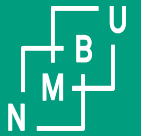


# The harvest volumes compatible with the EU Forest Reference Levels considered in light of the global forest sector developments



Results and conclusions based on trend and forest sector model projections

**Maarit Kallio, NMBU, Norja & Risto Päivinen, Tapio**  
Metsäekonomistiklubin iltapäiväseminaari, 14.3.2022.

*Eesitys perustuu tutkimukseen*

*Päivinen, Kallio, Käär & Solberg. 2022. Forest Policy and Economics*

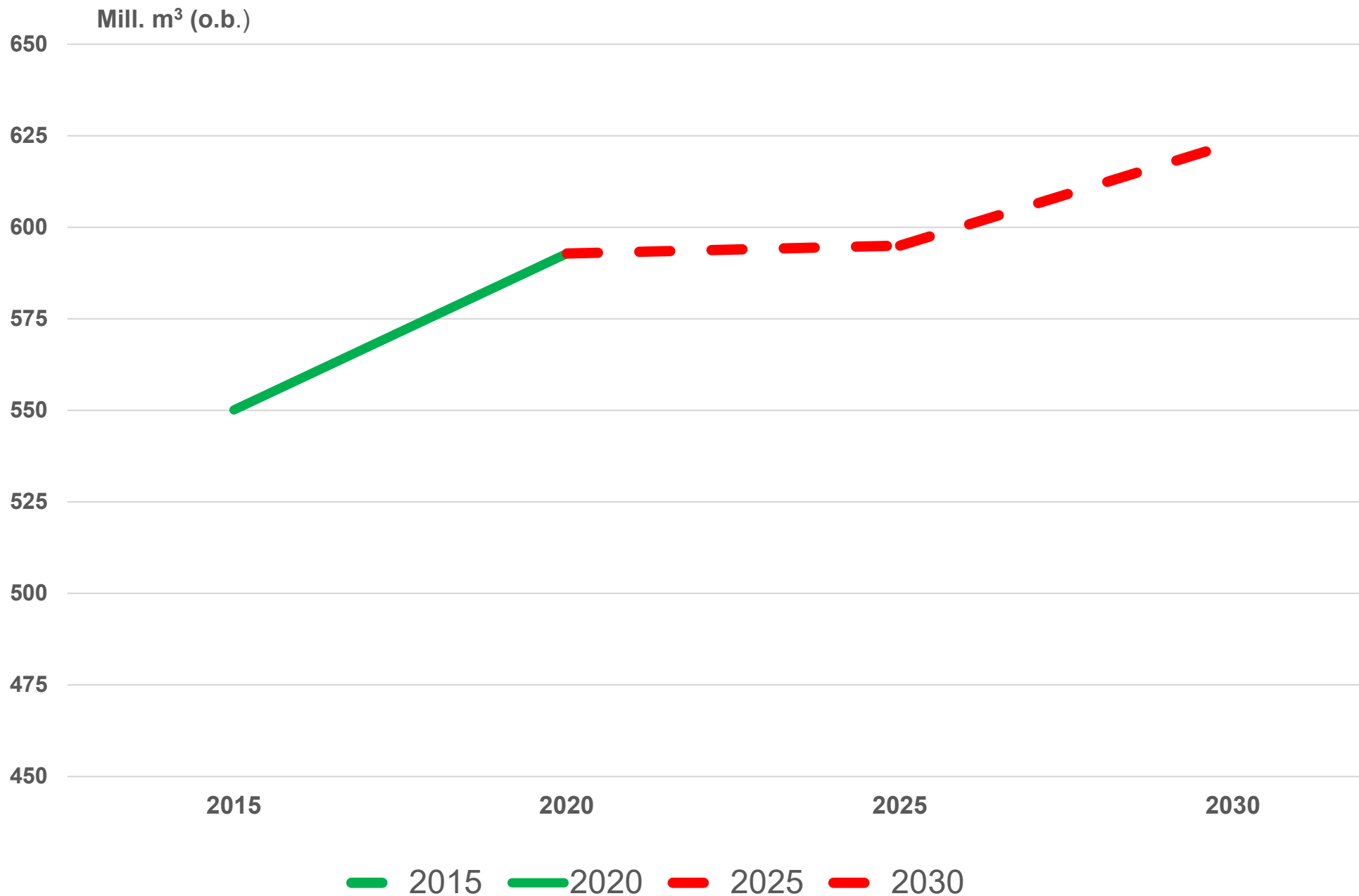
# Total FRL compatible harvests in 2030 in the EU+UK+N exceed the harvests in 2020

The harvest levels compatible with the reference carbon sinks for forest management in 2030 are well above the current harvests in the region EU+Norway+the UK



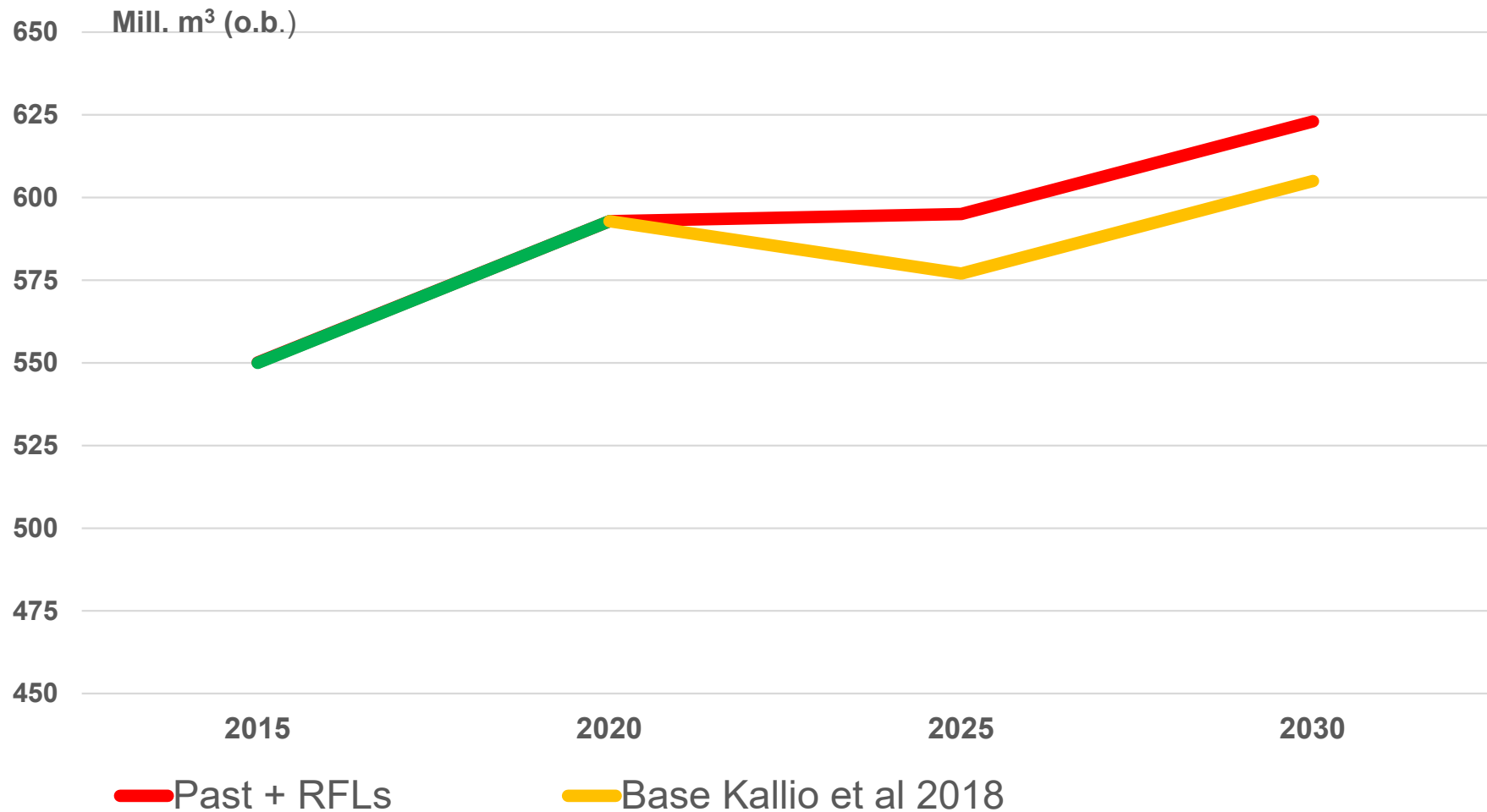
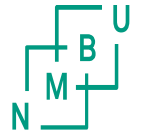
**FRLs will not affect the forestry and forest-based industries *or do they?***

# Roundwood harvest in EU+UK+N up to 2020 and the FRL compatible ones in 2025 and 2030



*Up to 2020 from FAOSTAT*

# RFL compatible harvests are also above our previous baseline projection\*



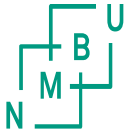
# Study setting



- FRL compatible harvests (EU, UK, N) compared to
  - Simple trend harvests up to 2030
  - Harvests projected by two global forest sector models
- Global market impacts where projected for the hypothetical case where countries decided to avoid reporting emissions from forest management.

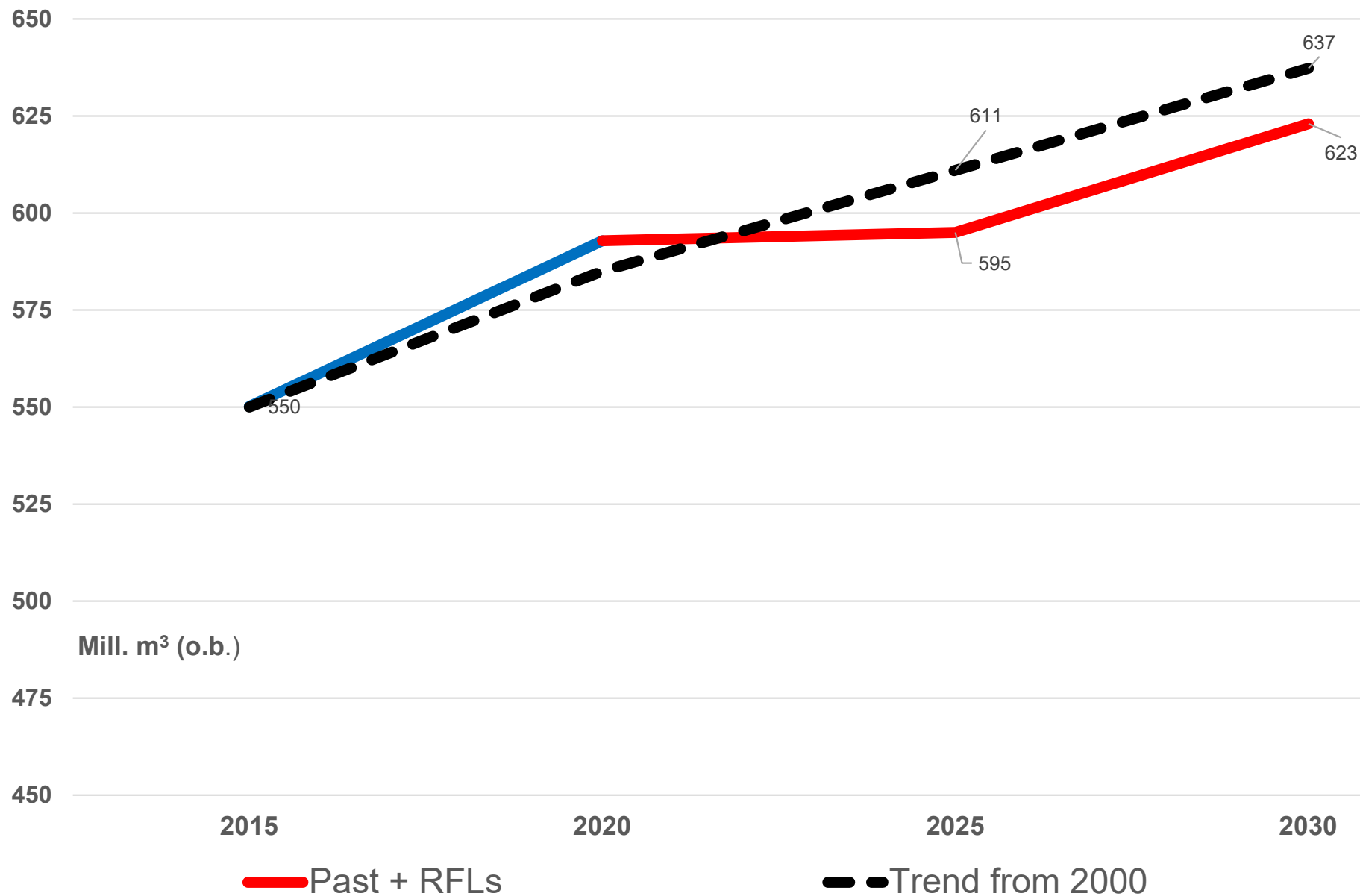
Note that we do not claim that governments have power to implement such a policy. But it is a spirit of the LULUCF policy that emissions are not desirable.

# Study setting I: simple trend



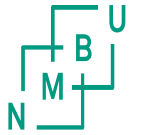
- FRL compatible harvests (EU, UK, N) were compared to
  - Simple trend of harvests up to 2030
    - Linear trend based on 2000-2019 harvests

To reach FRLs, EU+N+UK countries should curb the harvest trend. Else some countries in the area need to report FM emissions



Up to 2020 from FAOSTAT, except Trend 2020

# Study setting II: models



- FRL compatible harvests (EU, UK, N) were compared to
  - harvests projected by two global forest sector models.
  - Also, impact on global forest sector developments was examined.
  - EFI-GTM, Kallio et al. (2018)
  - FORMEQ, Kallio (2021)

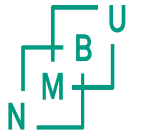


# Cases where countries are not exceeding their FRL compatible harvest levels after 2020 compared to three alternative baseline cases

- One as documented in Kallio et al. (2018) projected with the EFI-GTM
- One as in Kallio (2021) projected with the FORMEQ model, slightly modified (GDPs, textile pulp elasticities and Chinese plywood production revised)
  - Adding sub-case: Russian ban for some rw exports in 2022

For that article FRL compatible harvest levels were not available. Now it was possible to repeat the case.

# About the forest sector models

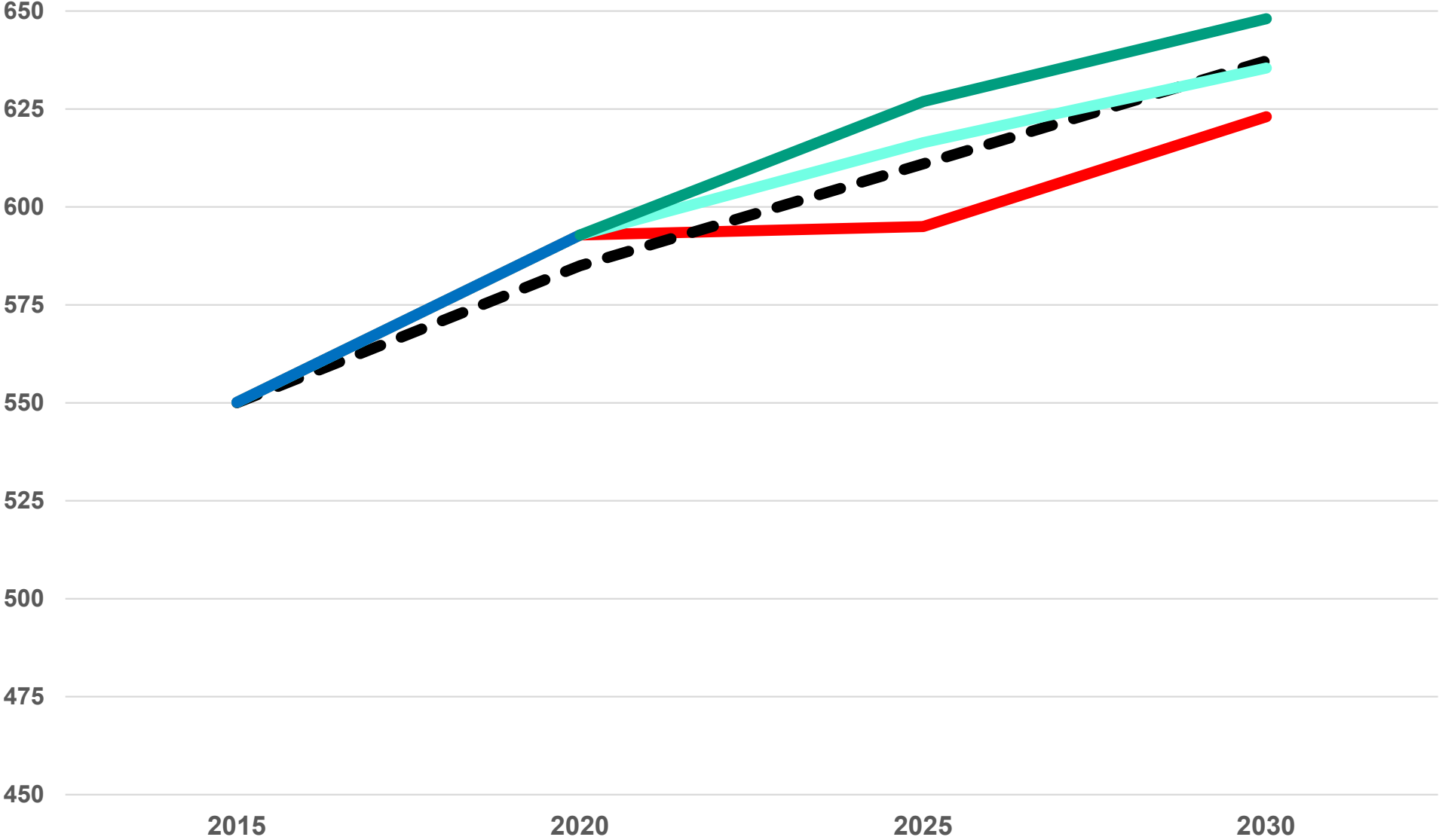


- Partial market equilibrium models for the global forest sector that:
  - mimic the market development based on economic theory and assuming competitive markets.
  - solve equilibrium prices and quantities produced, consumed and traded covering the forest products
  - divide world to regions (57 in the EFI-GTM; 117 in the FORMEQ) that produce, consume and trade.
  - are detailed in industrial production technologies, and include 6 roundwood grades
- More about the scenarios and models in the articles cited.

# Roundwood harvest as in trend and in the two baseline cases projected by FORMEQ (in EU+UK+N)

(w/o and with Russian taxes for rw export in 2022)

Mill. m<sup>3</sup> (o.b.)



Past + RFLs

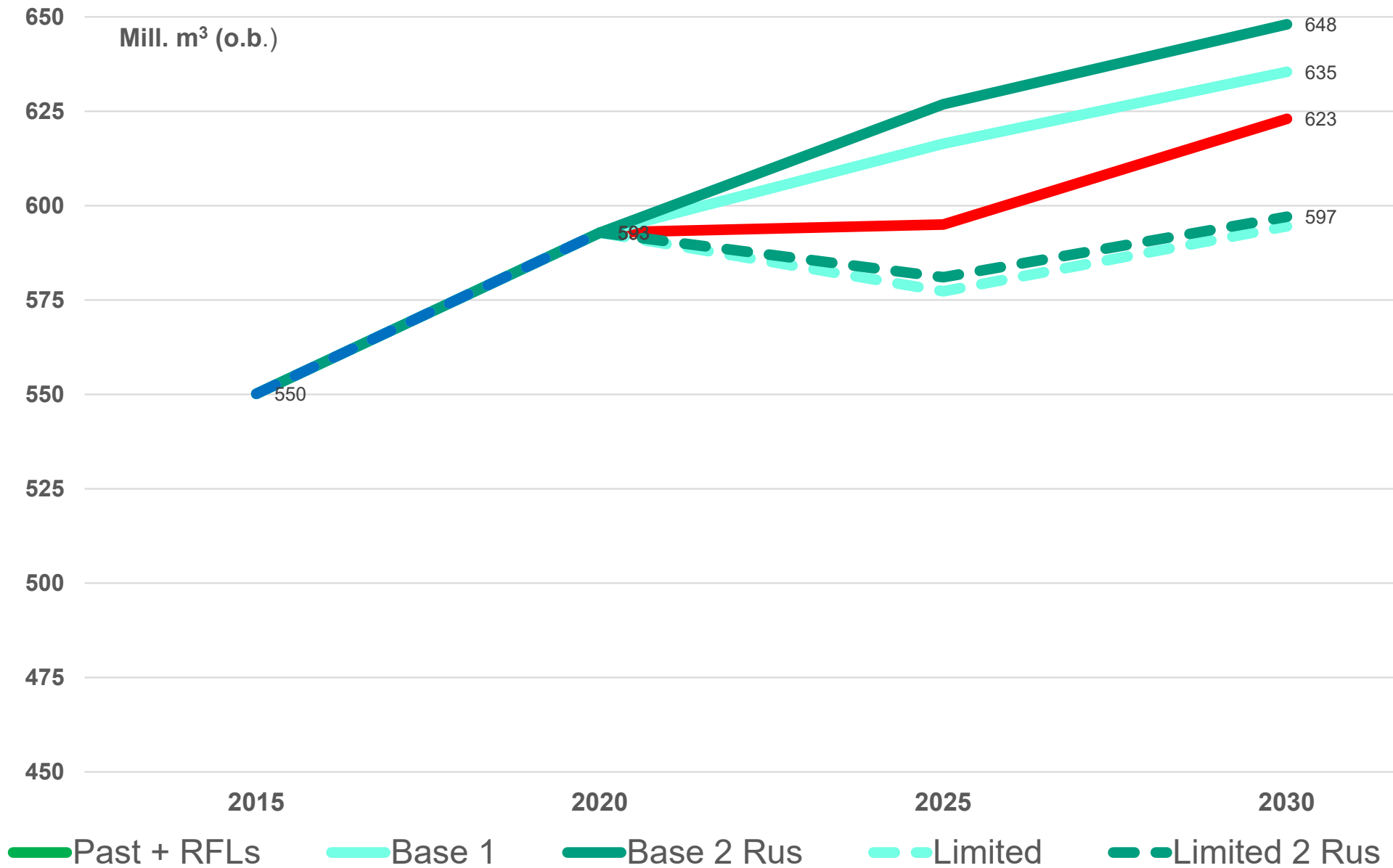
Trend from 2000

Base 1

Base 2 Rus

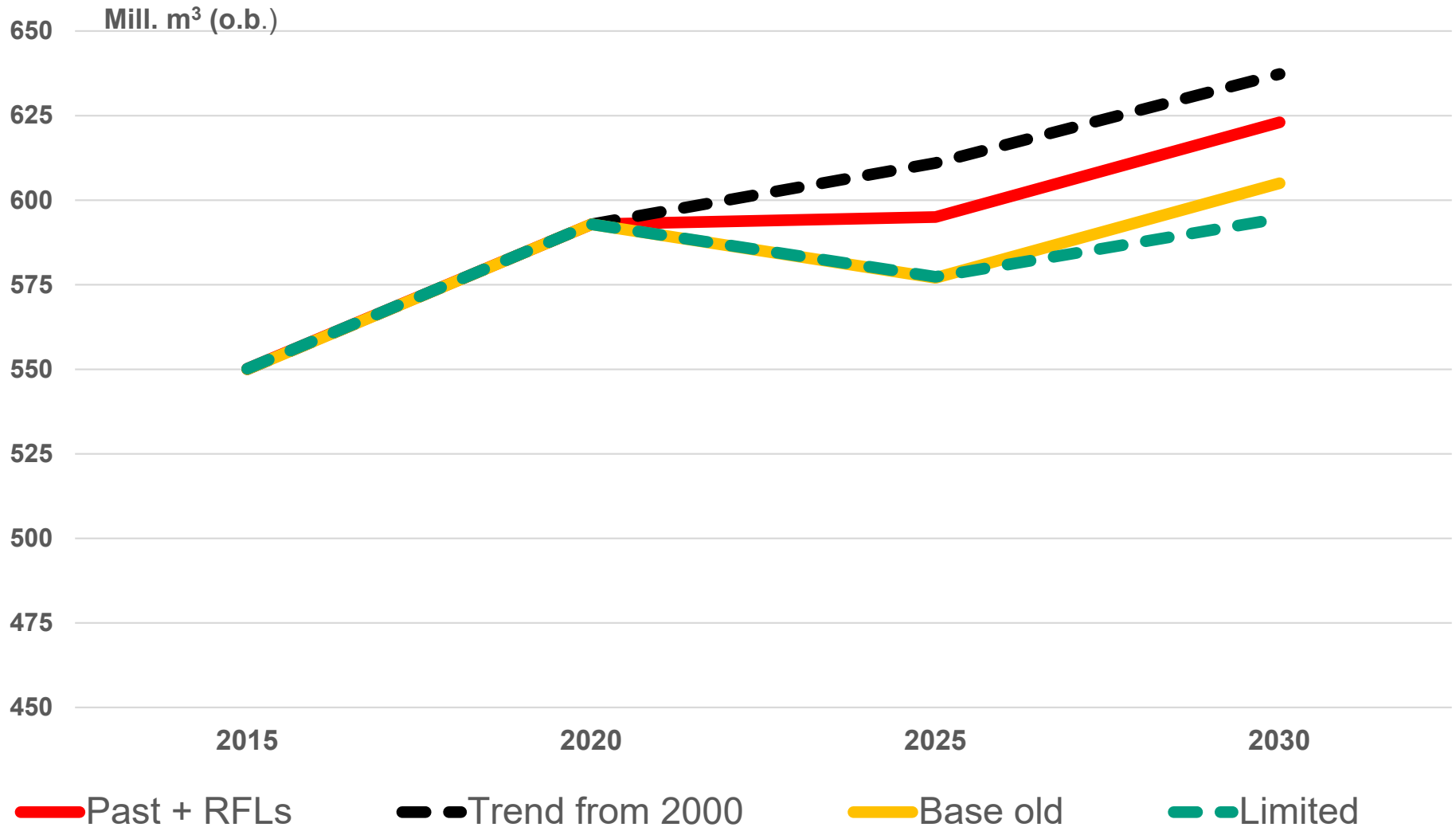
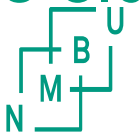
Up to 2020 from FAOSTAT, except Trend 2020

# Roundwood harvest in the baselines and in the hypothetical cases where all countries must achieve their own FRLs (Limited)



Up to 2020 from FAOSTAT, except Trend 2020

# Roundwood harvest in the baseline Kallio et al. 2018 (Base old) and in the hypothetical case where all countries must achieve their own FRLs (Limited).



# Changes in production, 2030



Baseline vs. case where no country harvests more than its FRL compatible level

	Round-wood	Pulp	Sawnwood & plywood	Mechanical board
EU+N+UK	-40.9	-1.2	-5.2	-3.0
RoW	26.1	-0.7	3.6	1.7
World	-14.8	-1.9	-1.5	-1.3
Leakage%	64%	none	70%	55%

# Changes in production, 2030

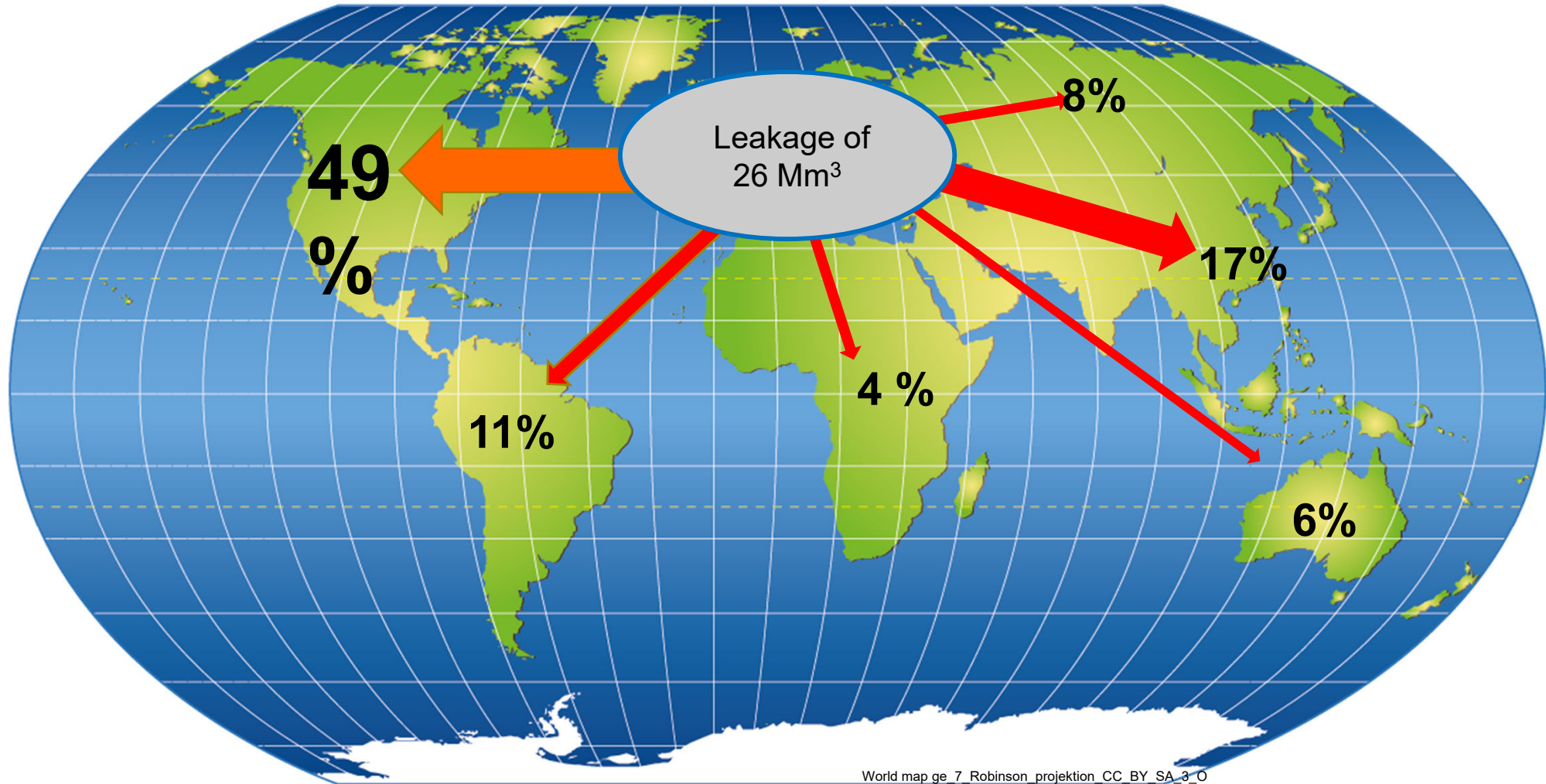
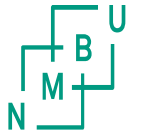


Baseline vs. RFL-limited case  
with Russian rw export ban 2022

	Round-wood	Pulp	Sawnwood & plywood	Mechanical board
EU+N+UK	-51.0	-1.1	-7.8	-3.6
RoW	30.5	-1.6	5.2	2.1
World	-20.5	-2.7	-2.6	-1.5
Leakage-%	60%	None	66%	58%

FORMEQ projections.

# Regional allocation of the leakage of roundwood harvests in 2030



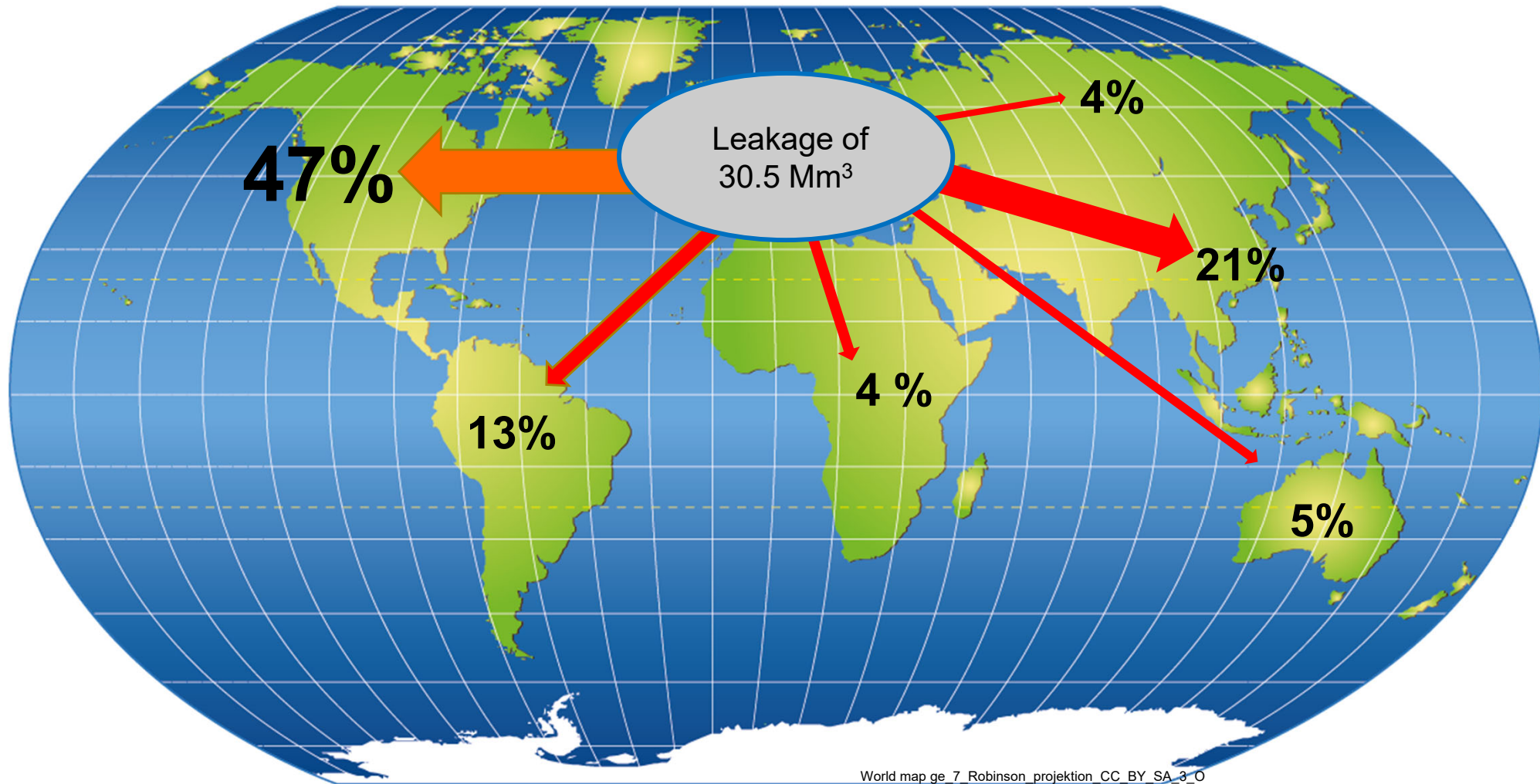
-41 Mm<sup>3</sup>  
from EU+N+UK

+26 Mm<sup>3</sup>  
to elsewhere

Leakage  
rate 64%



# Regional allocation of the leakage of roundwood harvests in 2030 with less imports from Russia



-51 Mm<sup>3</sup>  
from EU+N+UK

+30.5 Mm<sup>3</sup>  
to elsewhere

Leakage  
rate 60%

# Conclusions 1/3

***At the EU level, there may become deficit of forest carbon credits that could be transferred between MSs by 2030.***

The aggregated FRL compatible harvest level is below the plausible trend or market-driven future harvests in the region in 2030.

- Some countries will need to report emissions from forest management because of not reaching their FRL sinks and they must find GHG savings from land categories other than managed forests.
- Alternatively, they need to find measures that change the harvests development.

# Conclusions 2/3

***Harvests lower than the market-driven levels would cause substantial leakage of harvests and forest-based production from the EU to other countries.***

If the countries would implement policies that reduce their harvests from their market-driven levels, harvest leakage to countries outside of EU+UK+N region would occur.

For each 1 m<sup>3</sup> of reduced harvests in EU+UK+N, other regions were projected to increase their harvests by 0.6 - 0.64 m<sup>3</sup>. For sawlogs, the leakage rate was higher. Additionally, some leakage of forest industry production would also take place.



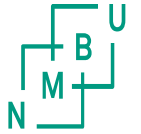
## Conclusions 3/3

### ***Harvest leakage increases the costs of using reduced harvest in Europe for climate change mitigation***

Given that GHG implications of roundwood harvests were equal globally, a leakage rate e.g., around 60% would imply that the costs of saving 1 t CO<sub>2</sub> emissions in Europe by harvesting less should be multiplied by 2.5 in order to obtain a more accurate cost estimate

- 1 tonne of CO<sub>2</sub> “saved” in Europe gives only some 0.40 t CO<sub>2</sub> -savings globally.

# Kiitos!



**Financial support for this work from the Ministry of Agriculture and Forestry in Finland and the Norwegian Research Council (NFR 302701) is gratefully acknowledged.**

## Articles cited:

- Päivinen, Kallio, Solberg, Käär, 2022. EU Forest Reference Levels: The compatible harvest volumes compiled and assessed in terms of forest sector market development. Forthcoming in *Forest Policy and Economics*
- Kallio, 2021. Wood-based textile fibre market as part of the global forest-based bioeconomy. *Forest Policy and Economics*, 123, 102364
- Kallio, Solberg, Käär & Päivinen, 2018. Economic impacts of setting reference levels for the forest carbon sinks in the EU on the European forest sector. *Forest Policy and Economics*, 92, pp. 193–20