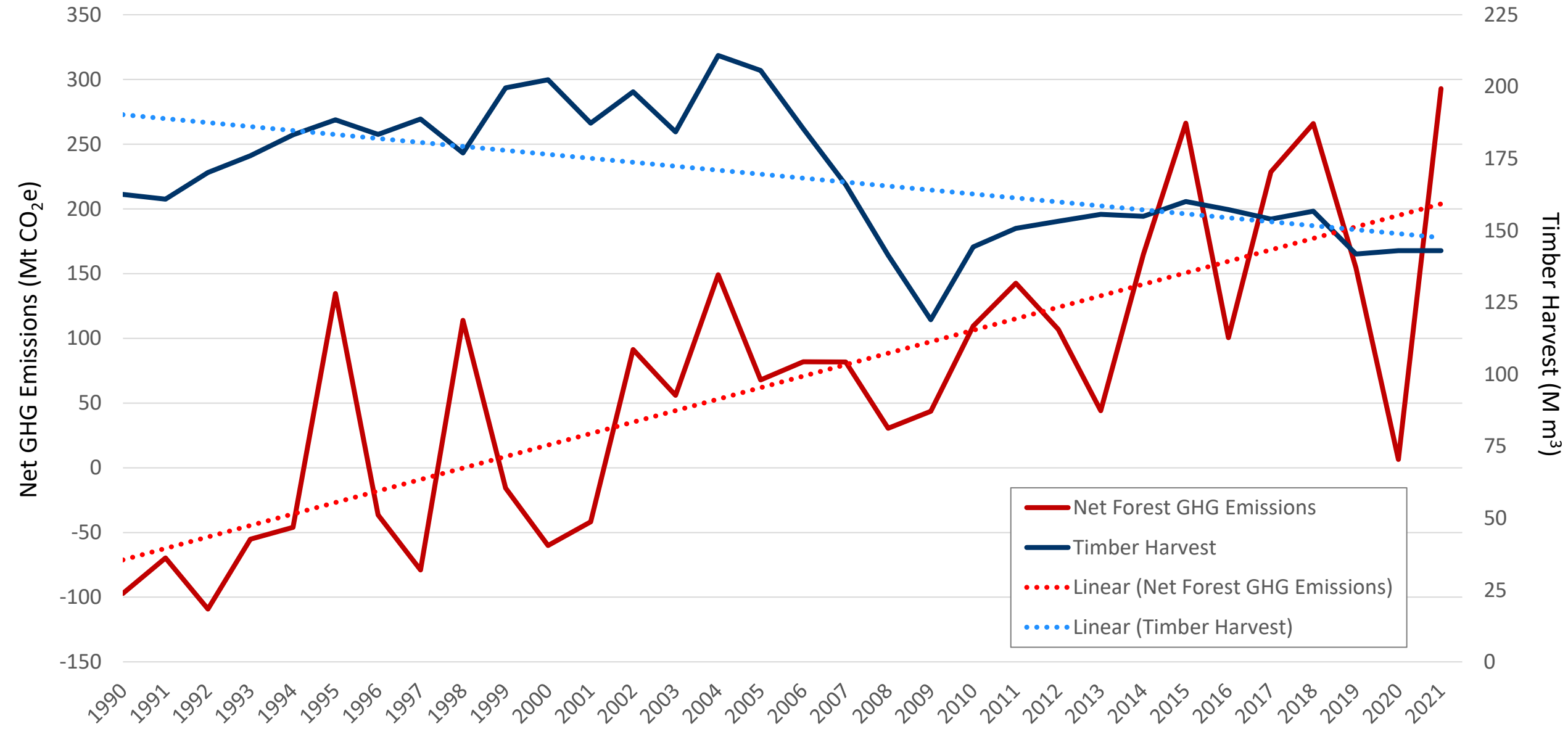


BECCS for Sustainable Forest Management in a Changing Climate

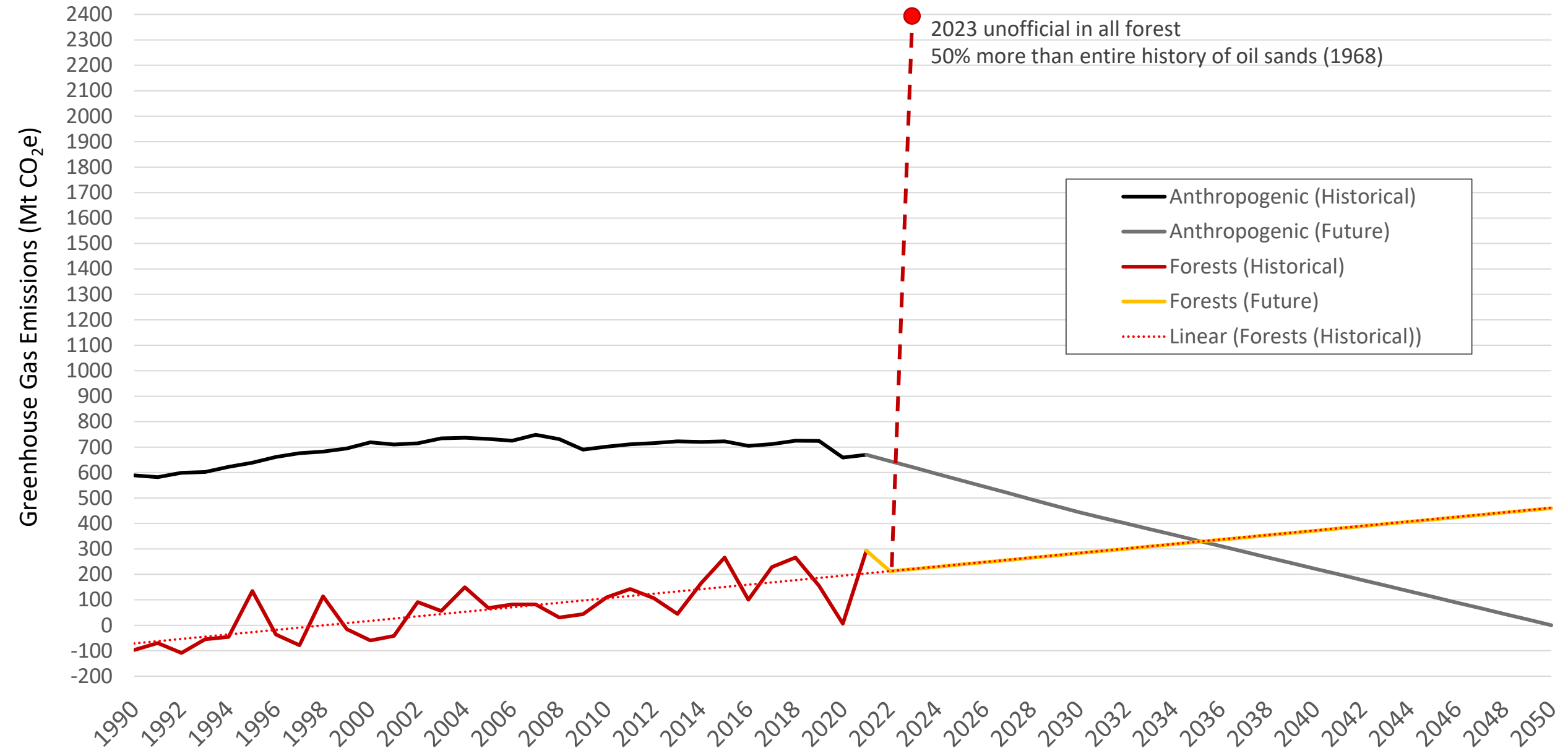


GHGs from Canada's Forests Vs. Timber Harvest

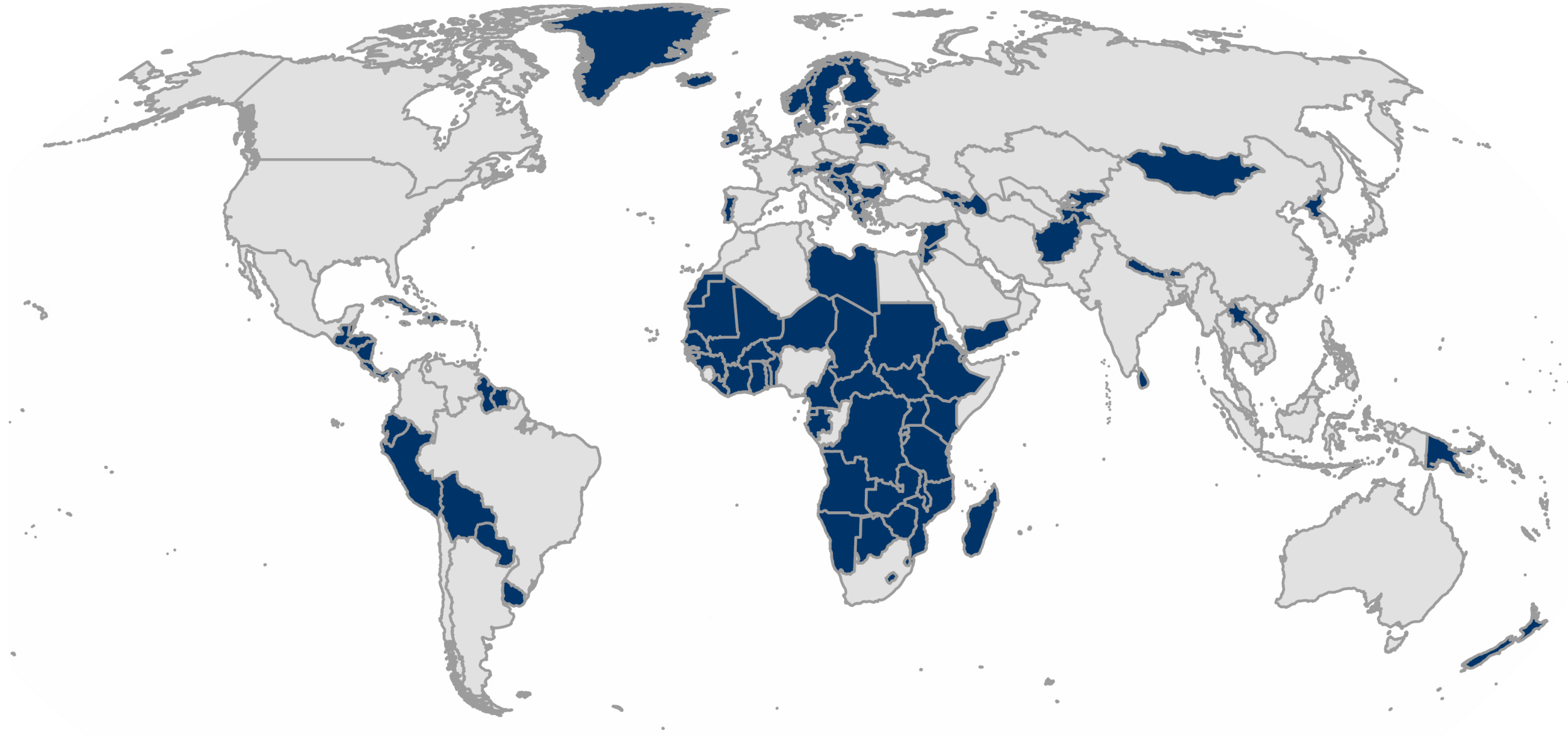




Human Vs. Forest Emissions



More than 138 Countries



Canada's Total GHG Emissions

85% of EU Emissions

50% of US Emissions

18.5 M ha burned

~France's total forest area

>Total area of Austria + Hungary

Does it have to be this way?

Canada vs Sweden
Wildfire rate per forested Ha

50x
(500x in 2023)

Per Capita GHG (incl. Forests)

Canada = 75

Sweden = 0.7

Harvest Rate

Sweden/Canada = 7

CA: Harvest <3.9% of growth

$\Delta = 1,000 \text{ Mt CO}_2/\text{yr}$

Climate-Smart Forestry

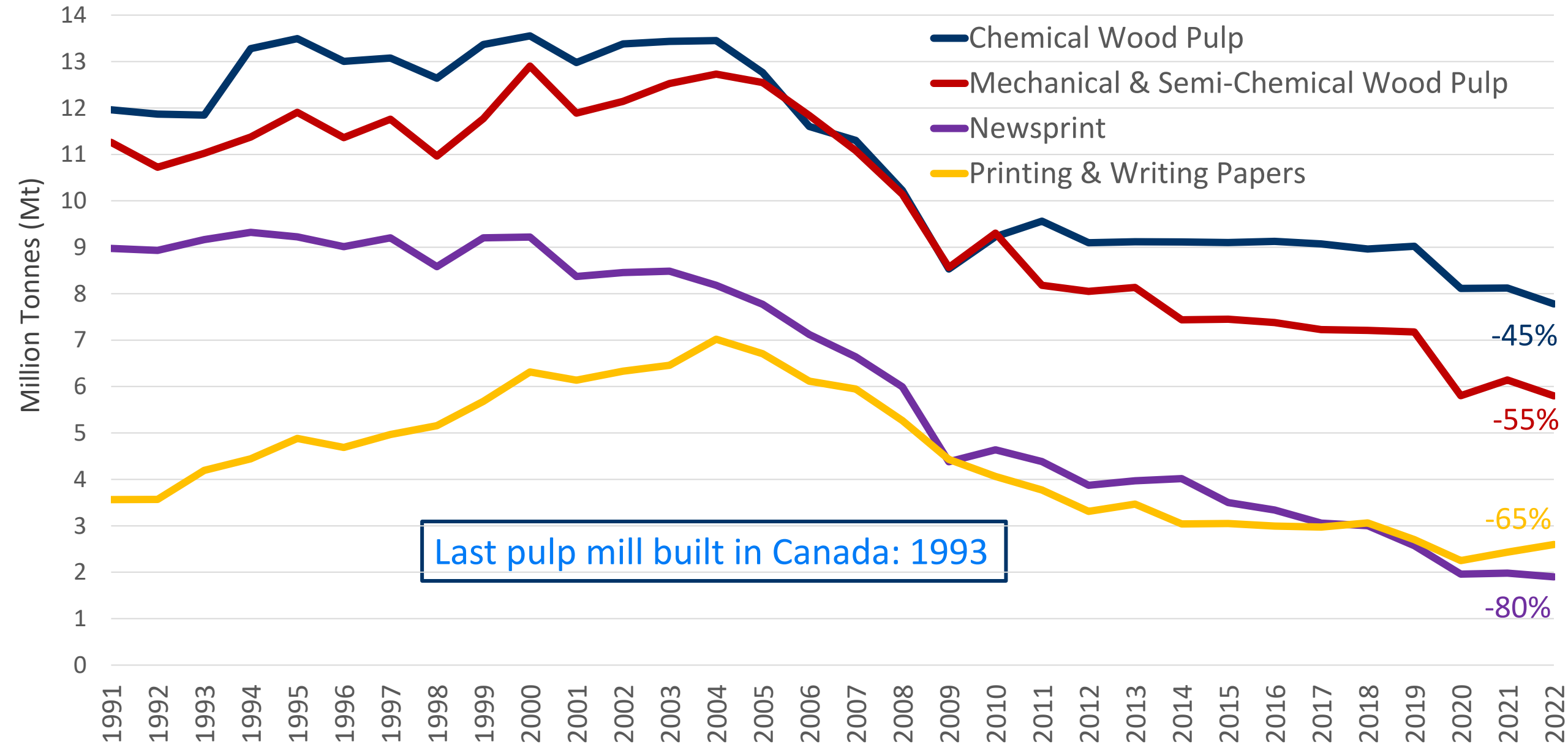
- Minimize carbon in the atmosphere
 - Maximize carbon stored in forest
 - Maximize carbon stored in long-lived solid wood products
 - Permanently store all other carbon subsurface
- Requires ACTIVE management in Boreal Forest (and other types)
 - Forest fuel reduction to reduce wildfire risk/limit carbon release
 - Thinnings to improve forest health and productivity
- Active management requires a market for low-value wood/biomass
- Carbon is NOT the only value to manage for

Store that Carbon

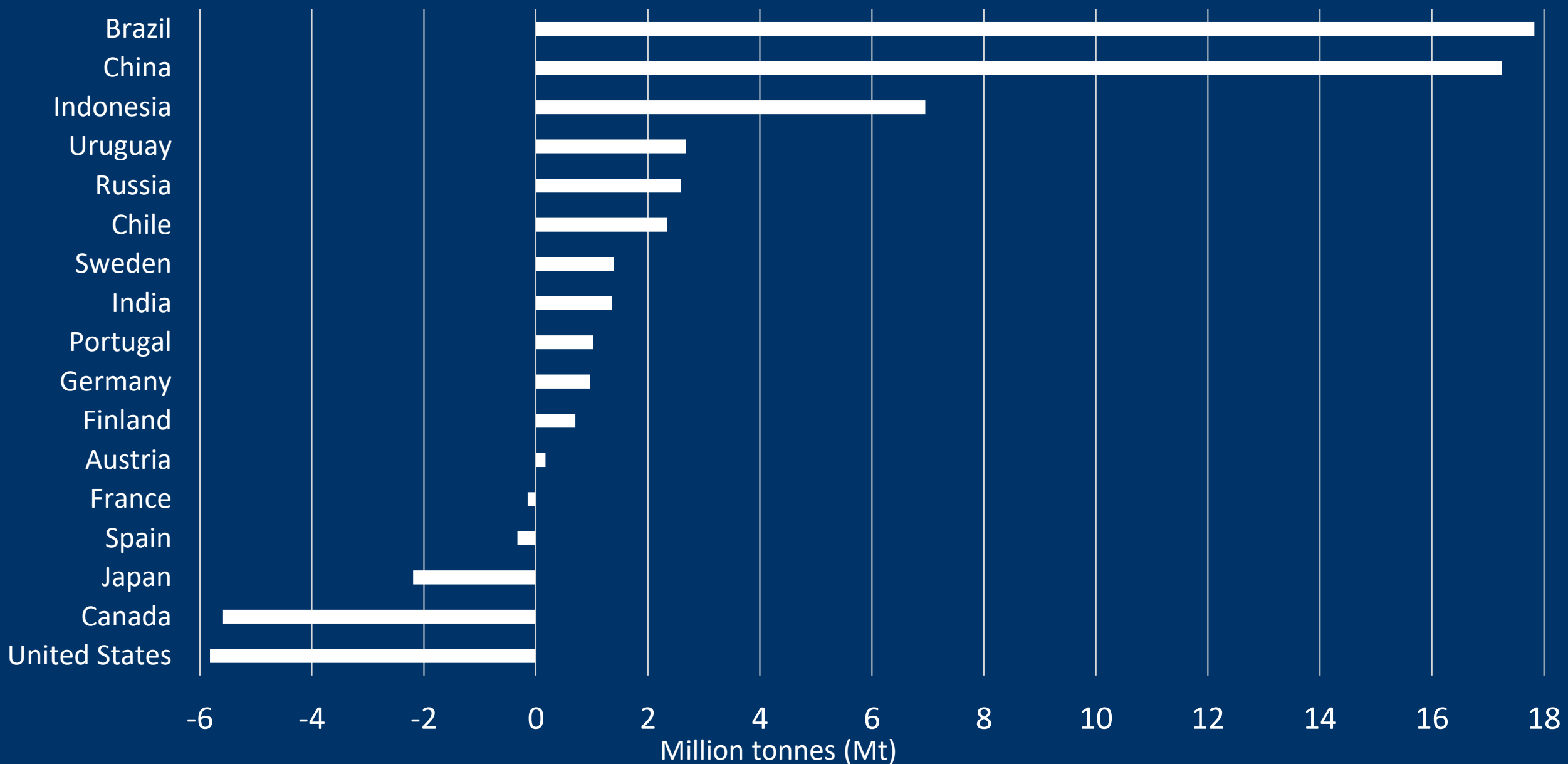


Only 30-33% of wood becomes
solid wood products

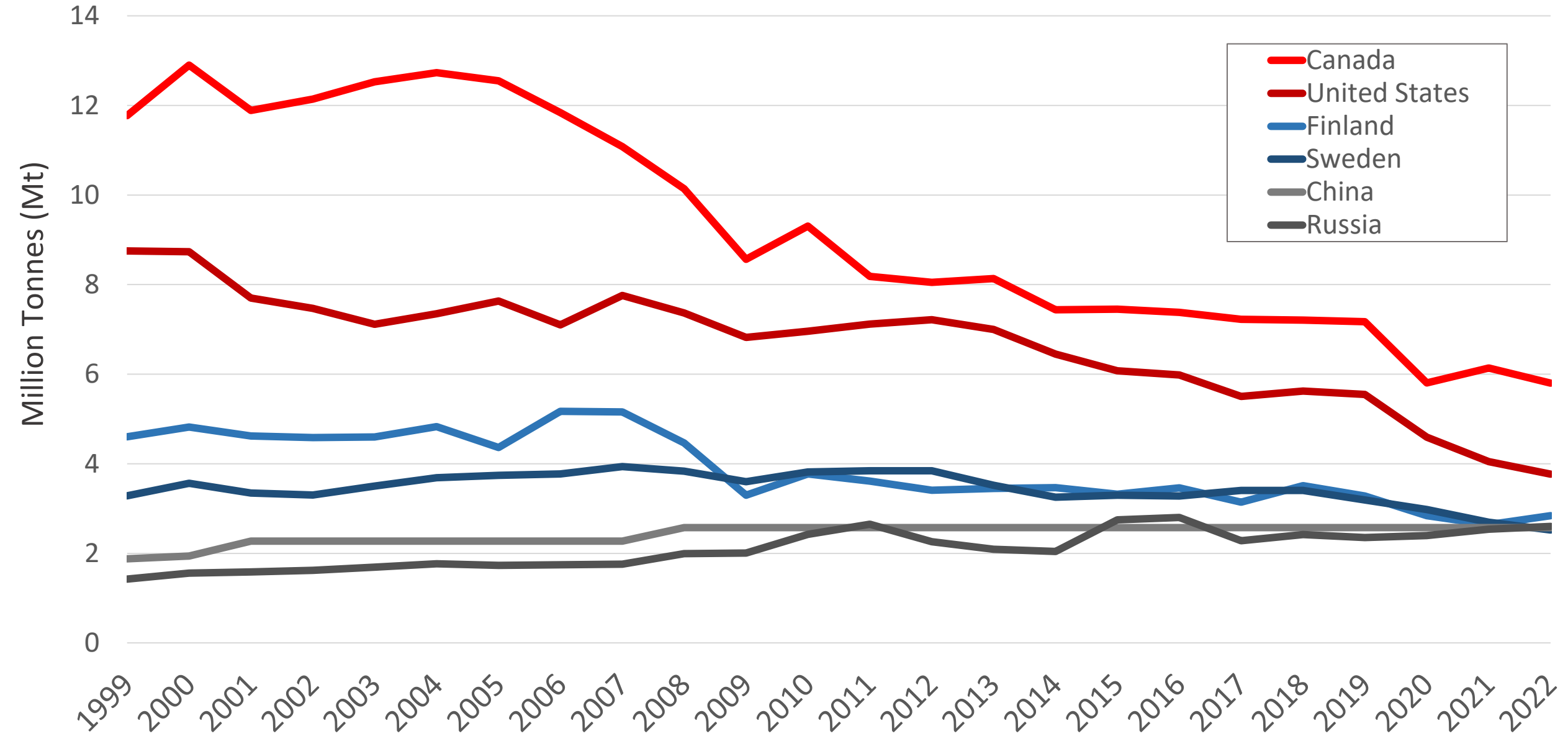
Canada's Pulp and Paper Production



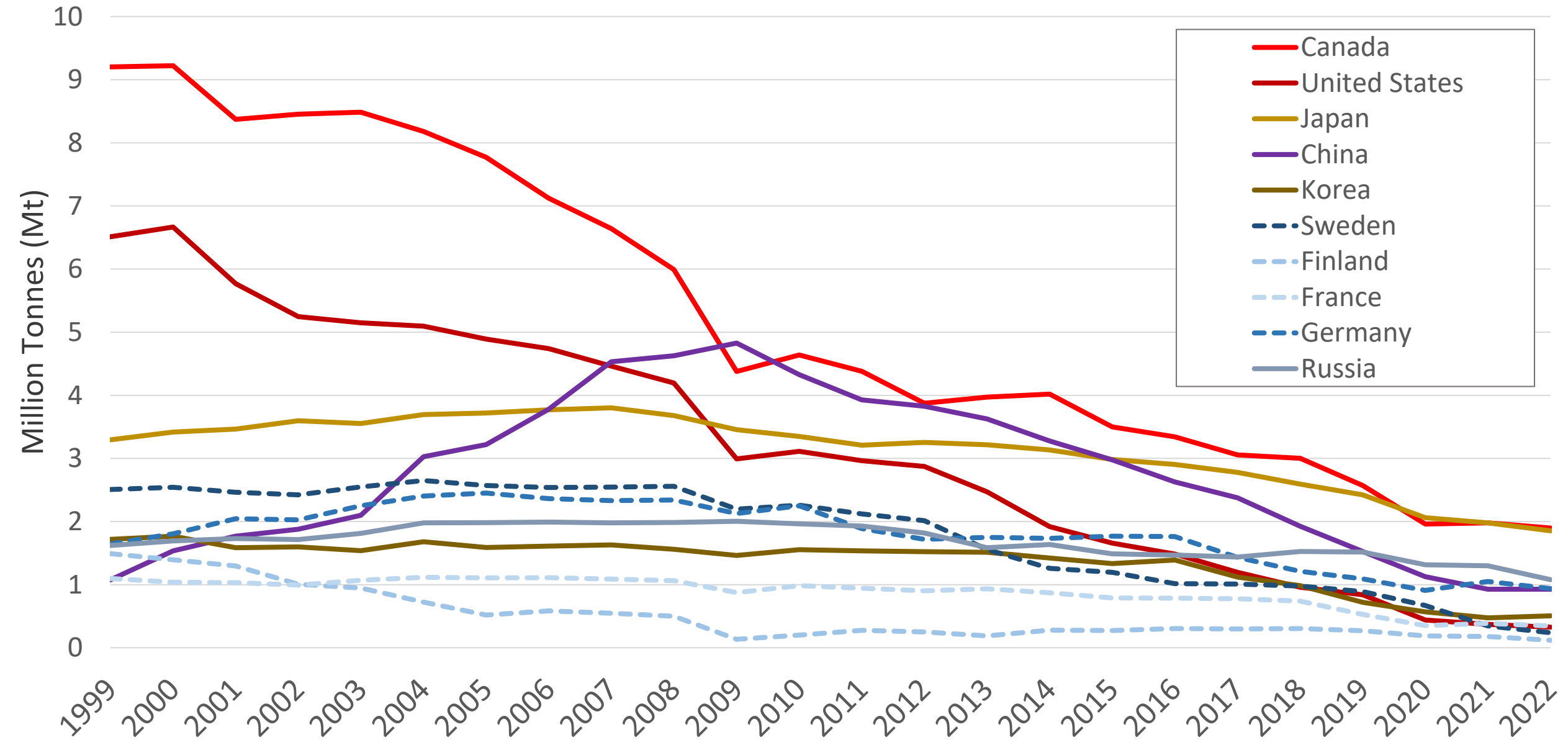
Chemical Pulp Production Change, 1999-2022



Mechanical Pulp Production (70-75% of Global)

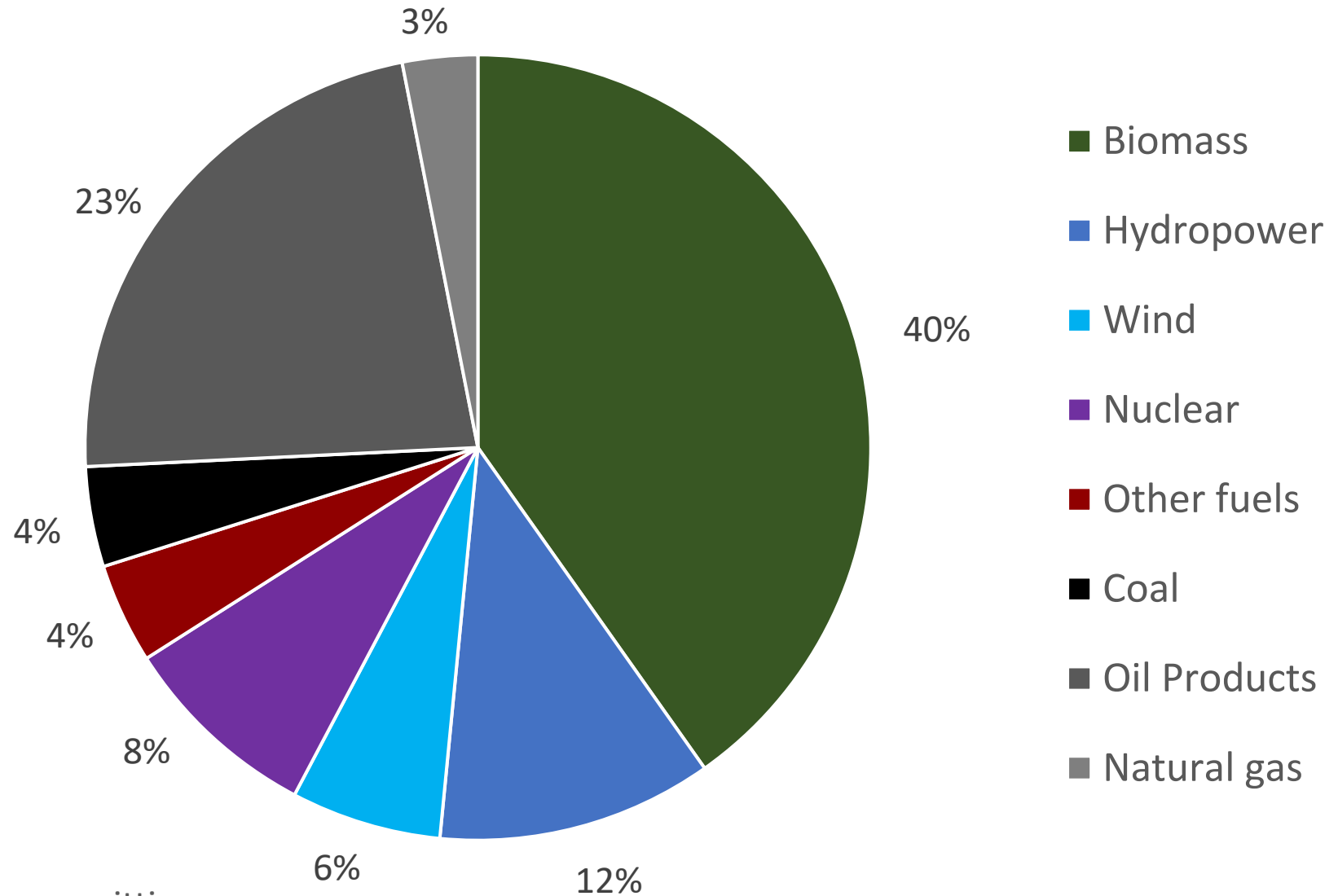


Newsprint Production (65-80% of Global)



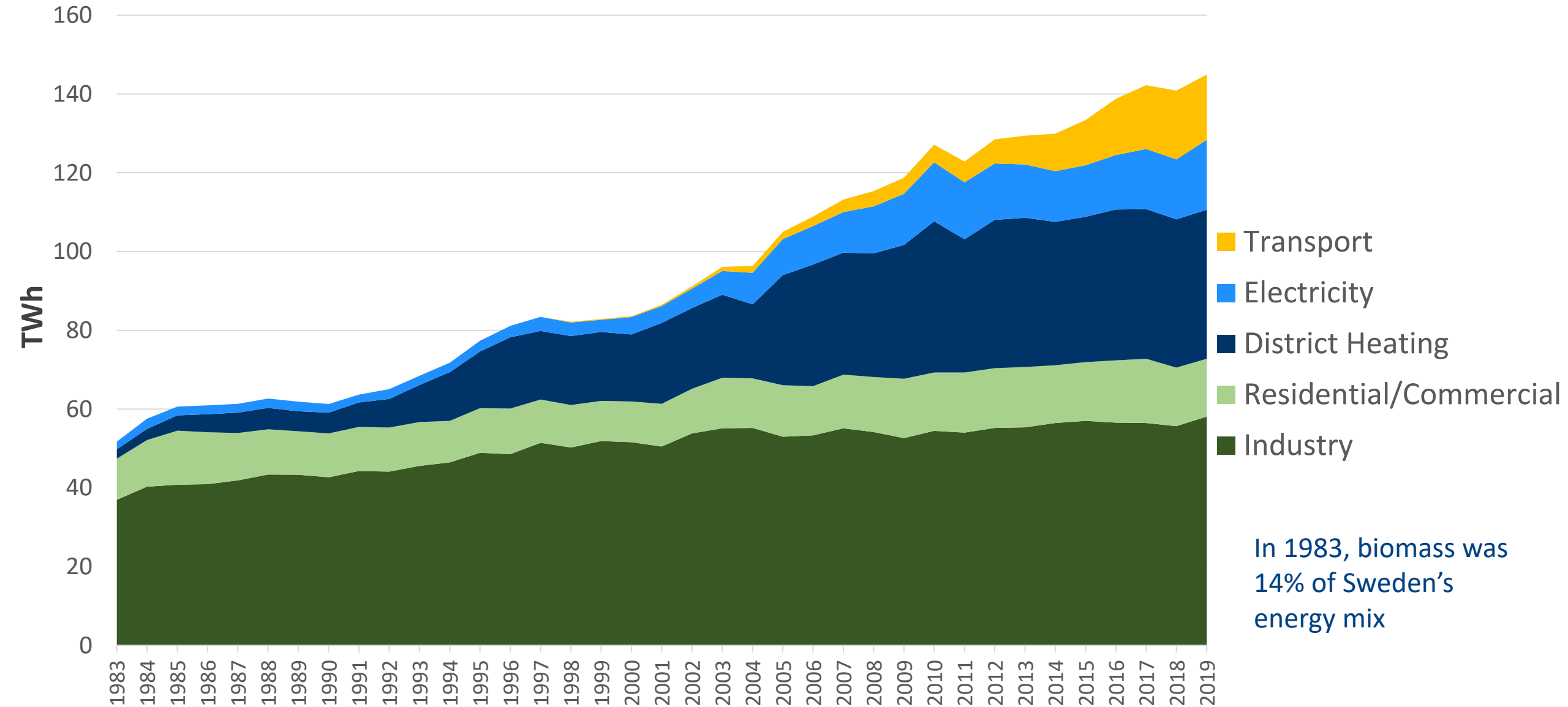
What will replace
pulp and paper?

Energy Consumption in Sweden

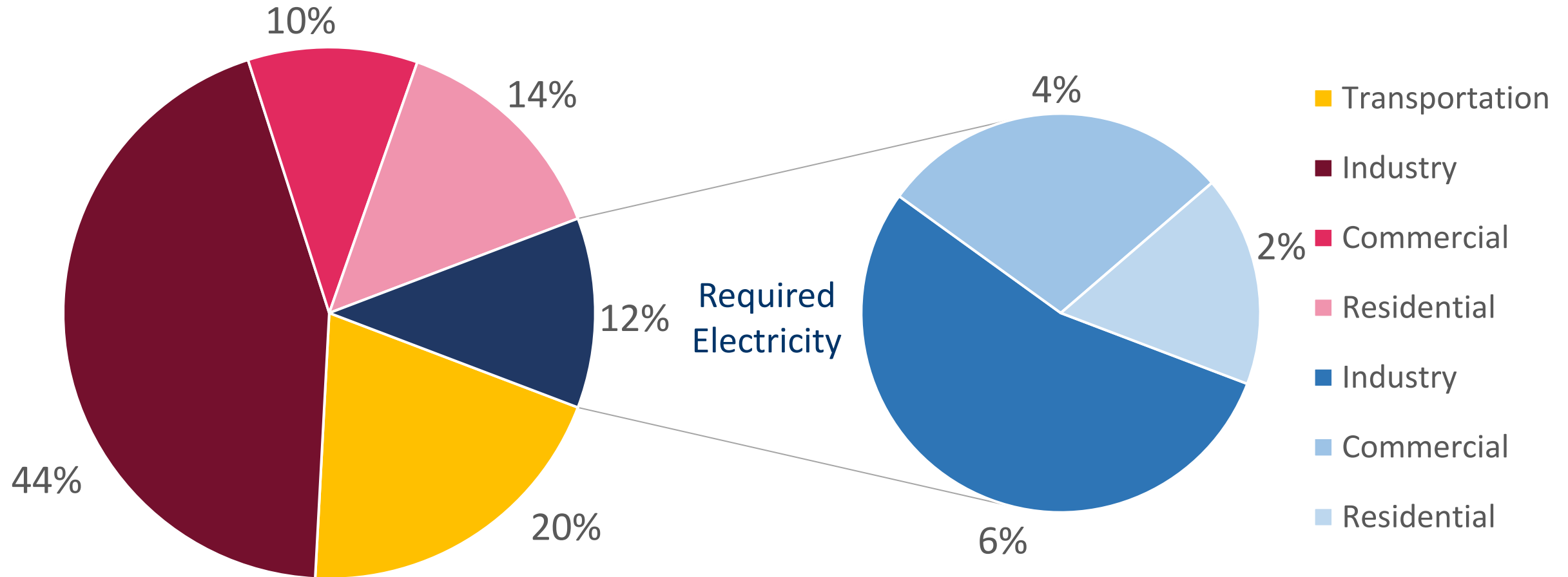


- 58% renewable energy, 65% non-emitting

Bioenergy Consumption in Sweden



Energy Demand in Canada



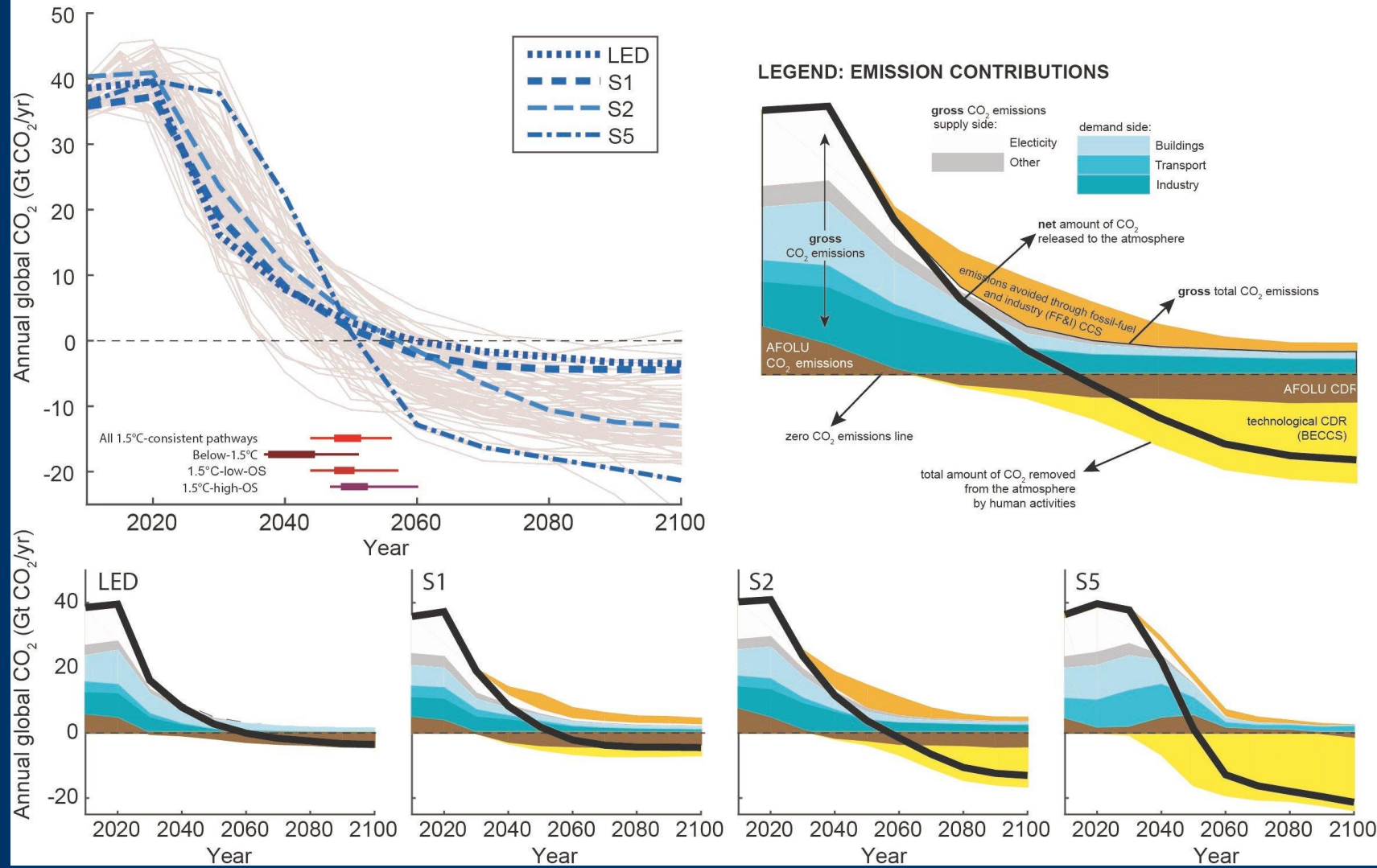
- Thermal energy (red shades) is approximately 60-65% of Canada's energy demand
- Excluding existing electrical heating, electricity (blue shades) is 12% of Canada's energy demand
- Heating residential buildings requires more energy than ALL of Canada's electricity demand

-
- The diagram illustrates a CO₂ capture and storage (CCS) system. On the left, a power plant with cooling towers is shown emitting a cloud labeled "CO₂". A yellow arrow indicates the capture of CO₂ from the plant. This captured CO₂ is then transported via a yellow pipeline to a storage site underground, represented by a blue block. The storage site is shown with a yellow arrow pointing down into a white cloud labeled "CO₂". In the background, there is a yellow building and a forest of green trees, suggesting the integration of CCS with industrial and natural carbon sinks.

- Lowest cost for CDRs (negative emissions)
- 4 decarbonizations:
 1. Electricity
 2. Heat
 3. Hard-to-abate (CDR)
 4. Avoided wildfires
- 3+ sources of revenue
- Carbon Dioxide Removals are an EXPORT product
- 6x the GHG reduction per tonne of wood as SAF

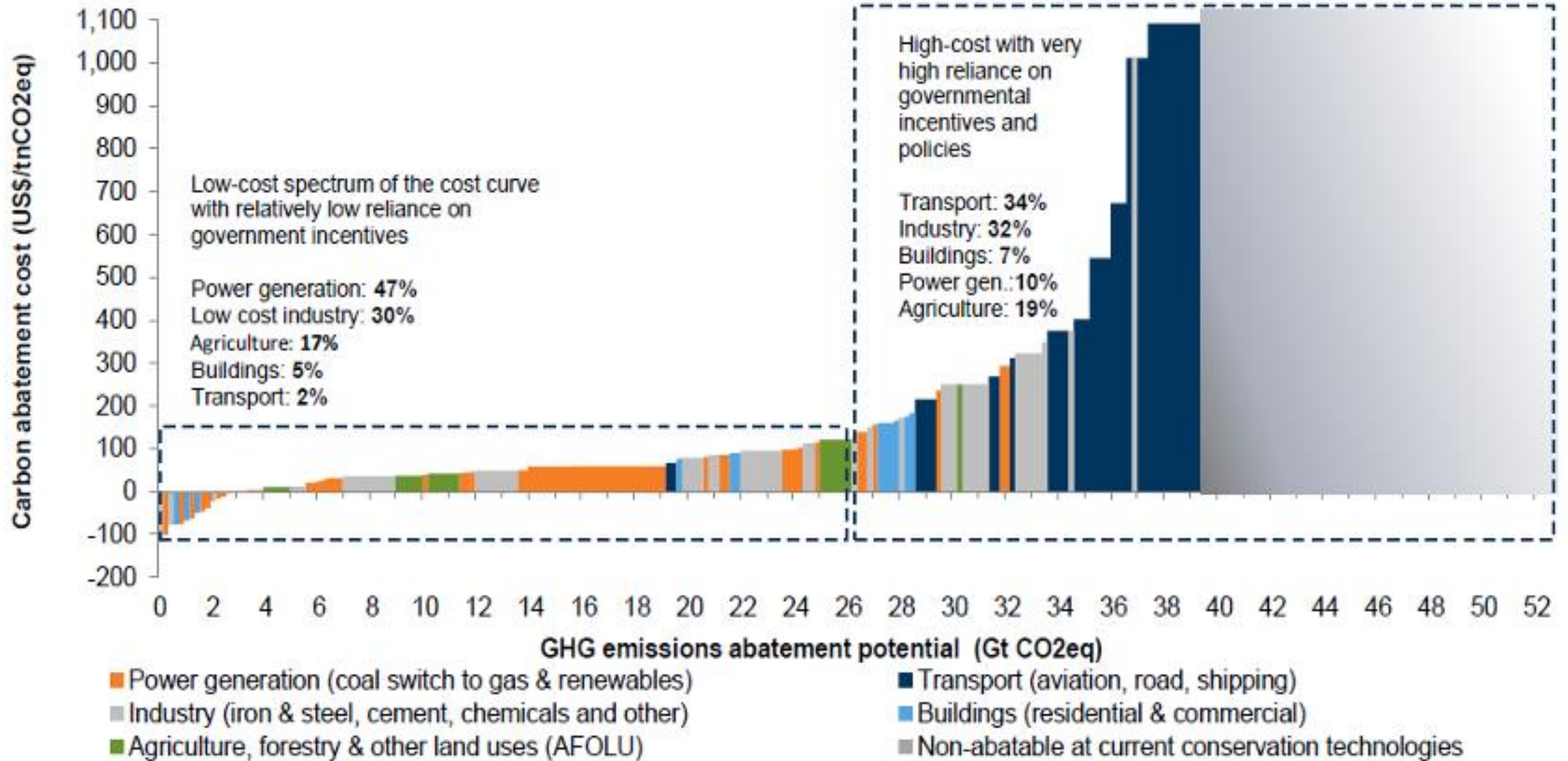
BECCS is Required to Meet Climate Goals

IPCC Mitigation Pathways Compatible with 1.5 C

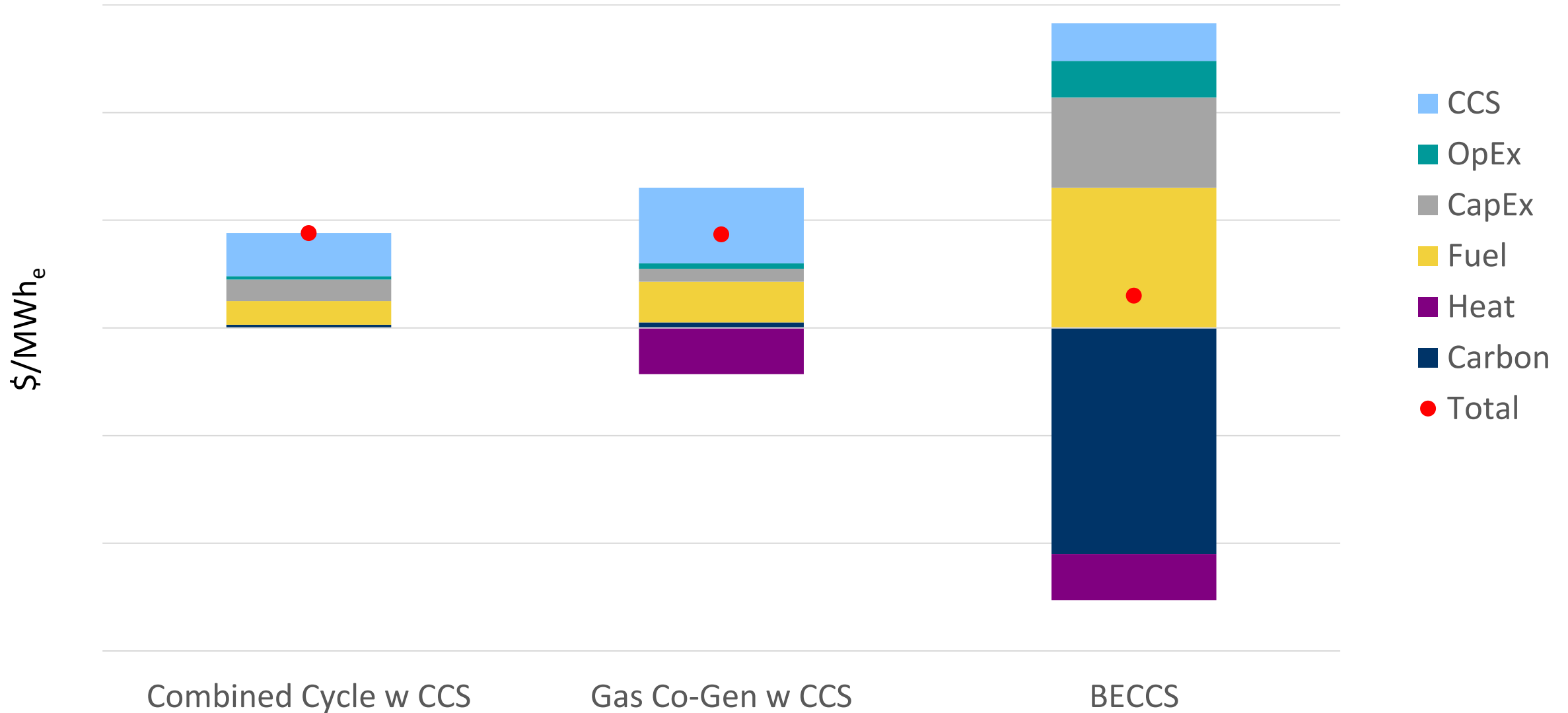


GHG Cost Abatement Curve

Source: Goldman Sachs



Multiple Products = Economic Viability



“As the carbon price increases, biomass CCS units become a negative cost generation option, where its average cost of production in 2050 is -\$85/MWh. Therefore, biomass CCS partially displaces all other generation technologies...”



BECCS for Sustainable Forest Management in a Changing Climate

