Does promoting wood bioenergy help or harm Vermont's climate goals?

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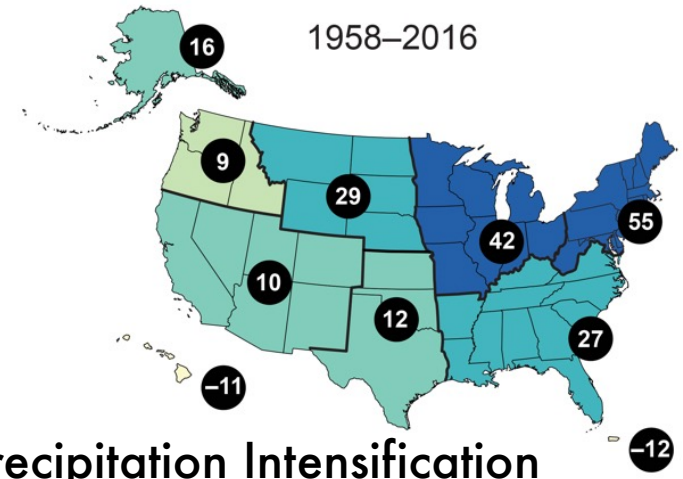
CLIMATE INTERACTIVE

Tufts UNIVERSITY

The climate has already changed

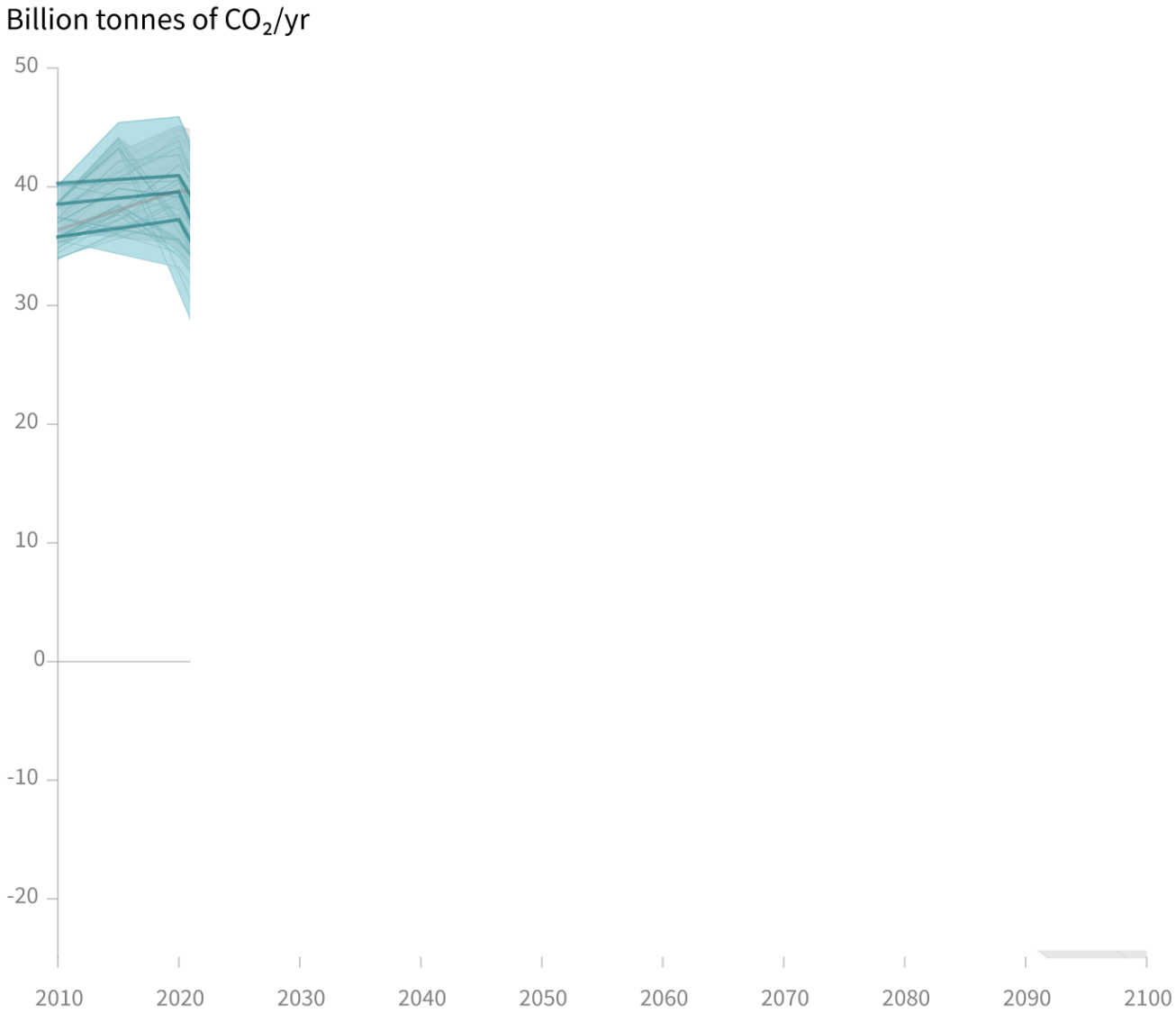


Emissions to limit warming to 1.5 °C

Halve emissions by 2030 (~7 years)

Achieve net zero emissions by 2050

Net negative beyond 2100



Source: IPCC Special Report on Global Warming of 1.5°C

Vermont's Climate Goals:

- Achieve **net zero emissions by 2050** across all sectors
- Achieve **long-term sequestration** and **storage of carbon** and promote best management practices to achieve climate mitigation, adaption, and resilience on natural working lands

https://toolkit.climate.gov/reports/vermont-climate-action-plan

Does wood bioenergy help or harm Vermont's efforts to meet climate goals?

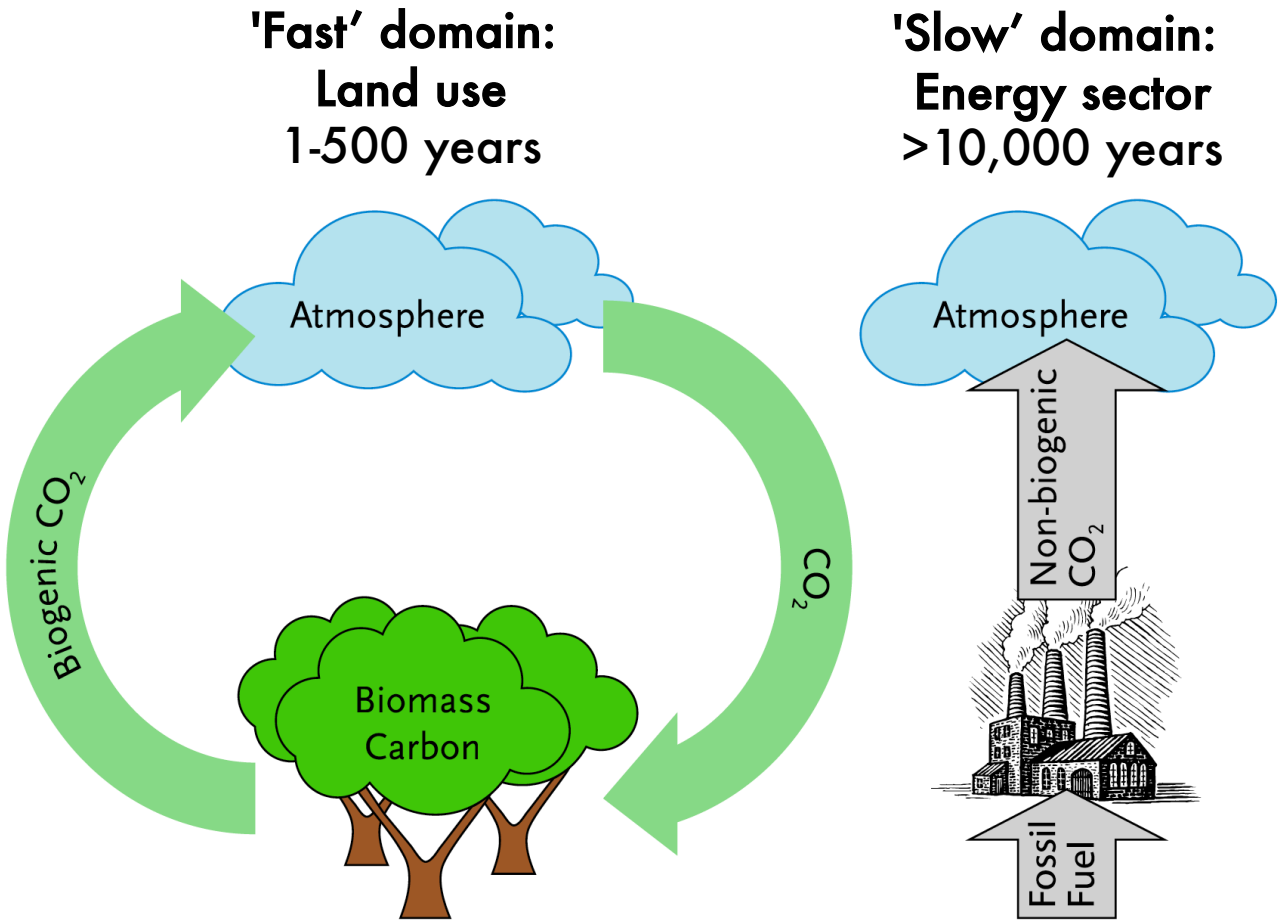
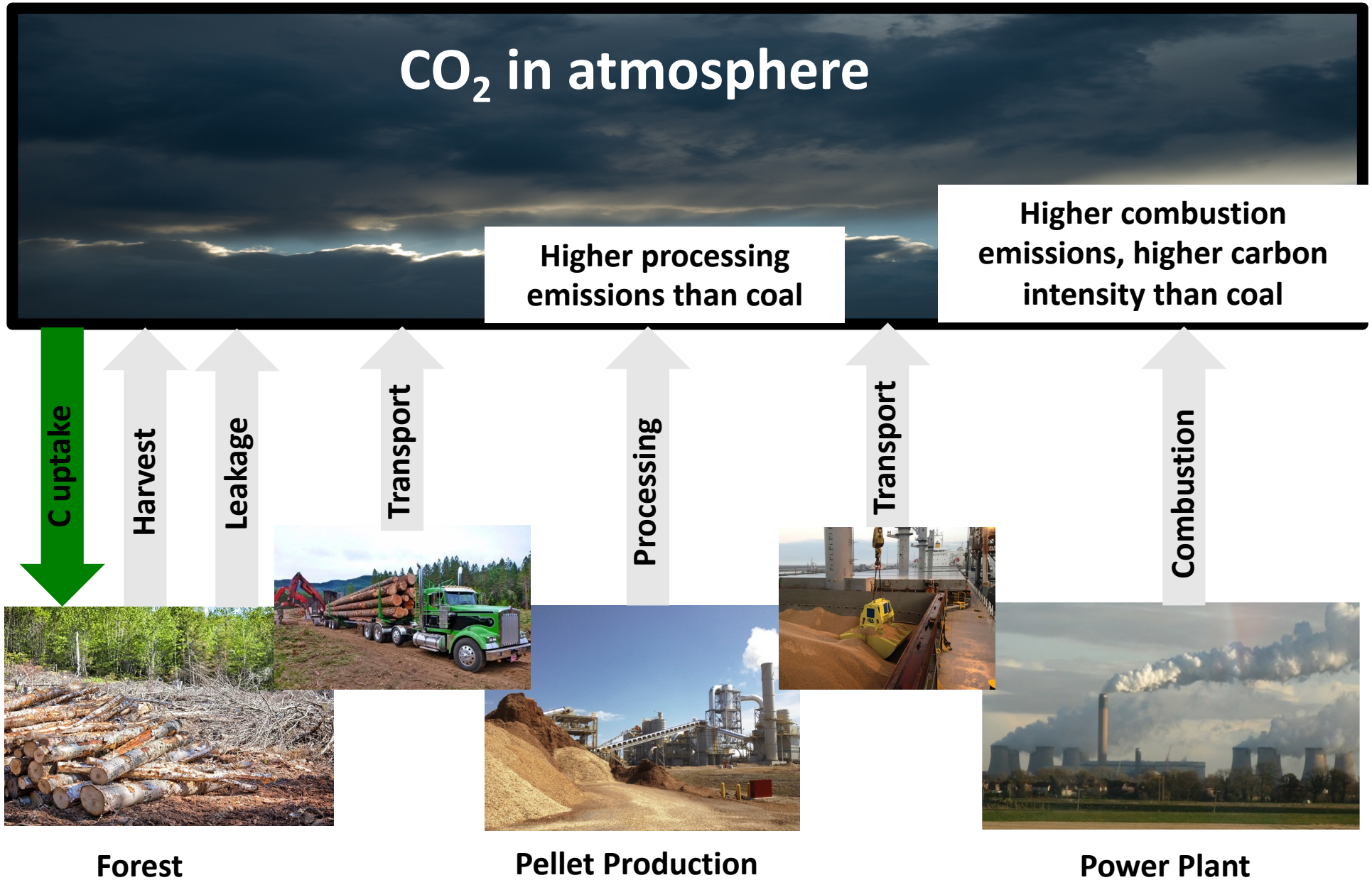


Figure: National Council for Air and Stream Improvement.

Life Cycle and Combustion Emissions from Wood Supply Chain



Three problems:

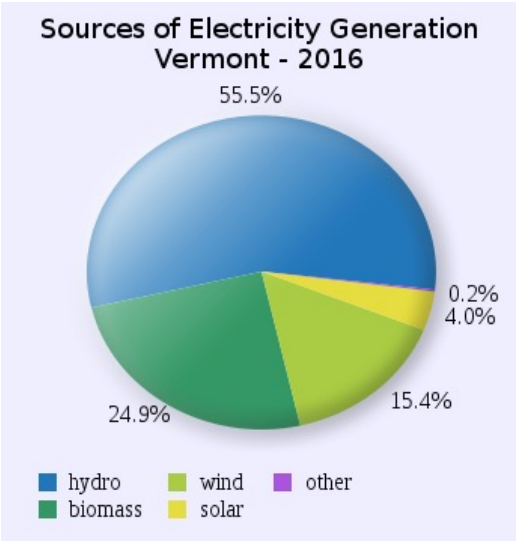
1. Rapid emissions cuts are needed – and possible – in the near term.

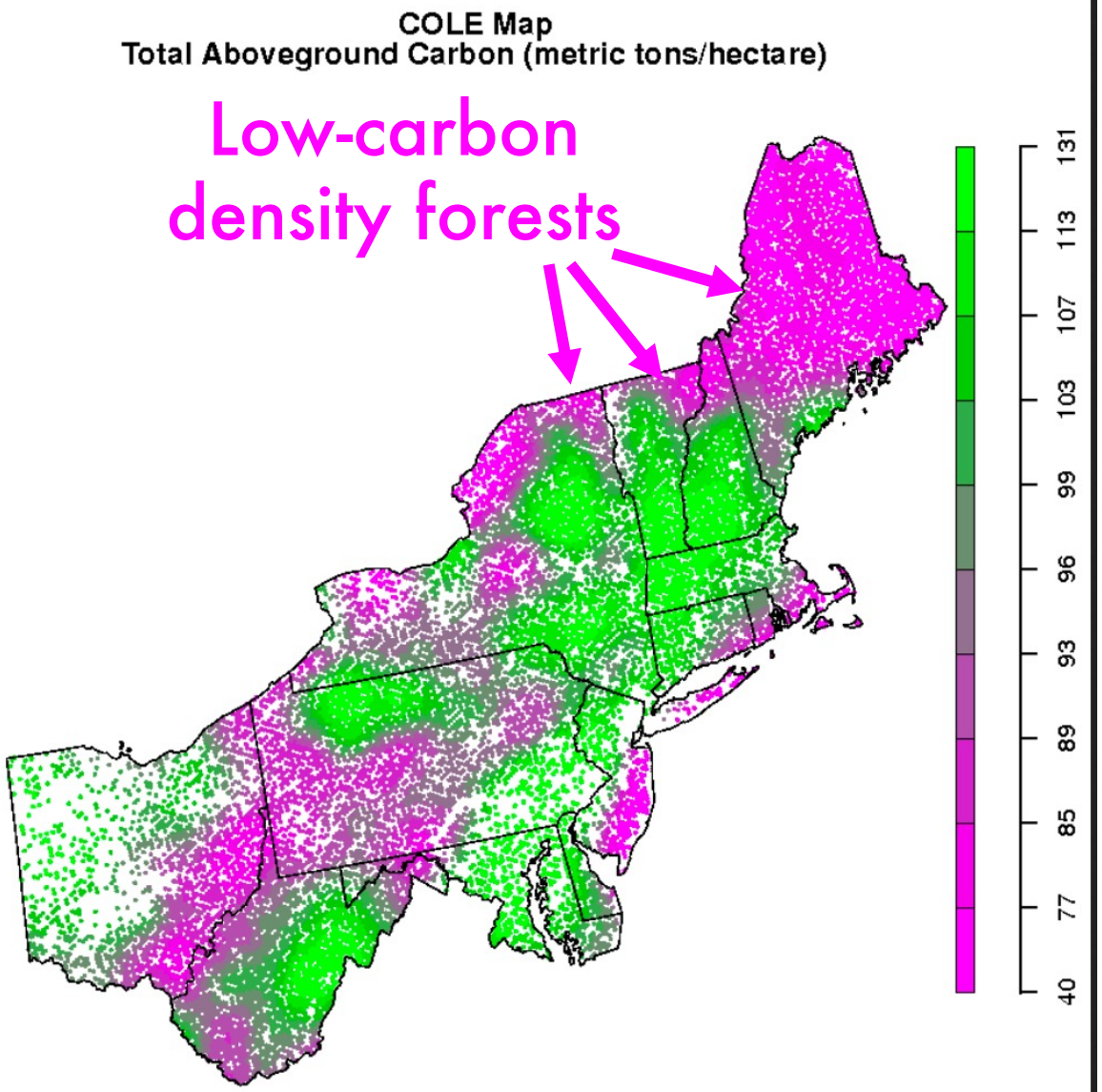
2. Growing the use of wood bioenergy continues to accrue carbon debt faster than it is paid off.

3. Delayed carbon neutrality is not climate neutral: it causes irreversible climate damage.

1. Rapid emissions cuts are needed – and possible – in the near term.

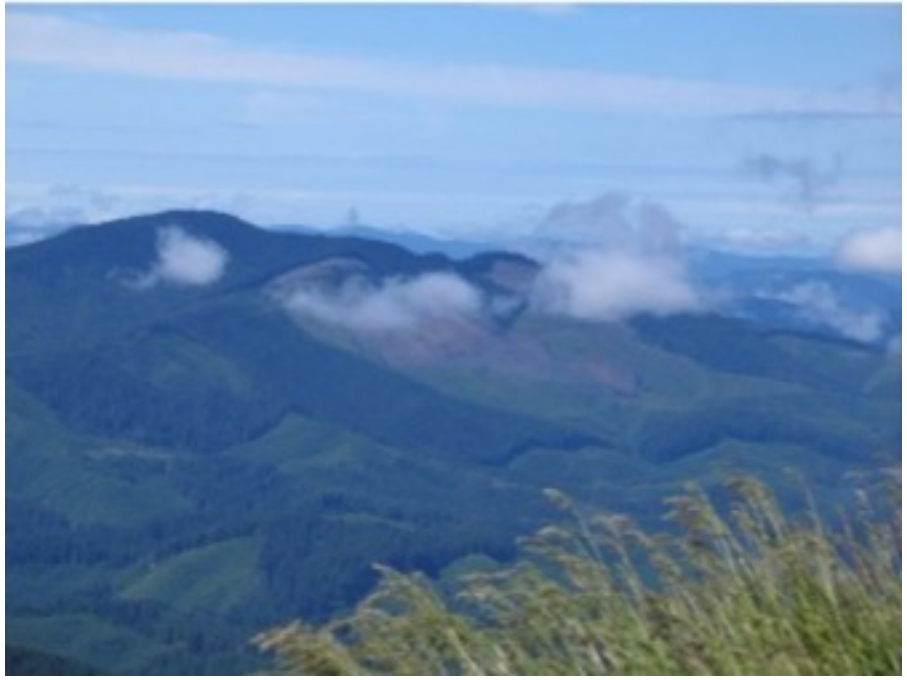
- We can't afford long payback times
- Wood bioenergy should be compared against counterfactuals that meet climate goals:
  - Low-carbon energy sources
  - Maximizing forest carbon removal and storage potential

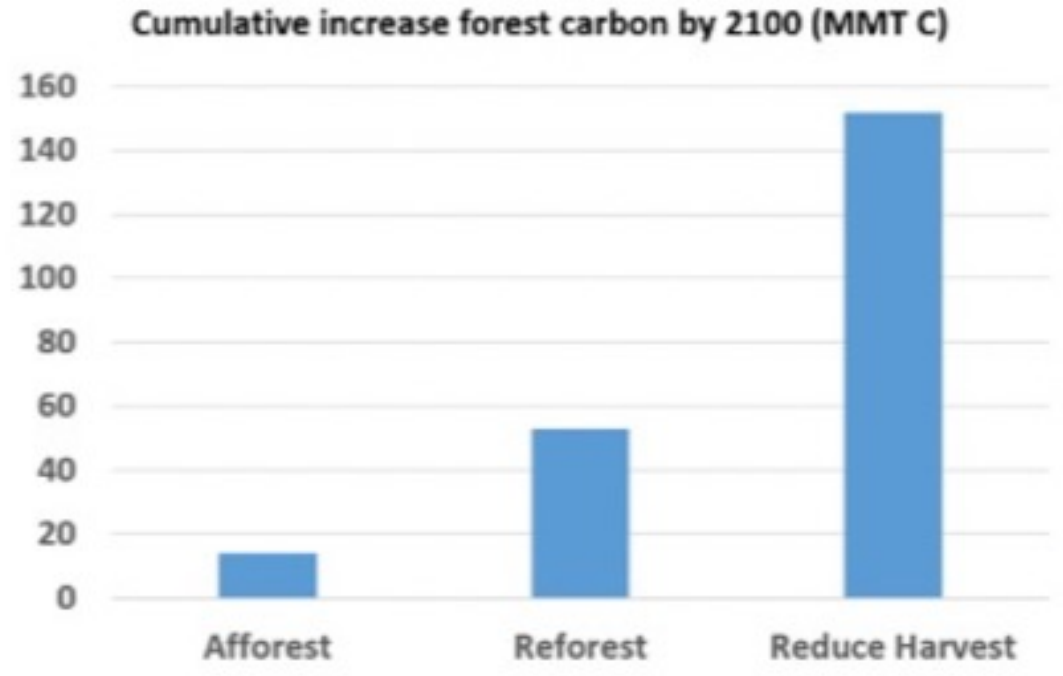




- 95% of New England forests are <100 years old.
- These forests are not yet mature and could **continue to accumulate carbon for >100 years.**

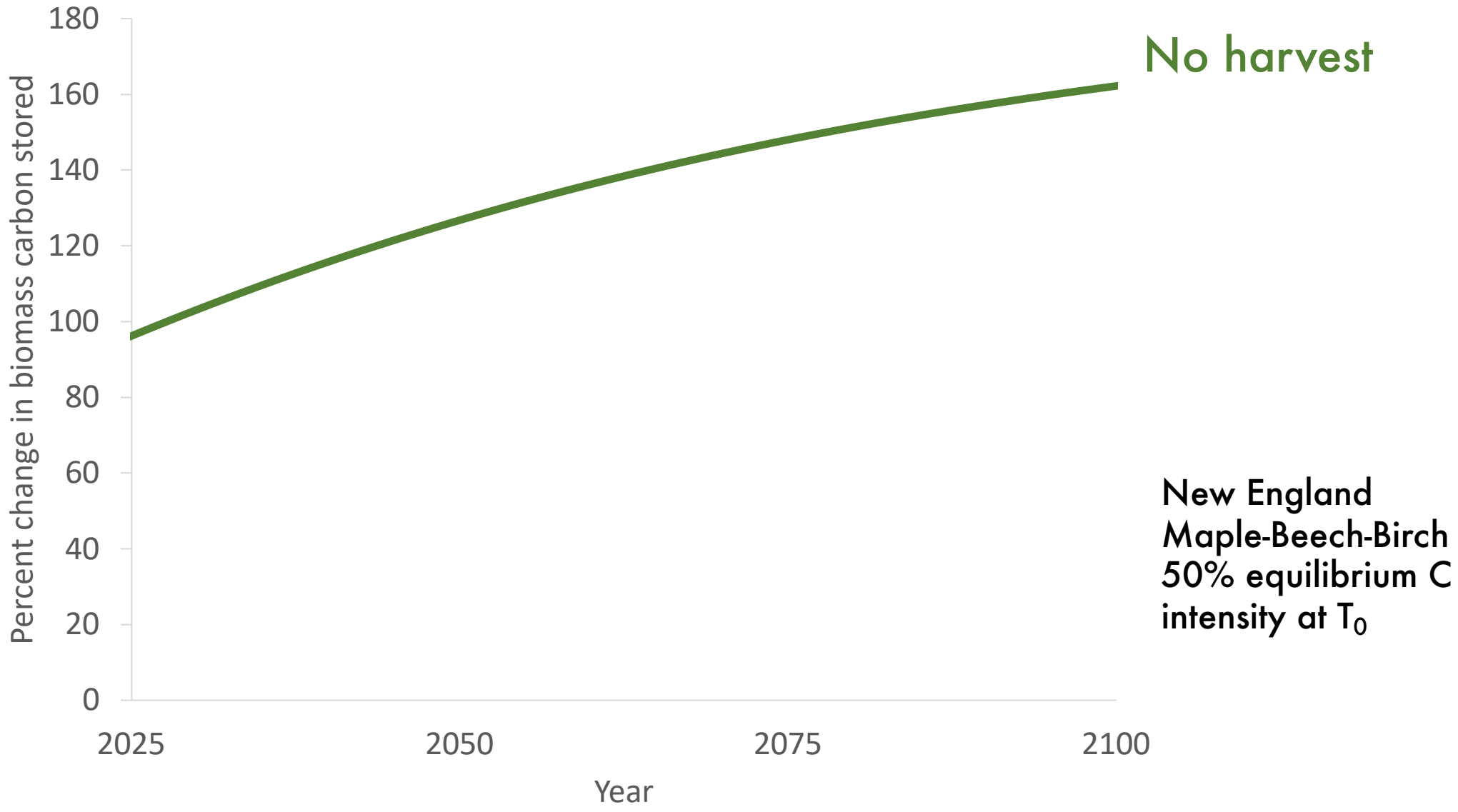
Accumulating carbon stocks in mature and old forests is the most effective forest-related climate mitigation strategy



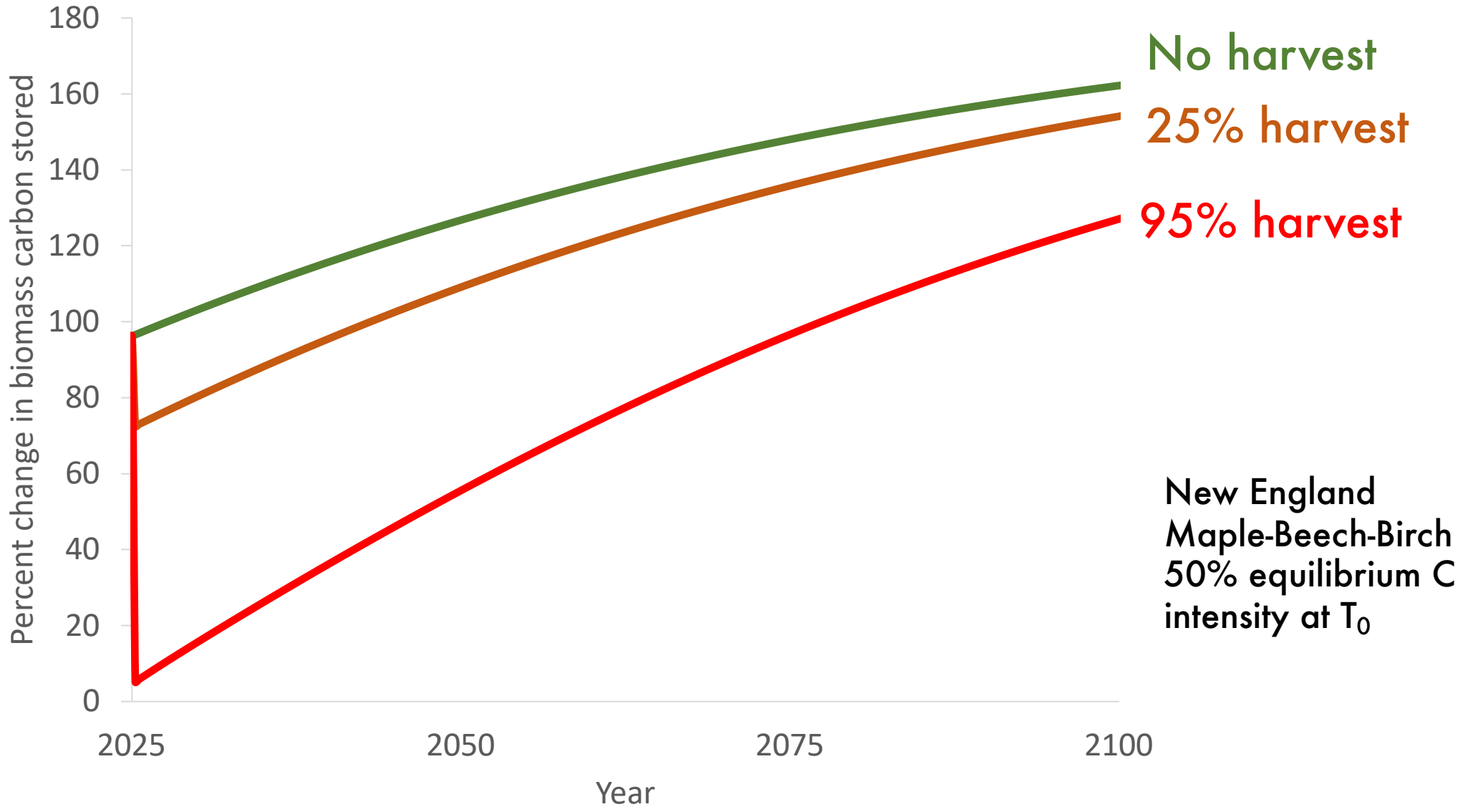


Restricting harvest to half of current rates on public lands and lengthening harvest cycles contributes the most to increasing carbon accumulation compared with business-as-usual management
(Law et al. PNAS 2018; Luyssaert et al. Nature 2008).

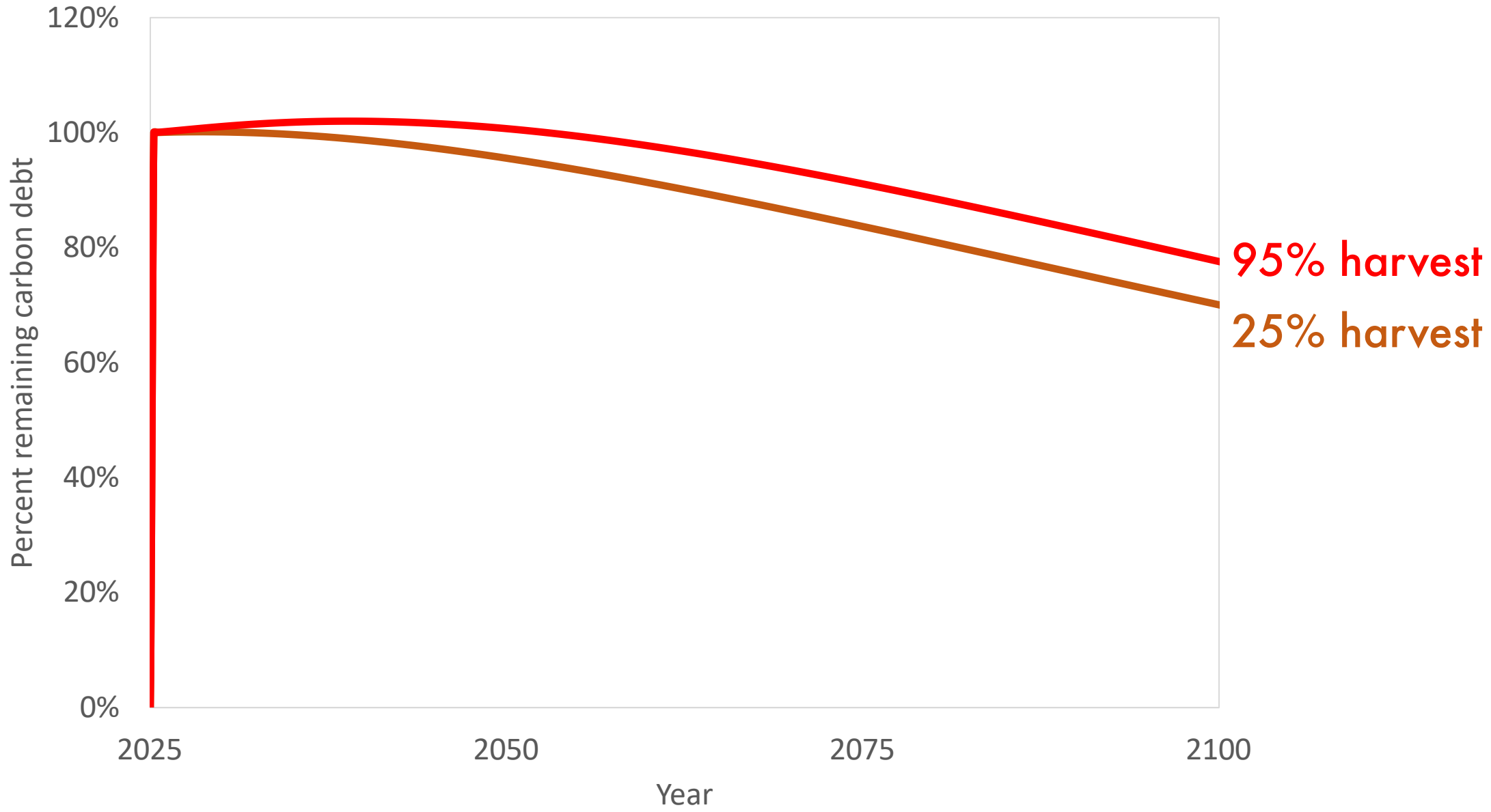
Biomass carbon intensity in a New England forest



Biomass carbon intensity in a New England forest



Percent of the original carbon debt remaining



2. Growing the use of wood bioenergy continues to accrue carbon debt faster than it is paid off.

- Should Vermont build new biomass electricity generation facilities?

- Should Vermont expand existing biomass electricity generation facilities? (McNeil and Ryegate)

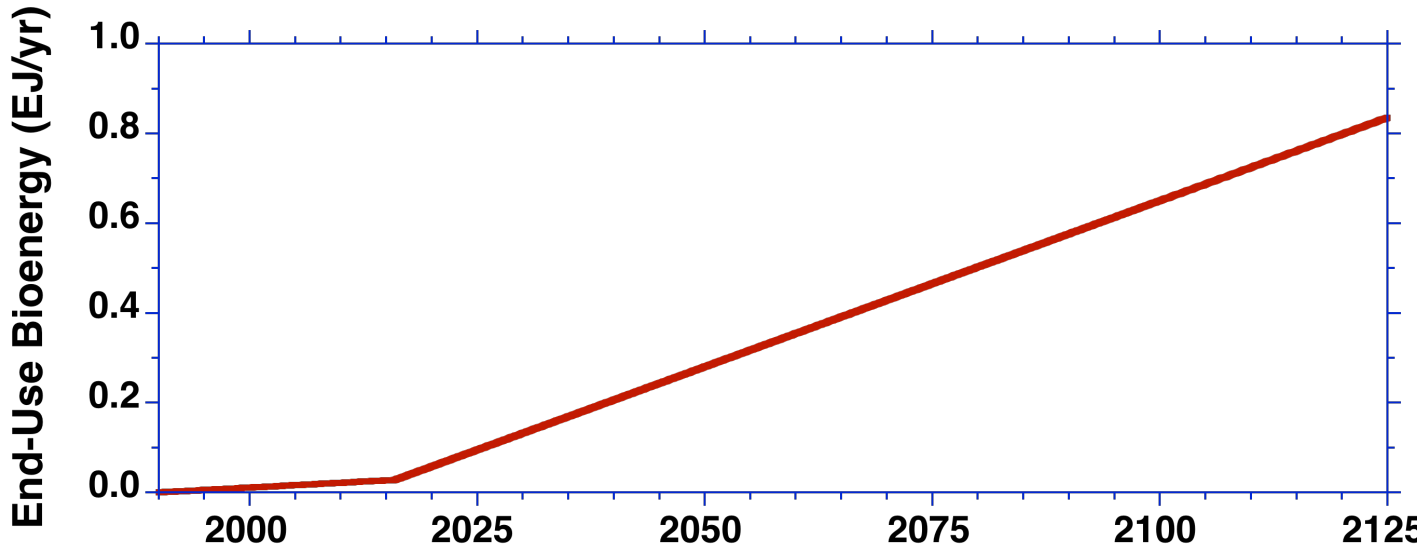
McNeil Generating Station

- 55 MW output
- Burns 500,000 tons of wood/year
- Source radius of 60 miles
- Opened in 1984
- Burns mix of wood waste and whole trees
- ~20% efficient

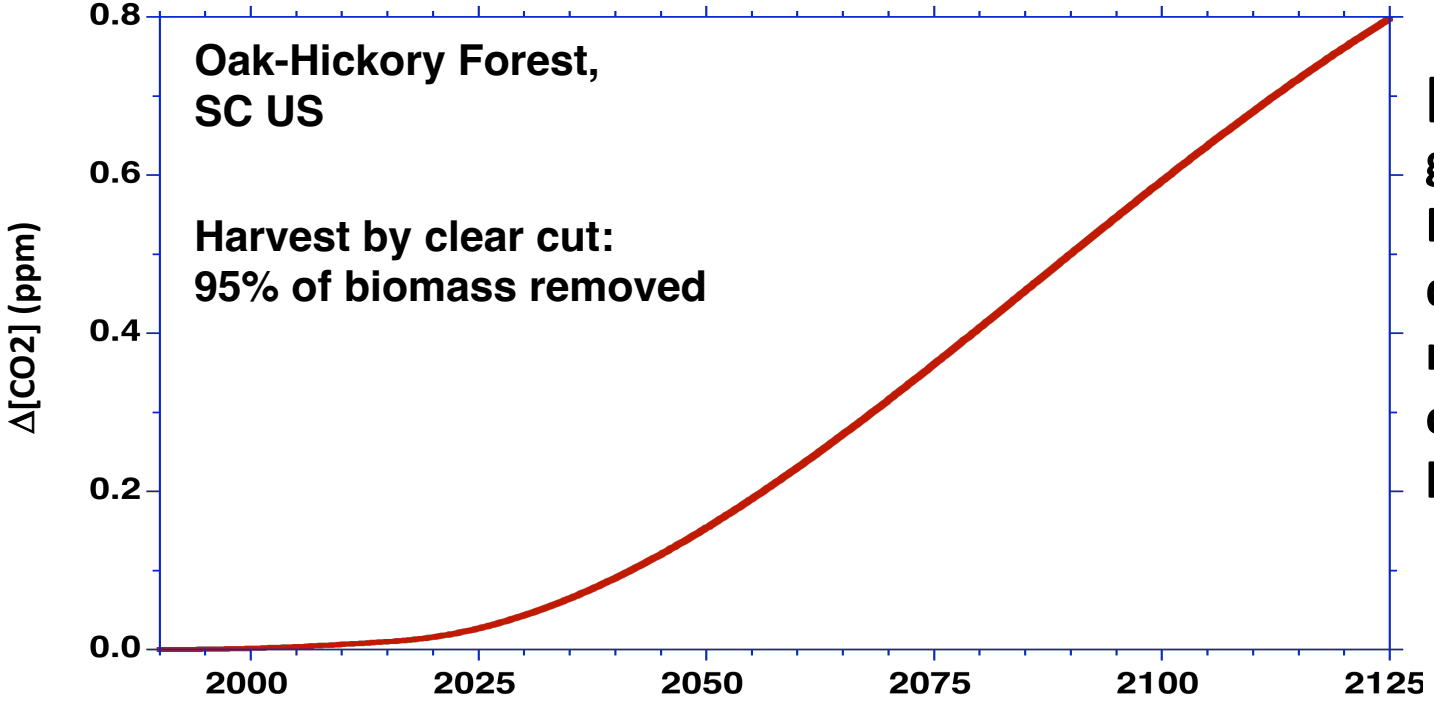
(Many thanks to Chris Matera of Massachusetts Forest Watch for providing this photo)

- Anticipated that scale would be limited by wood source transportation costs and remain local

Growth in US wood harvest

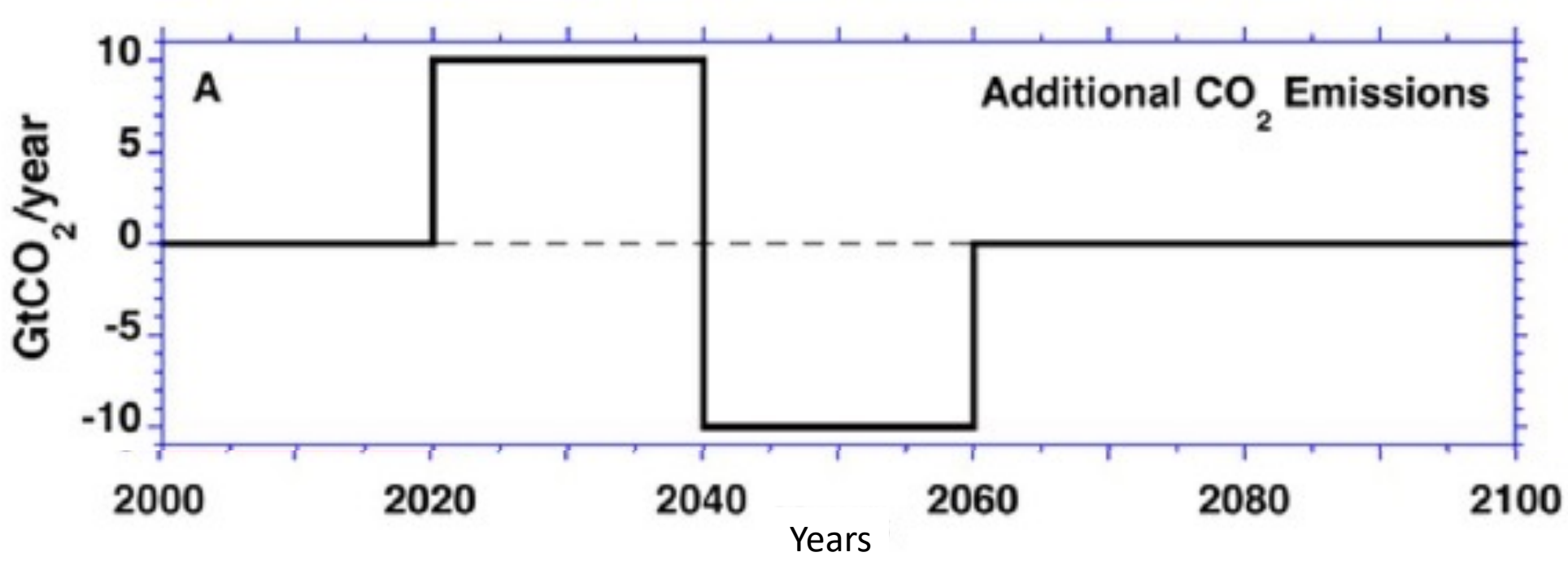


Linear growth in end-use energy supplied by wood

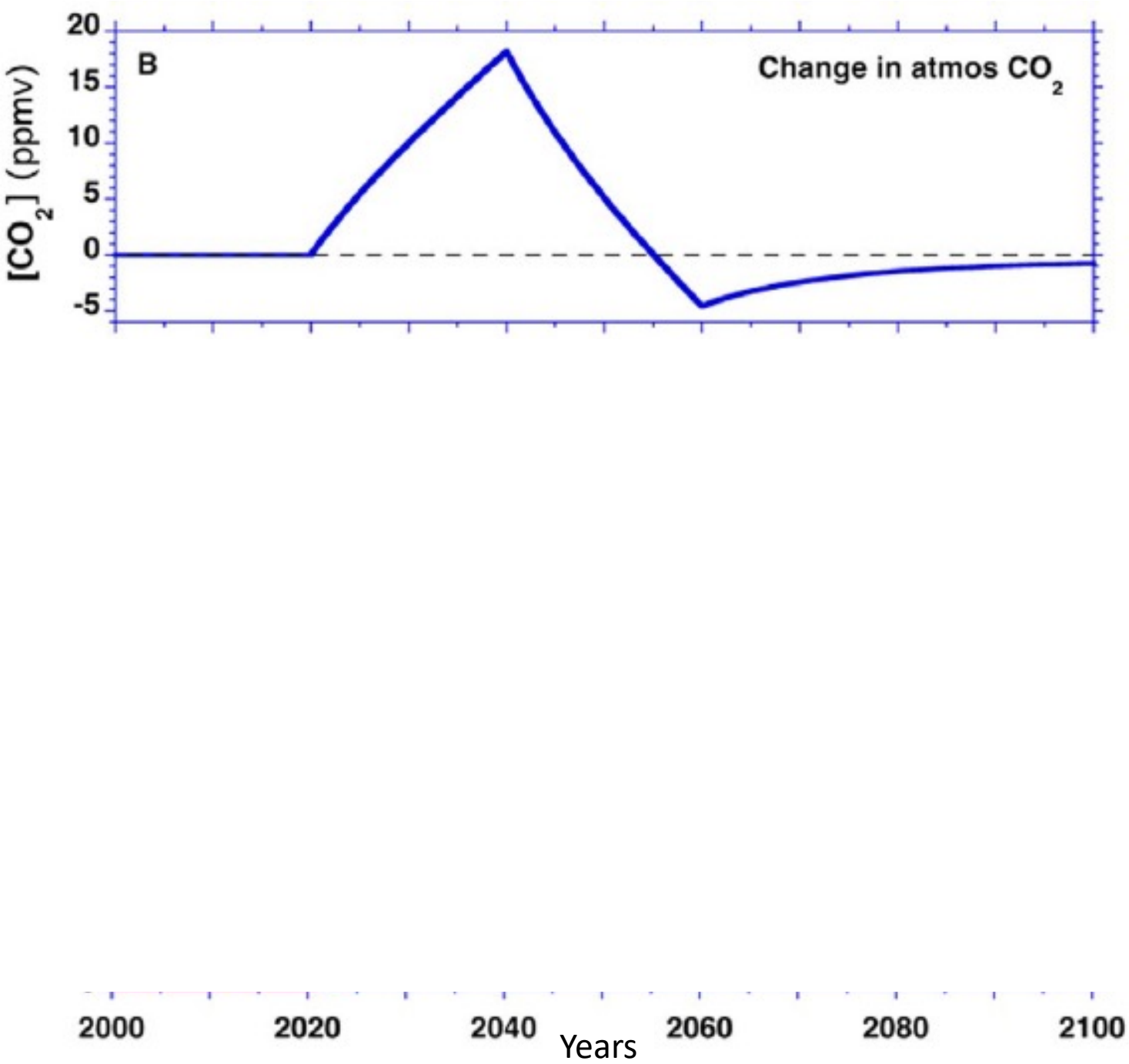


[CO2] steadily grows:
Each year new C debt exceeds repayment (NPP on previously harvested lands)

3. Delayed carbon neutrality is not climate neutral



Sterman et al. 2018. *Environ. Res. Lett.* **13** 015007
Sterman *et al* 2018 *Environ. Res. Lett.* **13** 128003



- Sterman et al. 2018. *Environ. Res. Lett.* **13** 015007
- Sterman *et al* 2018 *Environ. Res. Lett.* **13** 128003

Even temporary (centuries of) warming causes irreversible climate damage

https://www.nytimes.com/2011/09/01/us/01bridges.html

Rushing floodwaters during Irene took down even ski lodges in Killington, Vermont in 2011. Credit: Getty Images

What if only residues are burned?

- Research shows carbon payback times for burning residues are years to decades compared to decomposition (Booth 2018 *Environ. Res. Lett.* **13** 035001).

- An economically attractive counterfactual:
  - Oriented strand board
  - Wood cellulose insulation

Prior and changing public perception and policy

- **"The neutrality perception is linked to a misunderstanding of the guidelines for GHG inventories,"** IPCC AR 5 2013

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Burning forests for energy isn't 'renewable' – now the EU must admit it

Greta Thunberg and others

The EU's classification of wood fuels is accelerating the climate crisis. Next week, a key vote can change that

'Forests degraded by clearcutting are also more flammable, and in the midst of an accelerating climate crisis, this is a huge risk.' A clearcut forest in North Carolina, America, where trees are made into wood pellets. Photograph: Matt Adam Williams/PA

Europe Is Sacrificing Its Ancient Forests for Energy

Governments bet billions on burning timber for green power. The Times went deep into one of the continent's oldest woodlands to track the hidden cost.

By Sarah Hurtes and Weiyi Cai
Photographs by Andreea Campeanu September 7, 2022

wbur LOCAL COVERAGE

What to know about the new Mass. climate law

05:56

Updated August 11, 2022 By Miriam Wasser

The turbines of the Block Island Wind Farm off the coast of Rhode Island. (Jesse Costa/WBUR)

New Massachusetts climate law: Wood is excluded from the Renewable Portfolio Standard (RPS) and its subsidies

Declares biomass electricity isn't renewable

Whether to give renewable energy credits to wood-burning biomass facilities has been a contentious topic in Massachusetts over the last few years. The new law supersedes the Department of Energy Resources' controversial proposal to rewrite biomass rules.

Now, a woody biomass facility can only get credits for the electricity it generates if it was already getting those credits as of January 1, 2022. In practice, this just means that the two small combined-heat and power facilities in the state can continue to qualify.

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In the nation's asthma capital, plans to burn wood for energy spark fury

By David Abel Globe Staff, Updated October 20, 2020, 10:53 a.m.

Zulmalee Rivera-Delgado (left) sat on her porch in Springfield with her daughter Zeva Rae Joyner, 9, who has asthma and her mother, Grisel Delgado, 64, who has chronic obstructive pulmonary disease. The family opposes the wood-energy plant proposed for Springfield that they say will add to the already heavy pollution in the city. JESSICA RINALDI/GLOBE STAFF

SPRINGFIELD — For more than a decade, Amy Buchanan has lived in a small house in an industrial section of the state's third-largest city, where a pall of pungent air hangs over the neighborhood and heavy trucks spew diesel fumes on their way to a nearby paving company.

Policy recommendations

- **Exclude wood bioenergy from Vermont's Renewable Energy Standard** and subsidies.
- **Count emissions** at the point of combustion.
- **Prevent expansion** of wood bioenergy.
- Create **strategic forest carbon reserves** so forests grow more.
- Incentivize private landowners to preserve forests for **long-term accumulation of carbon.**

Thank you

- Questions?