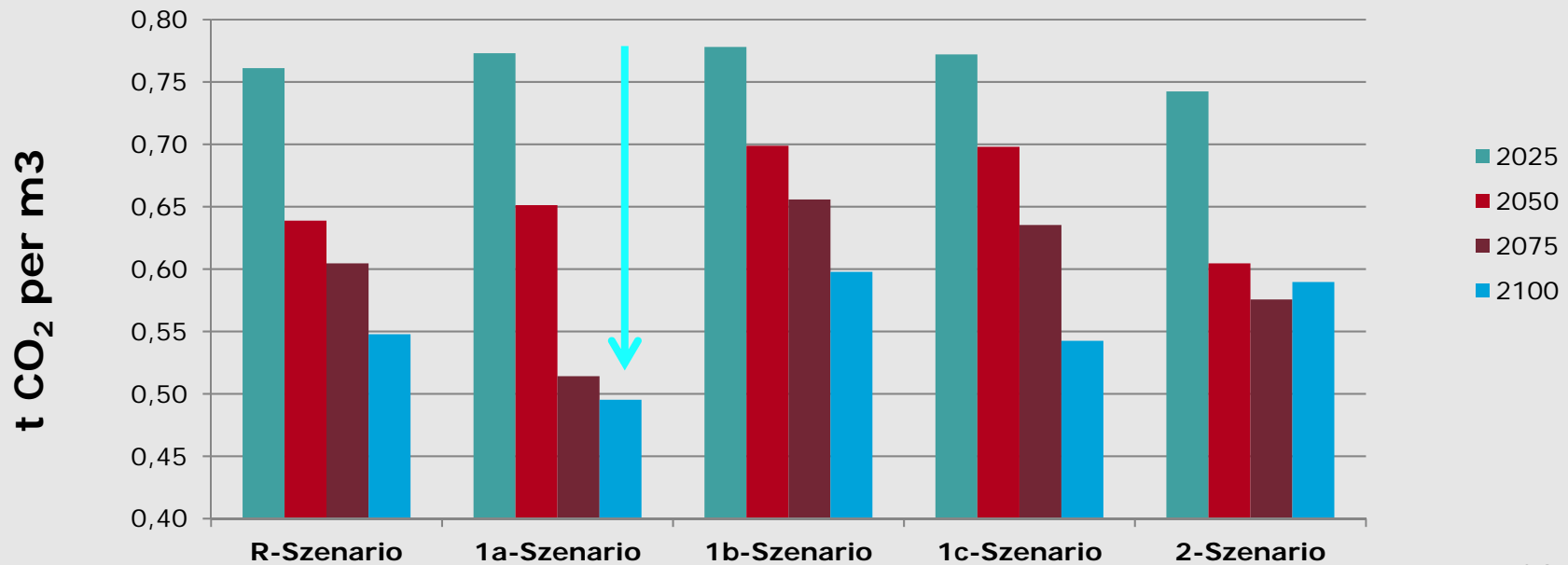
Under scenarios with equal C stock trends in the forests, scenario 1b would lead to the best results

Avoided GHG emission and HWP sink per harvested m³ wood



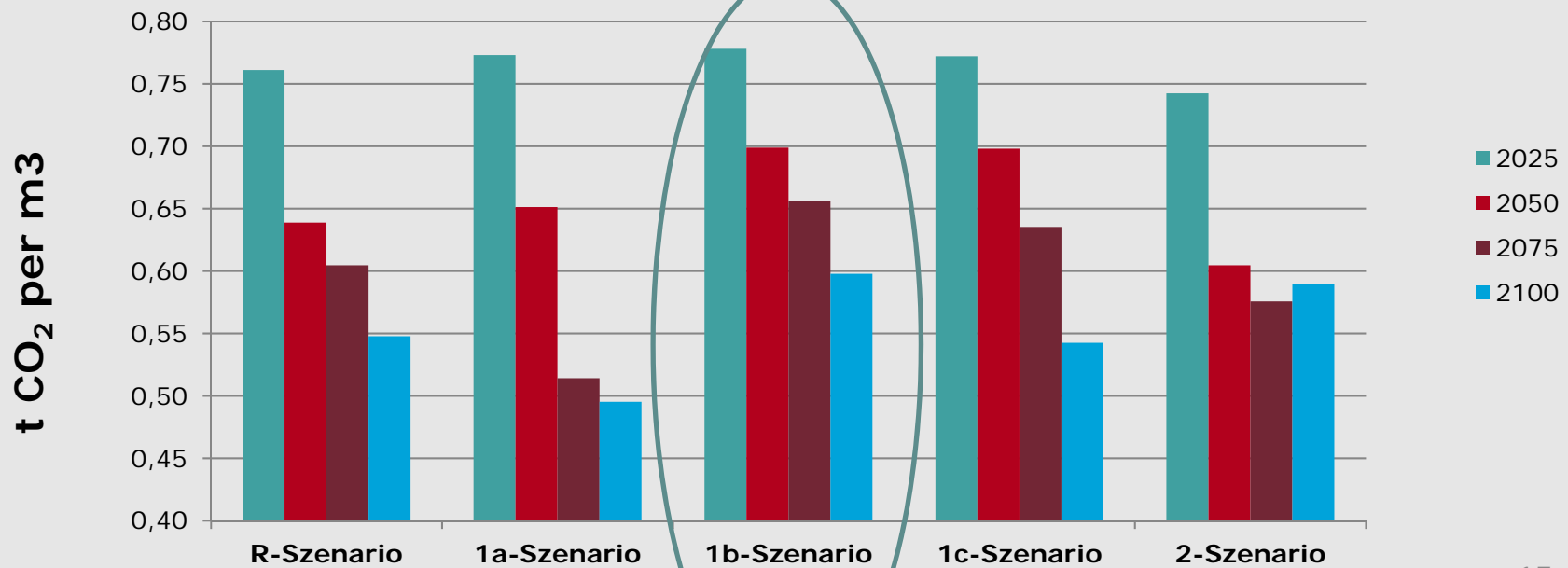
The GHG reduction per m³ harvested wood is worst for the Scenario 1a with enhanced direct use of wood for energetic purposes

Avoided GHG emission and HWP sink per harvested m³ wood

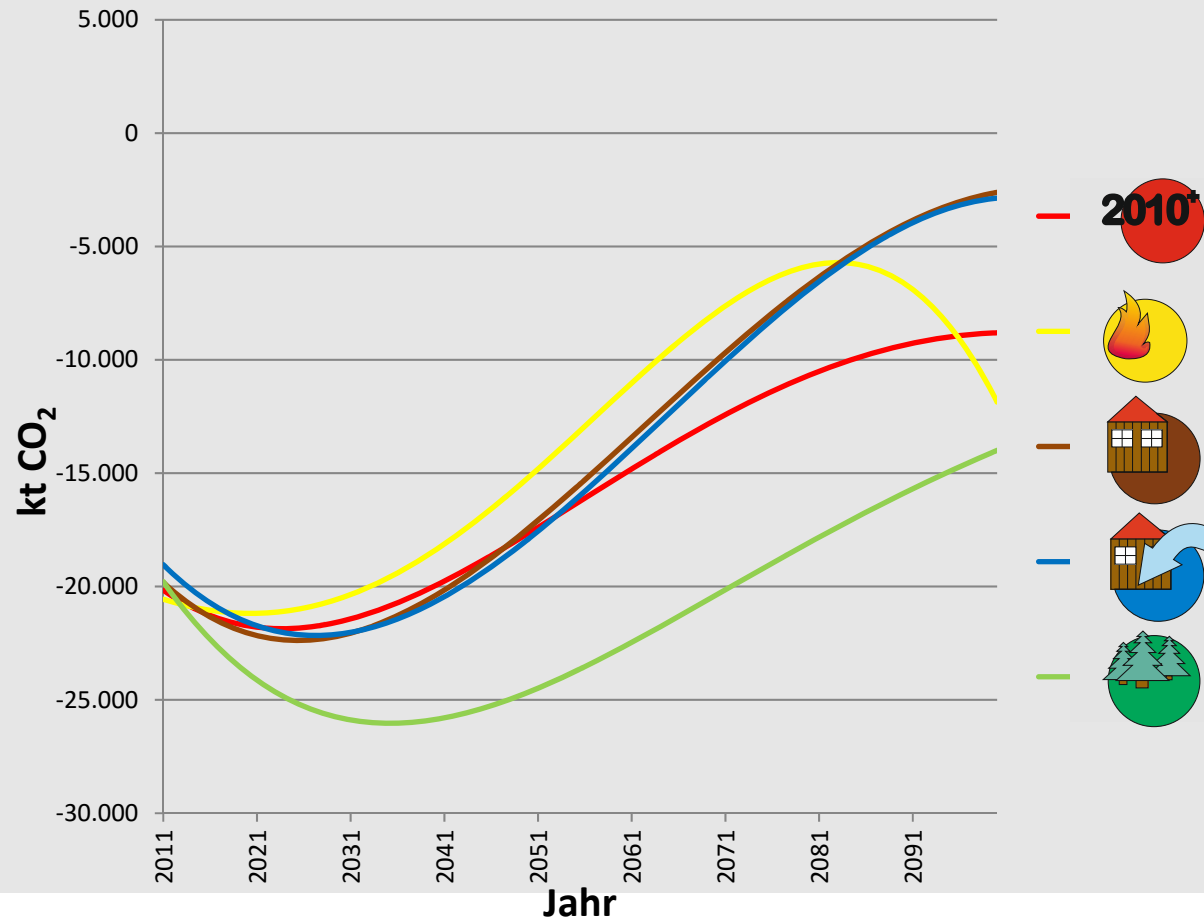


A cascadic use of wood (wood products – recycling – energetic use at the end of product life cycle), where possible, is better for the GHG balance

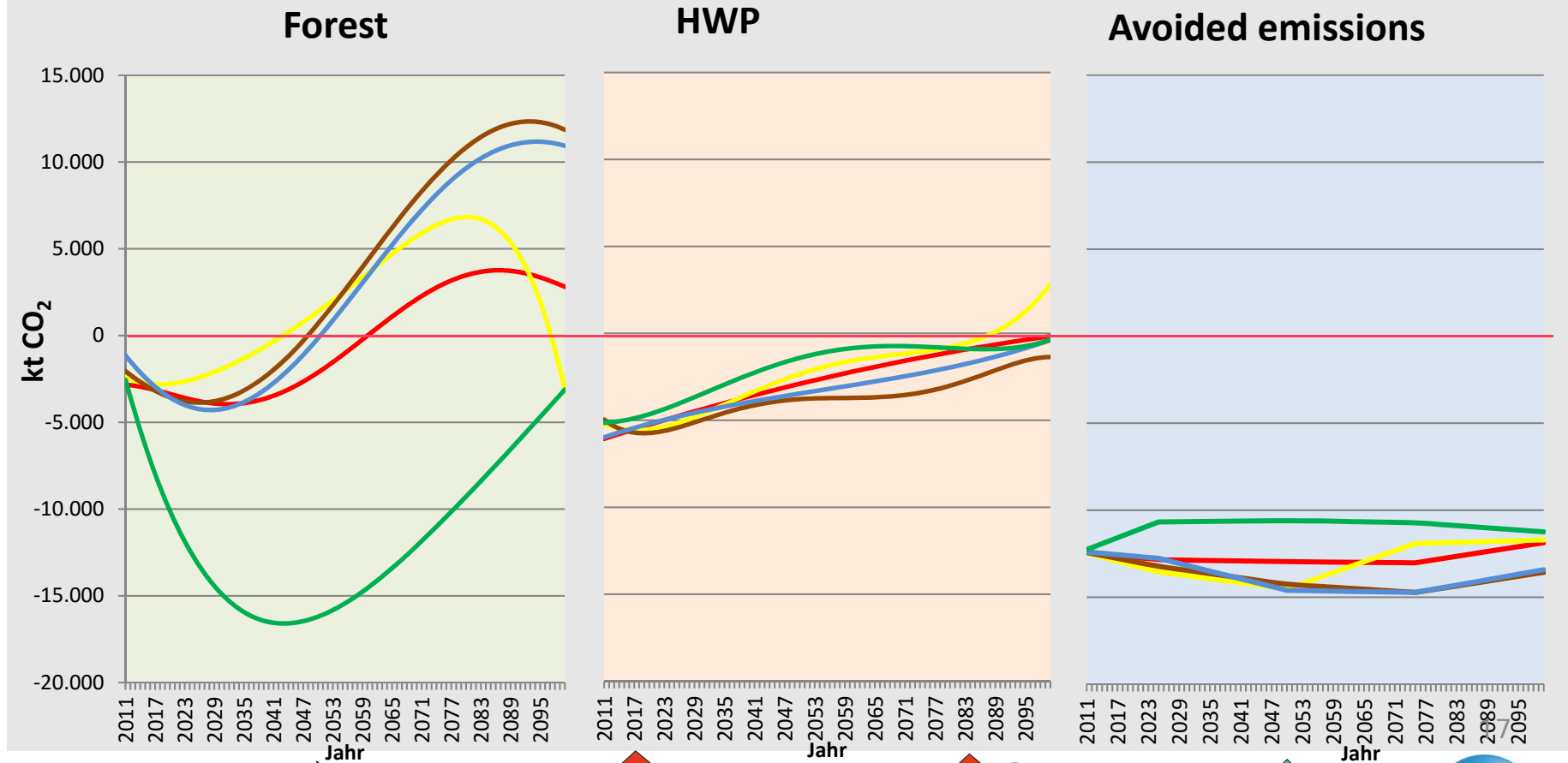
Avoided GHG emission and HWP sink per harvested m³ wood



All scenarios show their best GHG balance within the next three decades. Afterwards the removals/avoided emissions decrease.



Trend of the annual GHG balance in the three parts and in the five scenarios



Acknowledgement

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- Environment Agency Austria:
 - David Fritz, Werner Pölz, Carmen Schmid

Thank you for your attention

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