Trajectories of sustainable use and supply of biomass in Slovakia for the period 2025-2050

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„Only what it has, will burn“

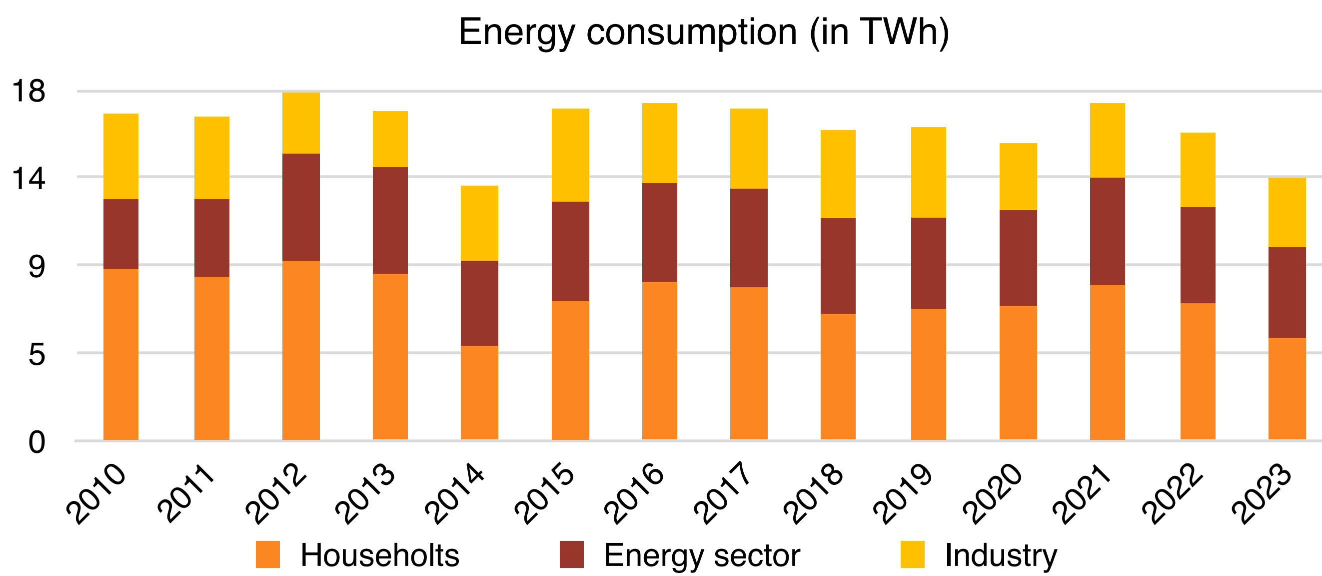
- Paper released officially yesterday! **6.11.2025**

Wood on the verge of change

- Wood is strategic for the transition to a sustainable bioeconomy
- EU is self sufficient in wood production to some extend
- Trade offs
  - Wood use: bioeconomy, renewable energy source
  - Restrictions: nature protection, climate goals
- The question of sustainability in energy use
  - Industrial wood used for energy should not be supported
  - Material use od wood and wood residues should be prioritized
- **Goal: Calculate the effects of different policies on energy and material use of wood**

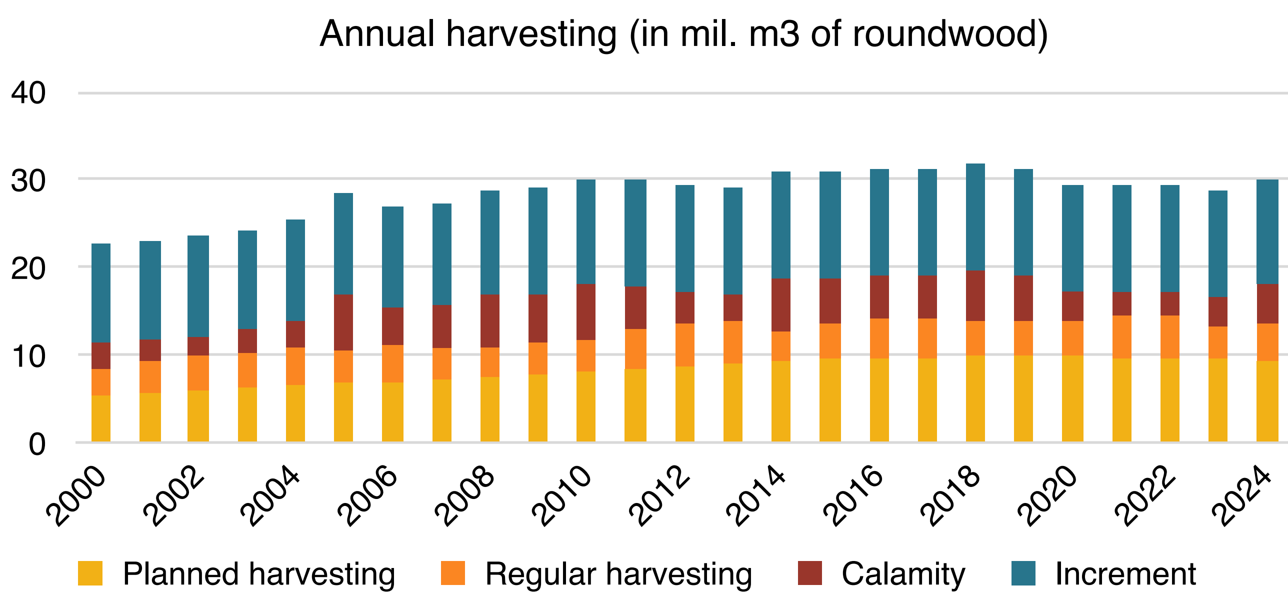
Energy use of biomass

- Accounts for more than 60 % in RES and 9 % total energy
- Larger fluctuations are only due to temperature changes in winter
- Wood in energy statistics: „Solid biomass“
- How will energy use of wood evolve under climate neutrality and RES expansion?



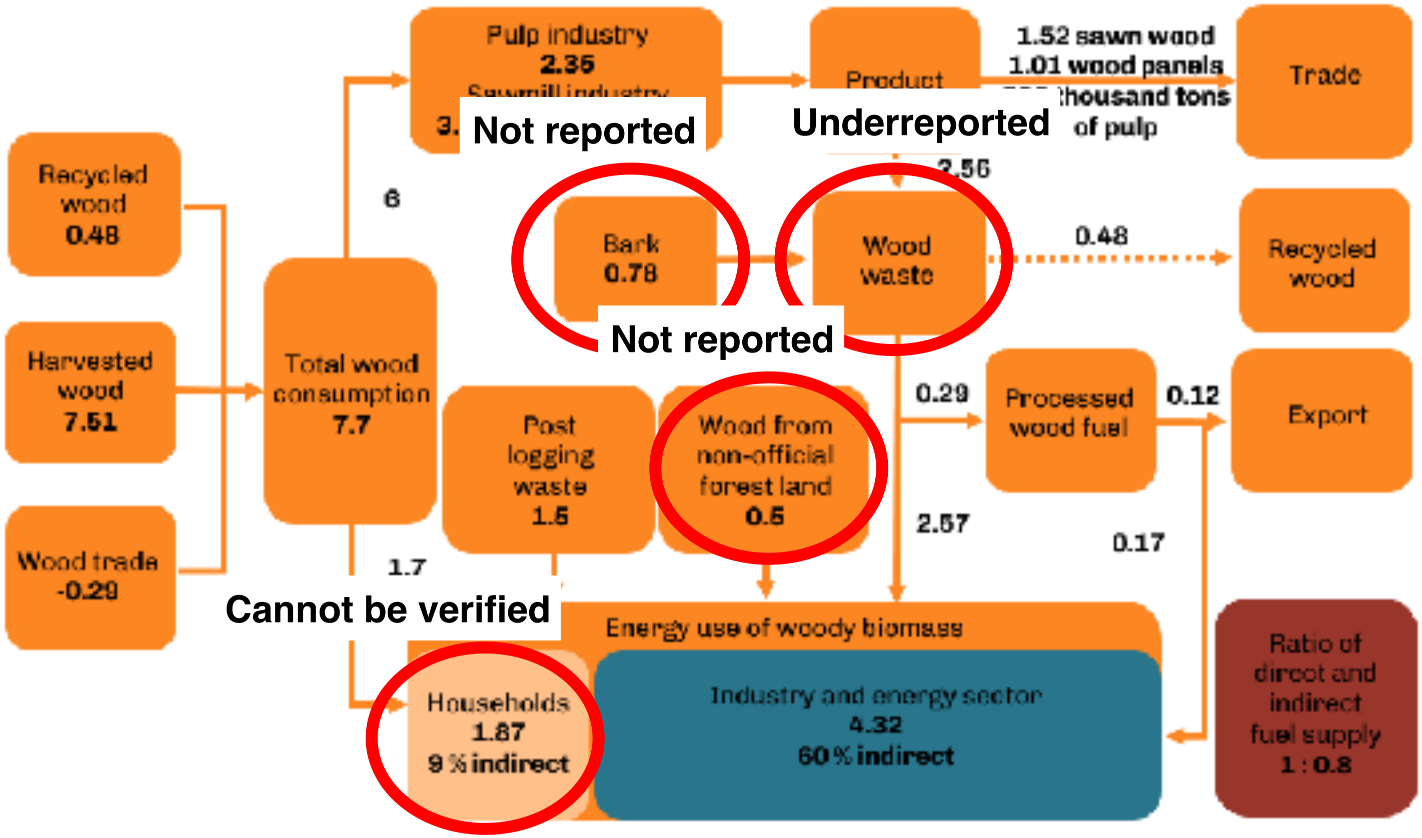
Wood use in Slovakia

- Harvesting is affected by calamities and market fluctuations
- Domestic consumption is lower than annual harvested volume (7,7 mil. m³ on average)
- How will nature protection and climate targets affect harvests?



Mapping present wood flows

- Major data gap → Existing wood use statistics do not capture full energy picture
- 6+ different wood and energy data sources
  - Details obtained though personal contact



Looking forward - demand

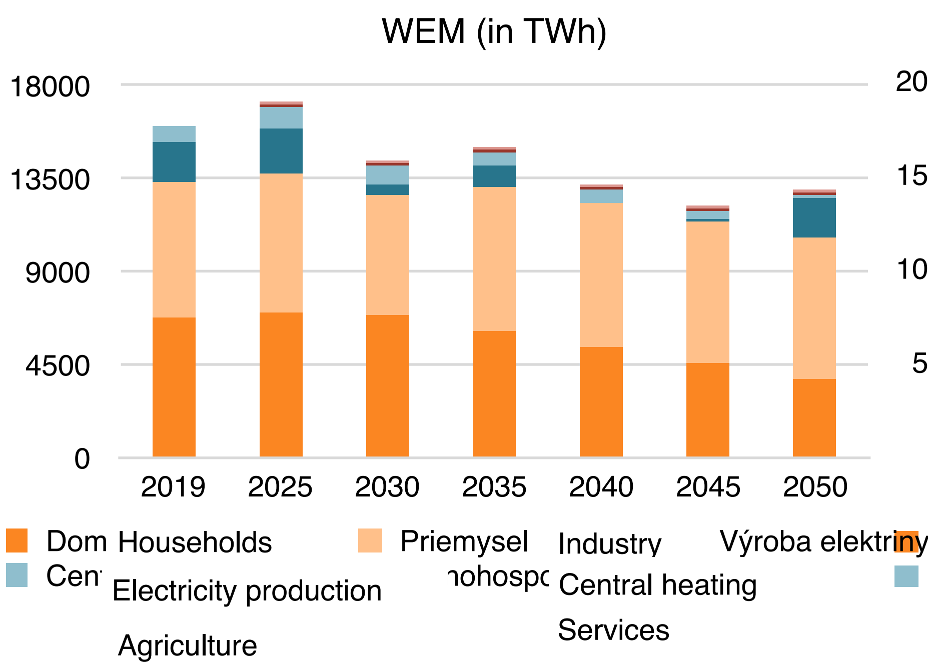
- Use of the CPS model
  - Optimizes the country's energy system
- Biomass energy consumption is part of the results
- The model does not accoung for wood availability in forests
- Two scenarios: reference scenario (WEM) and scenario with additional measures (WAM)
- The results are part of the National Energy and Climate Plan (NECP)

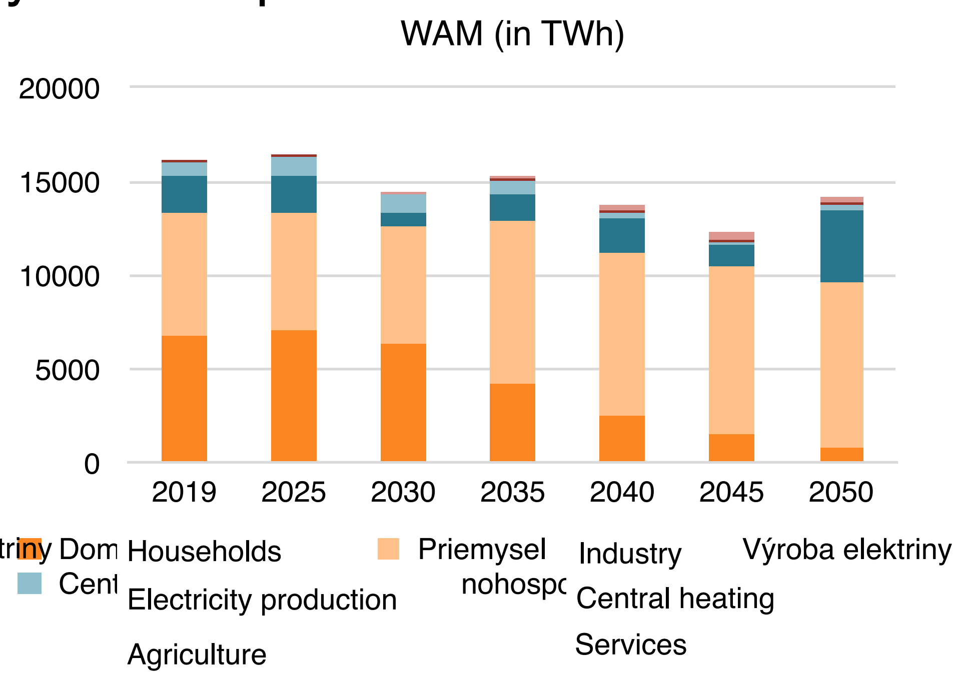
Looking forward - supply

- Forest modeling tool SIBYLA was utilized to simulate reference forest stands
- Reference stands were then matched to data from forest management programs
- Production charasteristics for each forest stand are avalaible
- Three scenarios:
  - Reference – planned harvesting
  - Nature conservation scenario - expansion of non-intervention zones
  - LULUCF scenario - fulfills climate targets

Results - demand

- Future energy system and decarbonisation will not rely on biomass
- Decline in the household sector – offset by heat pumps and higher energy efficiency
- Increase in industrial energy consumption

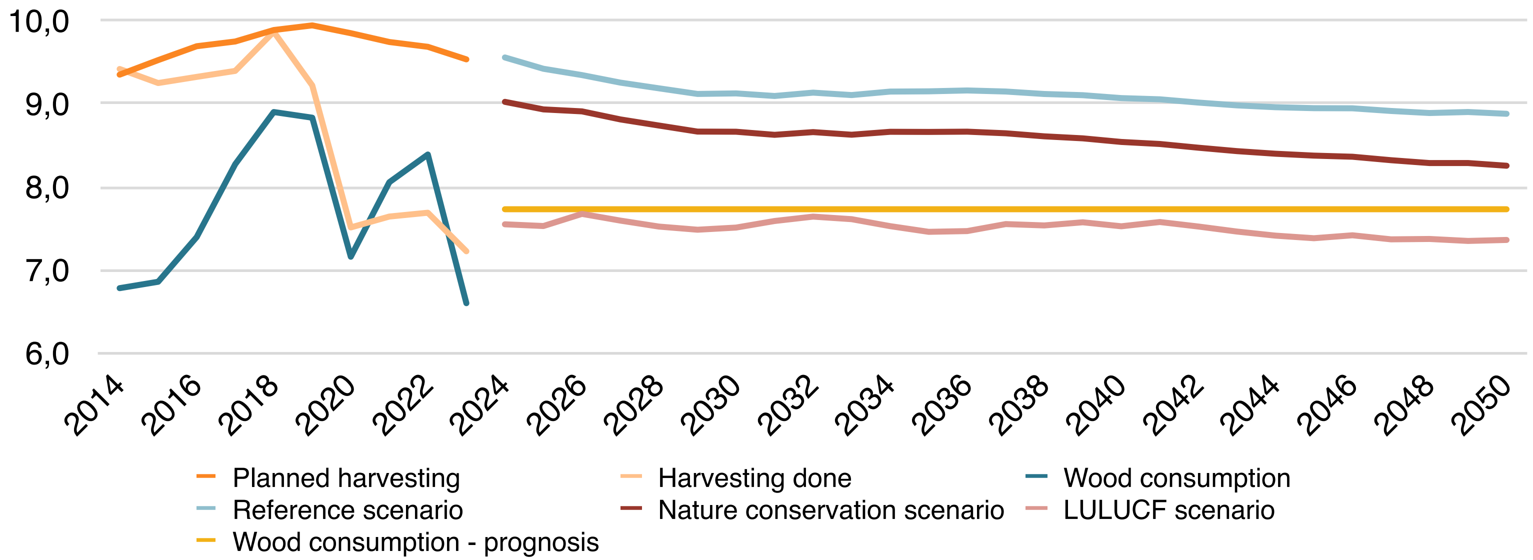




Results - supply

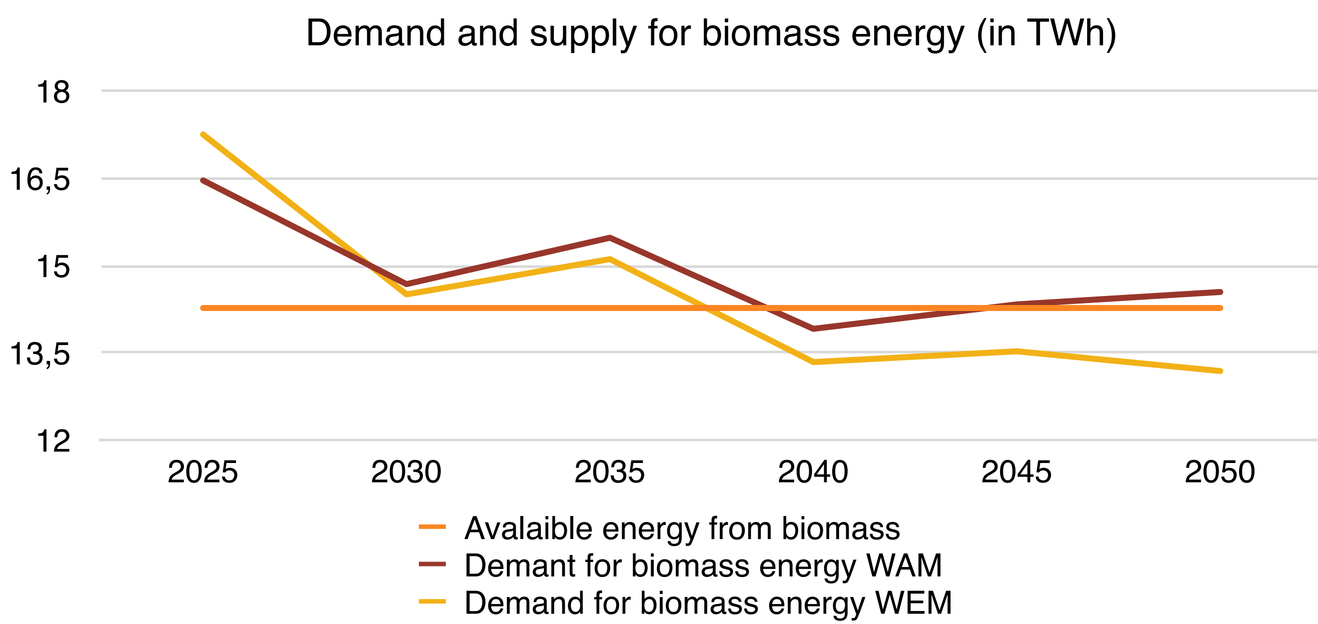
- Harvesting declines in every scenario due to the age of forests
  - Availability of high-quality assortments is declining
- No significant change in industrial consumption is expected
  - Estimated industrial consumption: 5.7 million m^3
  - Estimated total consumption: 7.7 million m^3

Harvesting and consumption prognosis (in mil. m3 of roundwood)



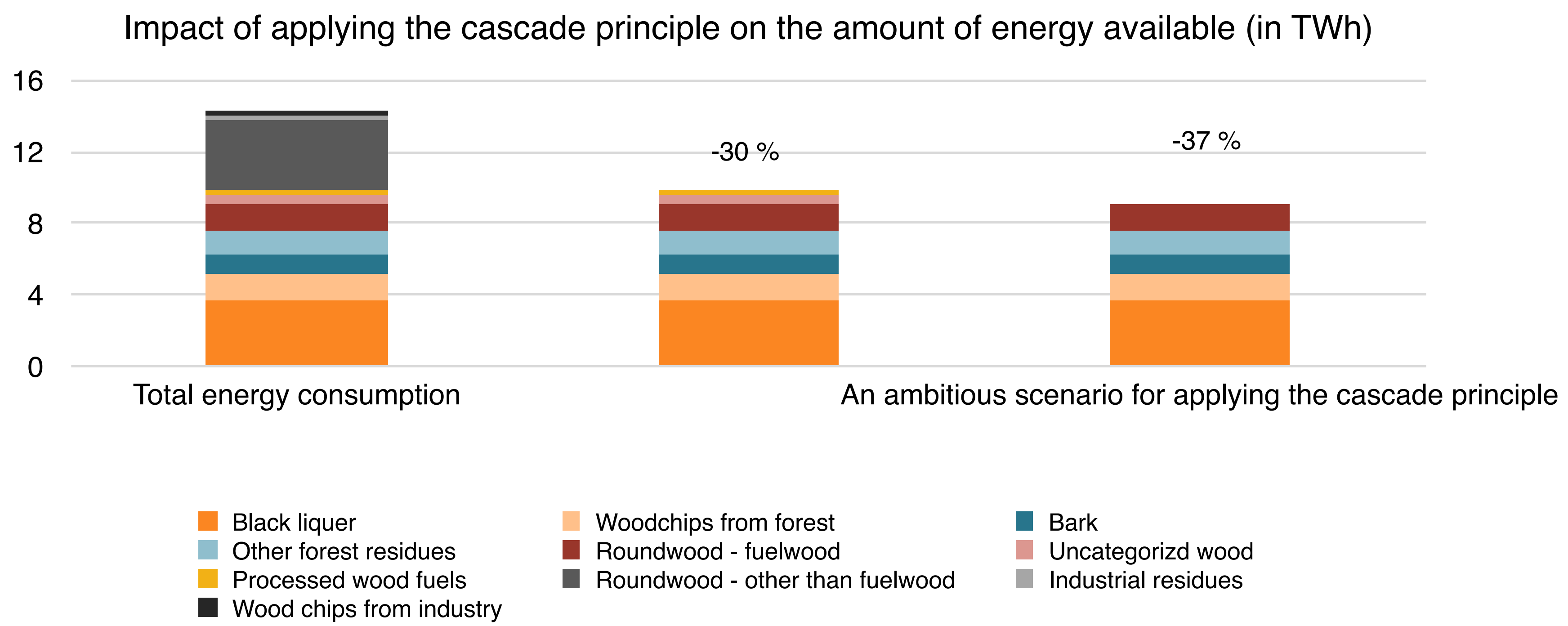
Biomass Energy: Supply vs. Demand

- Bussiness as usuall will provide sufficient energy
- However, sustainability criteria can affect it in a great way



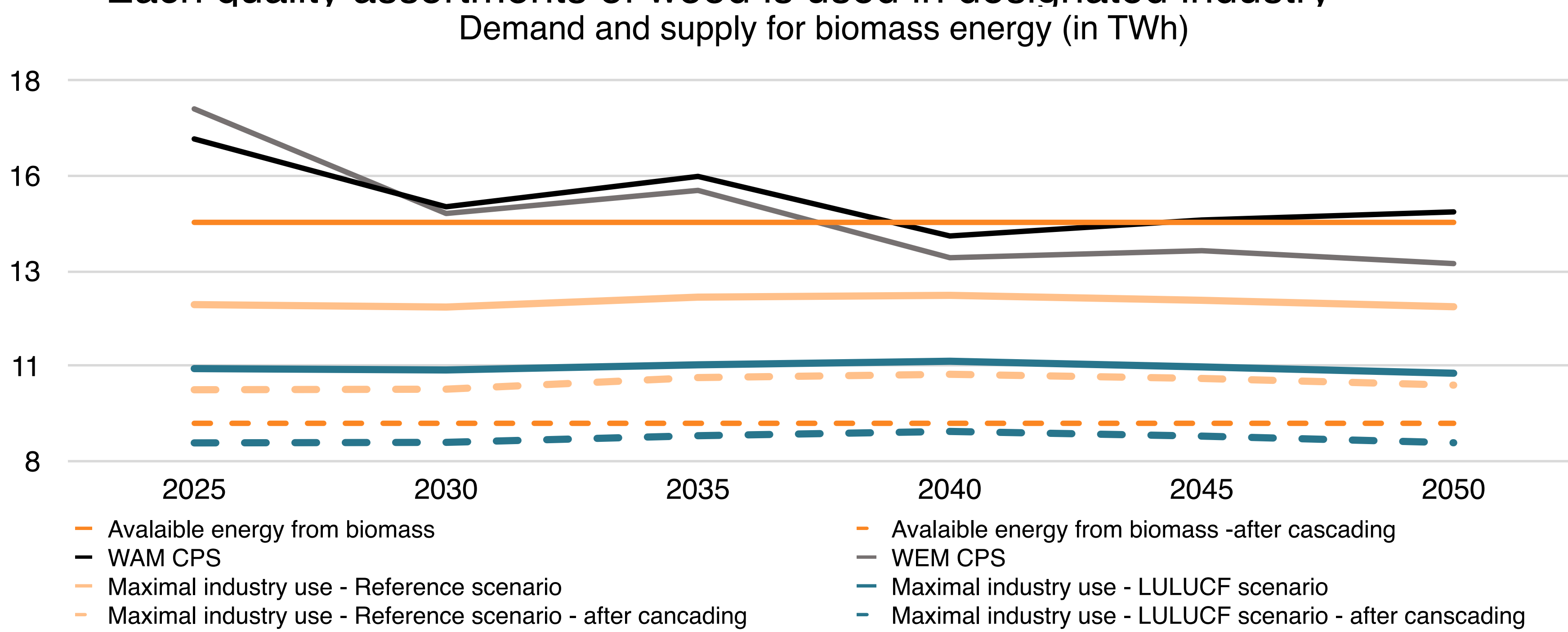
Applying cascading use

- Black liquer, bark, harvesting residues are renewables
- Roundowood, woodchips from industry, uncategorized wood can be recykled



If we would use all wood from harvest

- We used two scenarios: reference and LULUCF to calculate the hypothetical minimal energy consuption
- Two scenarios are used for handling residues: bussiness as usuall and cascading principle
- Each quality assortments of wood is used in designated industry



Conclusions and implications

- Monitoring and statistics needs to improve
- Forests provide enough wood overall, but the structure is changing, industry needs to adapt
- Trade-offs are unavoidable, dependent on export rate
  - Uncertainty persist, mainly on how wood is processed

Scenario/target	**Industrial demand**	**Energy demand**	**Energy under RED III**	**Climate target**	**Extended nature protection**
Reference	✓	✓	✓ (if not exported)	✗	✗
Nature conservation	✓? (lack of spruce wood)	✓?	✗?	✗	✓
LULUCF	✗	✗	✗	✓	✓

Recent political discussion

- ETS 2 can significantly disrupt householts heating sector
- Wood energy use does not fall under this sheme
- Even if quality wood is used for energy, it is still accounted as RES (does not recieve support)
- Who needs support when energy is expensive?
- Air quality and human health is the consequence

- Puzzling question:
  - **How to ensure, that lower quality wood (same price as fuel wood) ends up in industry and not householts?**

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