

SLU

Unit for Field-based Forest Research

- Experimental Forests
- Research Stations
- Long-term field experiments



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Combating climate change by managing our Nordic forests

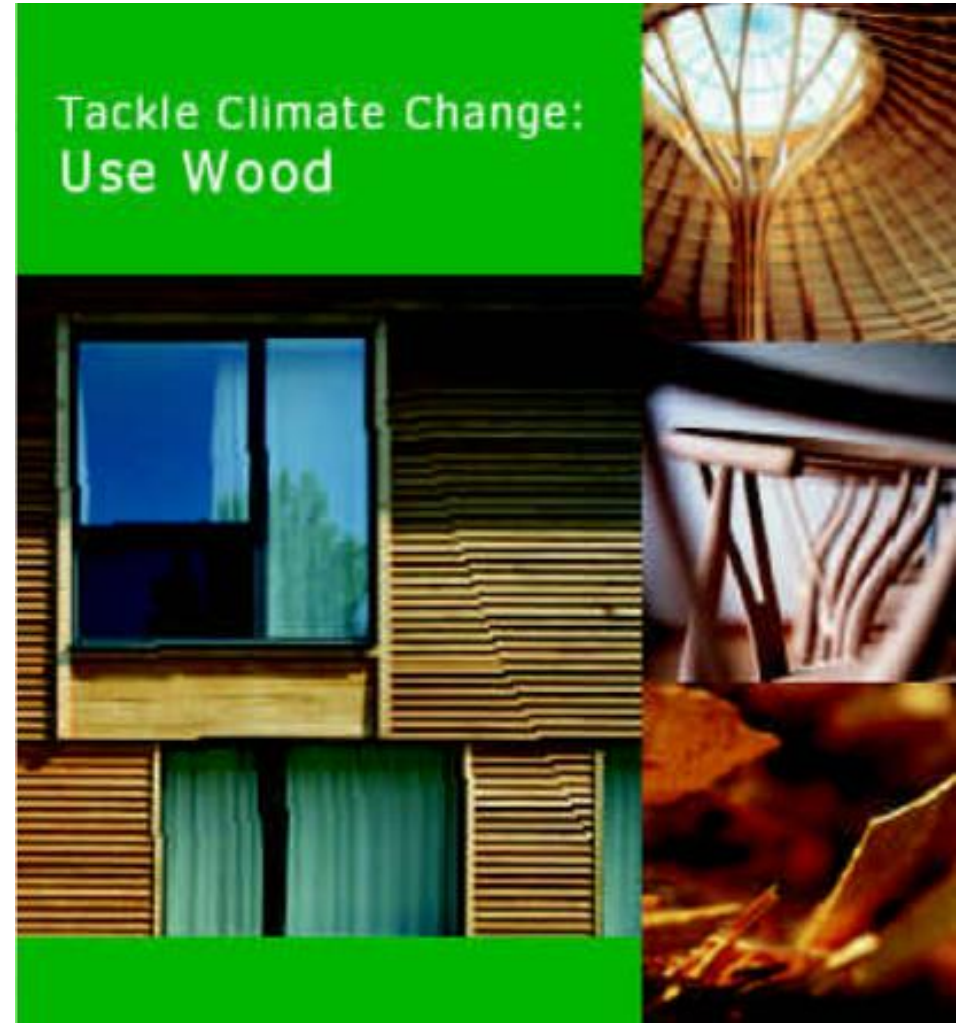
- Carbon balance of managed forests.
- Mitigation Options in the Forest Sector
- Strategies to mitigate climate change



Forest Mitigation Strategies: Two competing positions

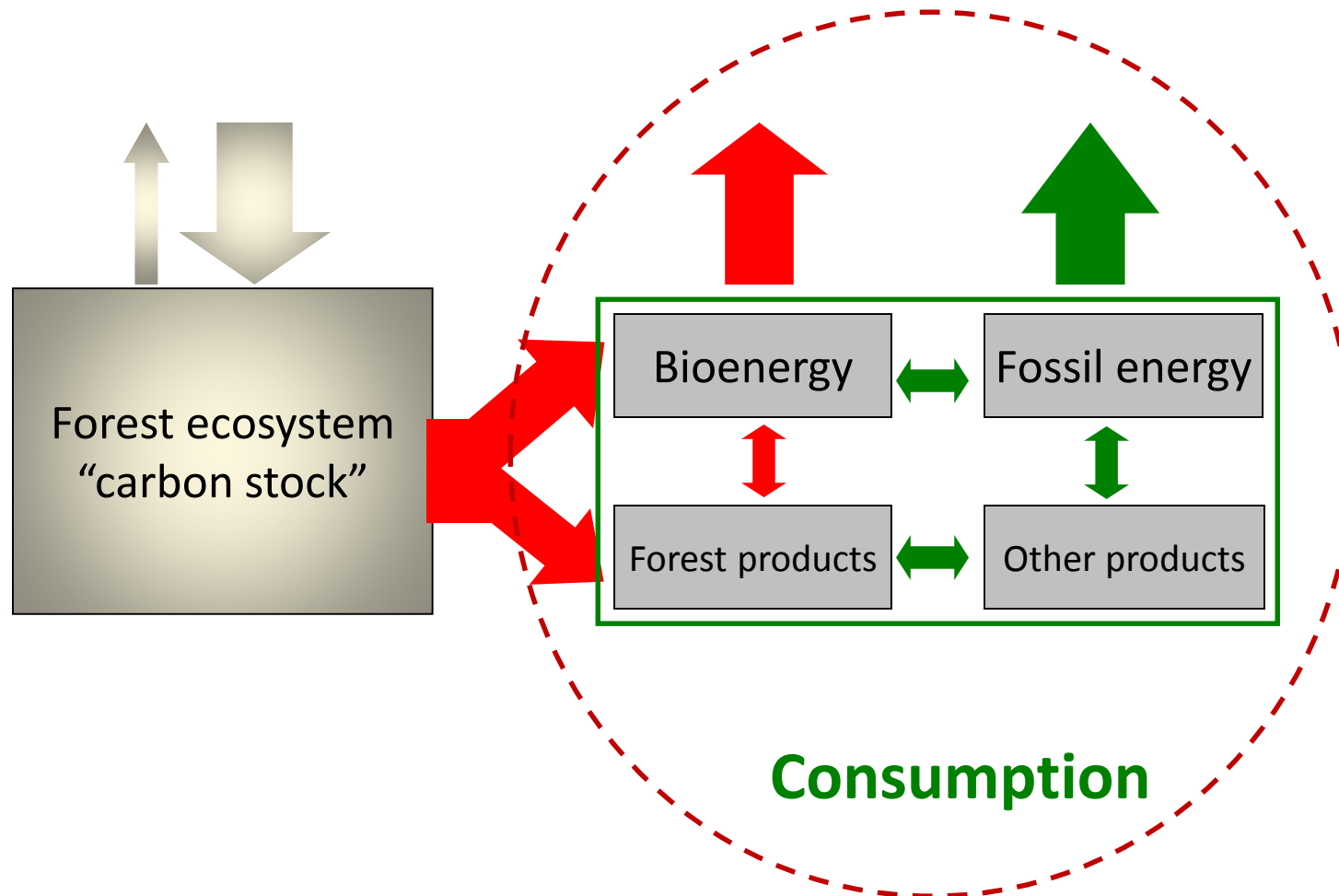
Stop logging

... or use wood?



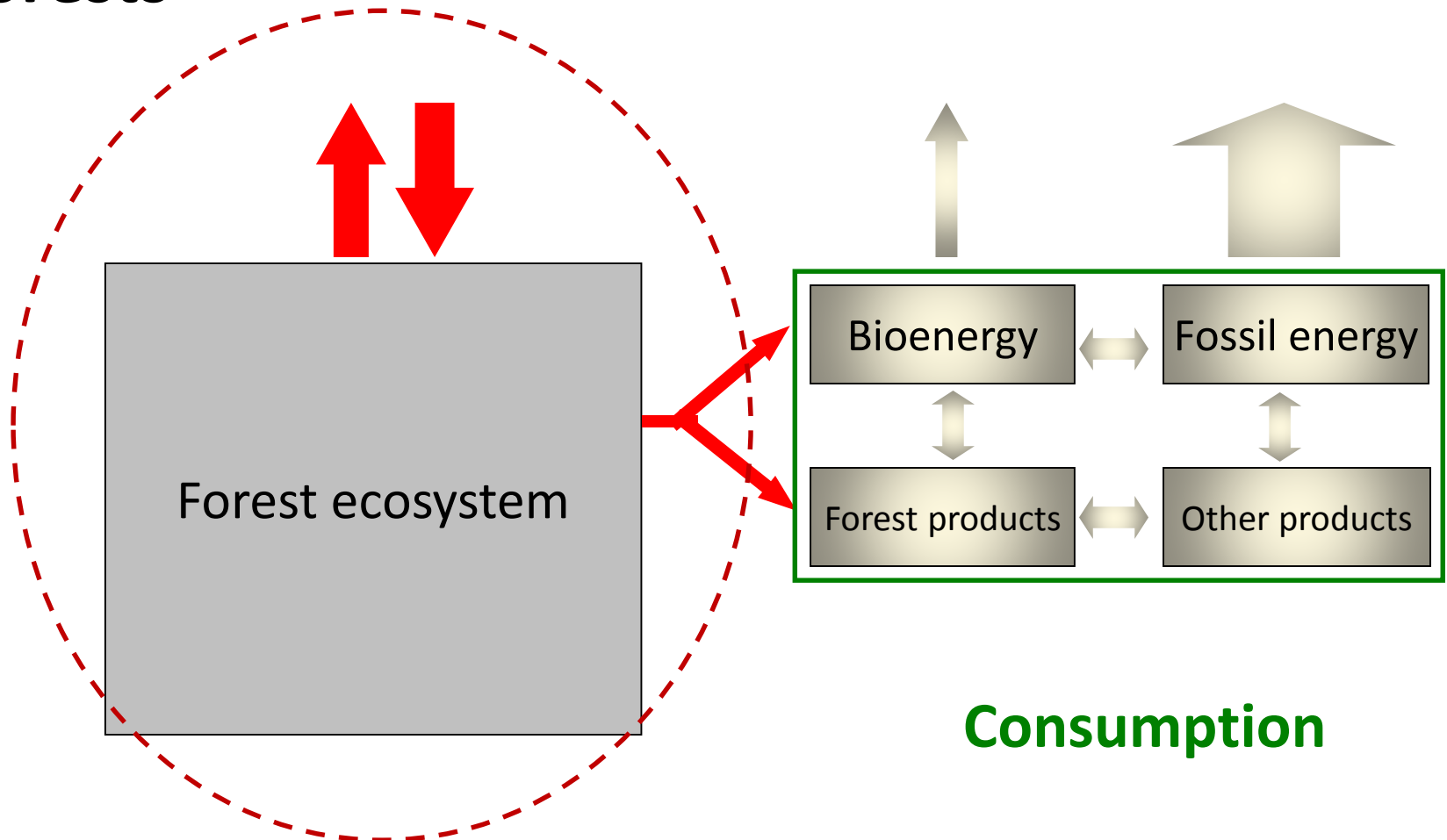
Strategies to mitigate climate change

... reduce emissions?



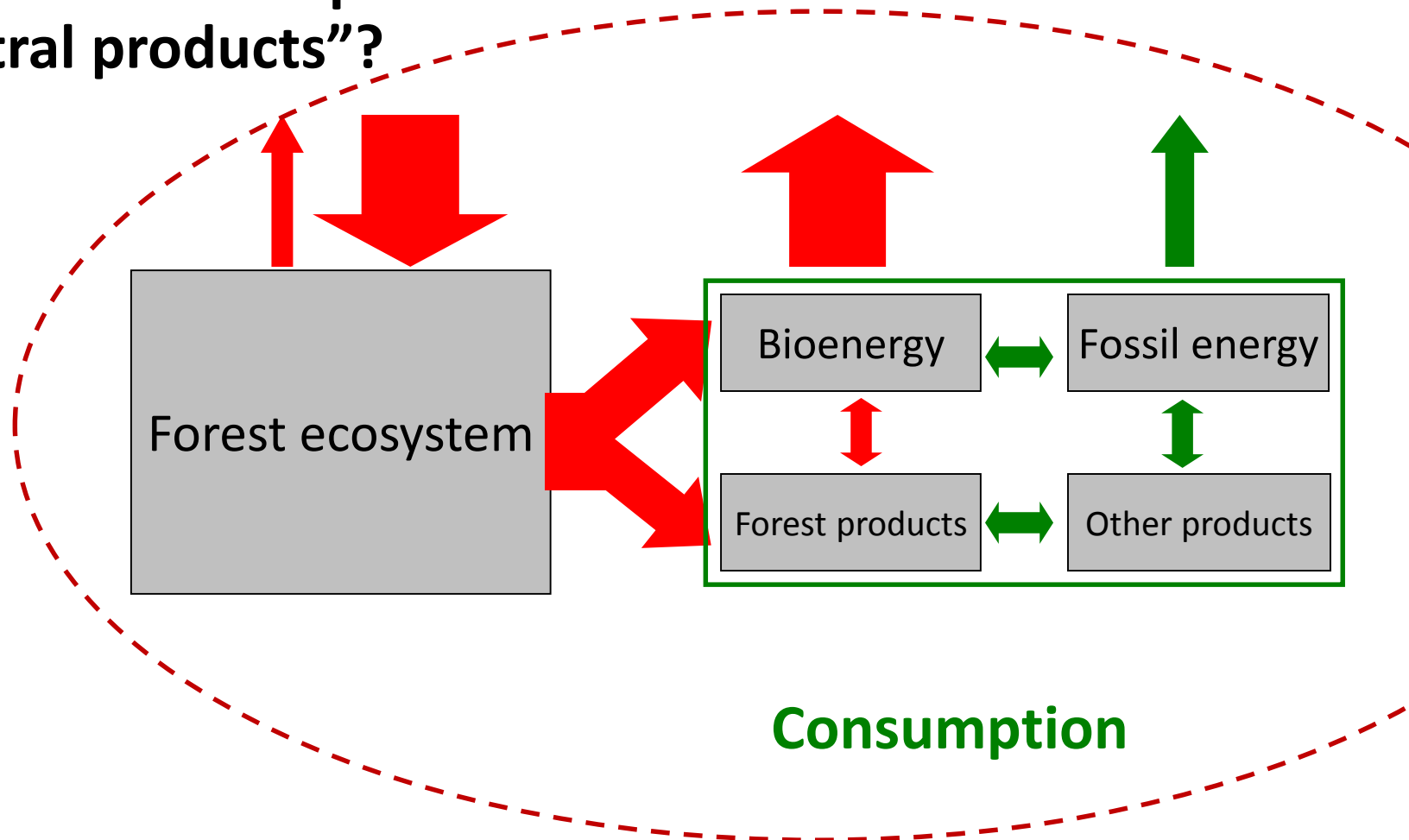
Strategies to mitigate climate change

...maximize carbon stock in the forests



Strategies to mitigate climate change

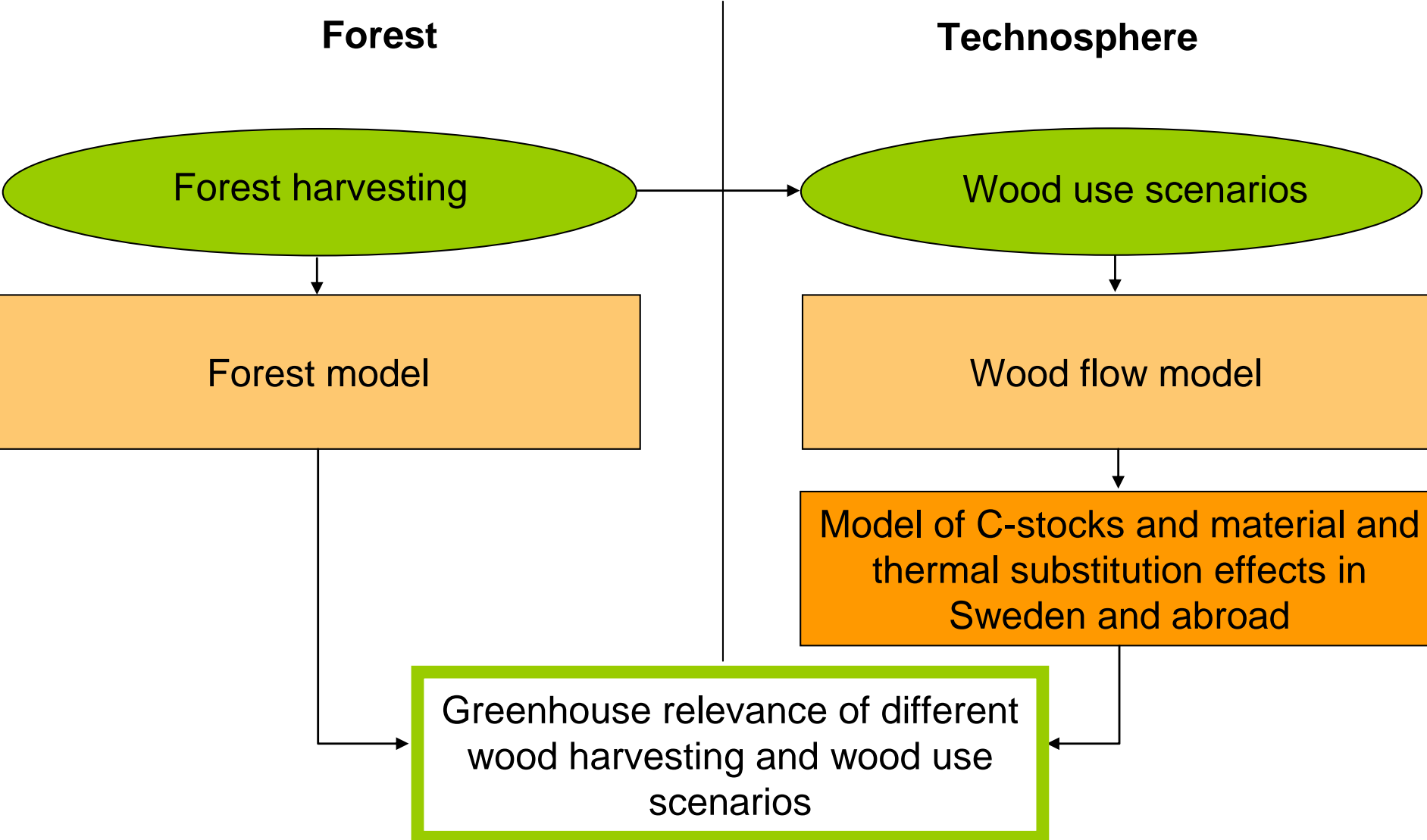
... or maximize forest growth to increase consumption of “CO₂-neutral products”?



Mitigation Options in the Forest Sector

1. Increase stand-level carbon density
2. Increase landscape-level carbon density
3. Increase (or maintain) forest area
4. Increase C stored in products,
5. Reduce or avoid fossil emissions through product substitution and through bioenergy use

Forest and carbon – our model



We have examined;

- The C stock in the forest
- The C stock in forest based products
- The substitution effect – using wood instead of energy-intensive material
- The substitution effect – using forest biomass as bio-energy to replace fossil fuels



Assumptions

- Additional forest growth that can be sustainably harvested will substitute energy-intensive material and/or fossil fuels
- Increased forest growth will increase carbon accumulation in forest soils
- Increased forest growth will increase carbon storage in trees (on average over the rotation period)



Long term climate benefit of present forest management in Sweden

- Reduced or avoided emissions in Sweden in the range of 15-20 million ton CO₂-eq per year
- Reduced or avoided emissions in other countries in the range of 45 million ton CO₂-eq per year
- Global effect ≈ 60 million ton CO₂-eq per year



Climate benefit per cubic meter

- ≈ 500 kg CO₂ in avoided or reduced emissions (average at present)
- ≈ 700 - 900 kg CO₂ in reduced emissions (if one "extra" cubic meter is used for substitution)
- ≈ 900 kg CO₂ in increased carbon stock (if one "extra" cubic meter is used to increase standing stock of trees)



Hur fungerar skogen ur kol och tillväxtpunkt

- Man kan sköta skog med olika system
- Ett viktigt randvillkor för en rättvis jämförelse är att använda en geografisk skala som tillåter båda systemen att leverera jämn virkesavkastning

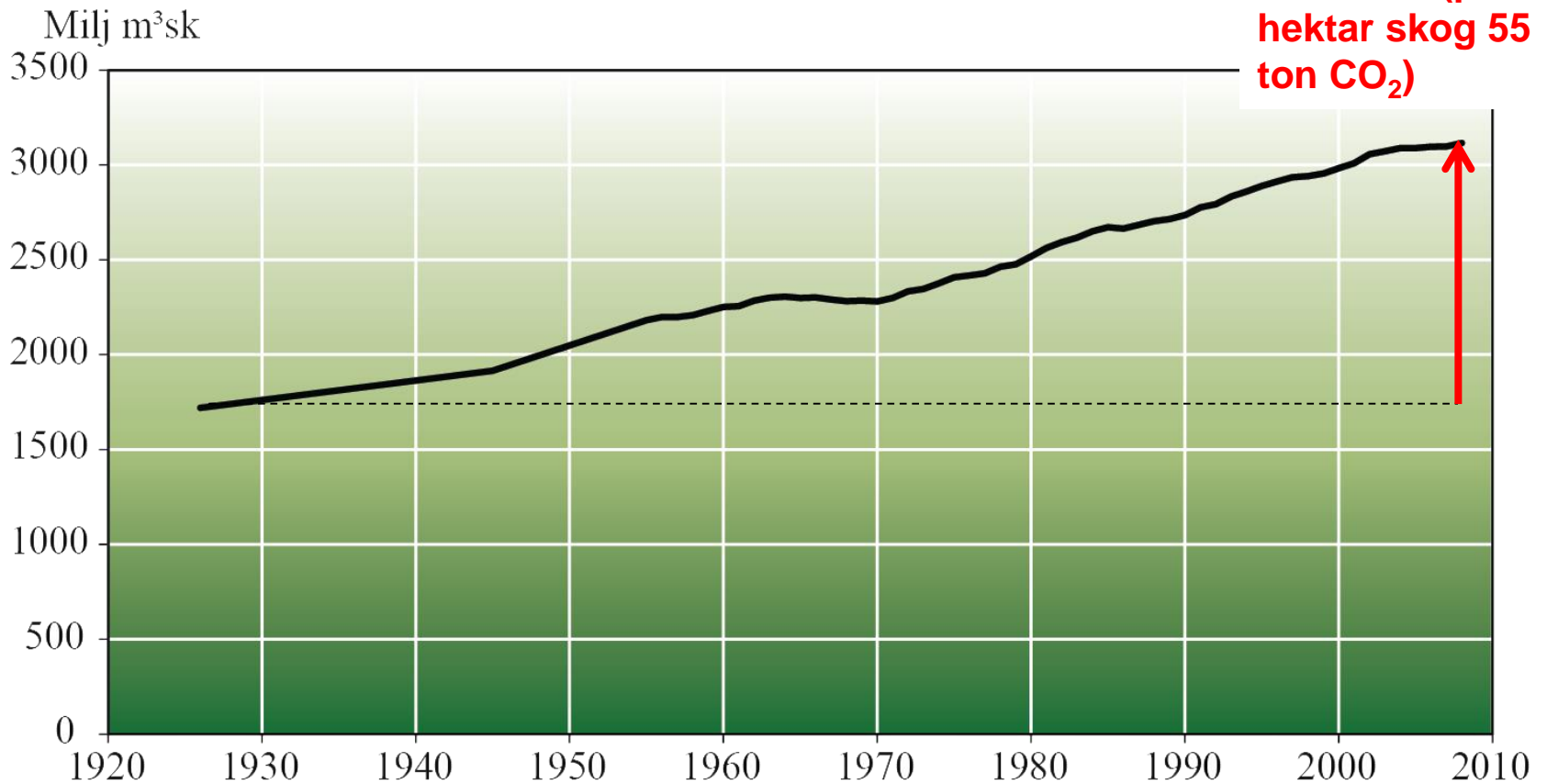
Skogen som system

- Skörden koncentreras till “mogna” träd medan tillväxten sker hos alla träd
 - Först växer skogen – sedan skördar man tillväxten
- “Hållbart skogsbruk” (ur produktionssynpunkt) innebär att det årliga uttaget av biomassa inte överskrider den årliga tillväxten av biomassa



Totalt virkesförråd

Ökningen motsvarar 1300 miljoner ton koldioxid (per hektar skog 55 ton CO₂)



Skogen som system

- Skogens potentiella bidrag till klimatarbetet bestäms således primärt av hur hög den årliga tillväxten är och kan bli
- Det årliga “överskottet” kan sedan användas på olika sätt, substituera eller lagra
- Oavsett användning så är tillväxten den avgörande faktorn

