Exploring Climate Solutions Webinar Series

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Build It With Wood

July 1, 2020

Build It With Wood:
Using Forests & Forest Products to Combat Climate Change

CT DEEP Exploring Climate Solutions Webinar

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July 1, 2020

NEW ENGLAND FORESTRY FOUNDATION

NEFF's Mission

Through the application of our core expertise in conserving forestland and advancing Exemplary Forestry, New England Forestry Foundation (NEFF) helps the people of New England to sustain their way of life, protect forest wildlife habitat and ecosystem services, and mitigate and adapt to climate change.

NEW ENGLAND FORESTRY FOUNDATION

Climate risk is: systemic, nonstationary, nonlinear, a risk multiplier, regressive

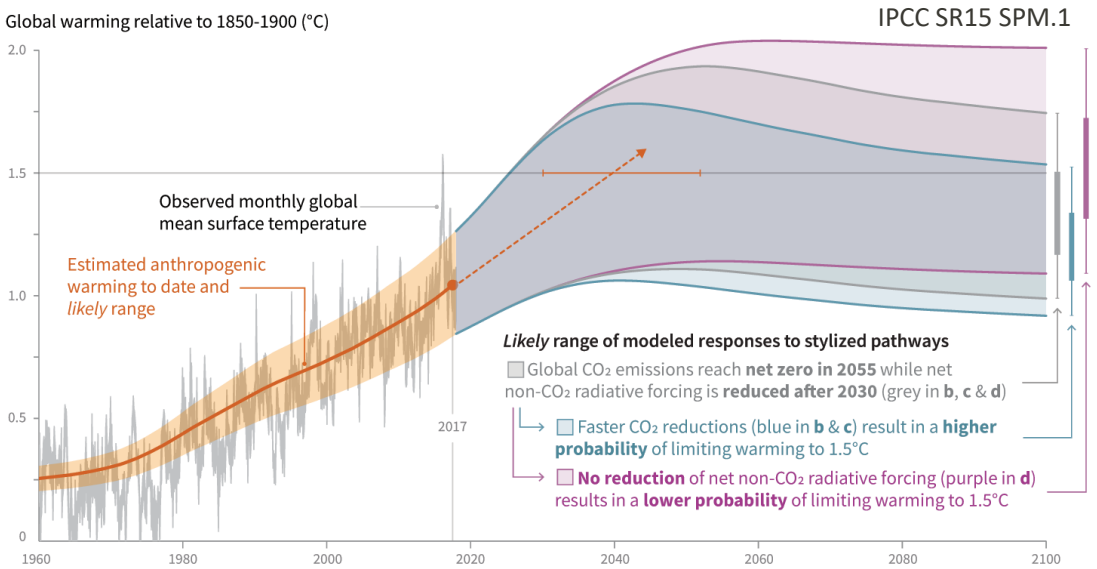
Risks to society

E.g., human health, security, infrastructure, climate justice concerns

Risks to natural systems

E.g. climate-driven forest mortality, species migrations and extinctions/extirpation, changing pest & disease dynamics

An Urgent Challenge



1.5°C of warming could occur between **2030 and 2052**

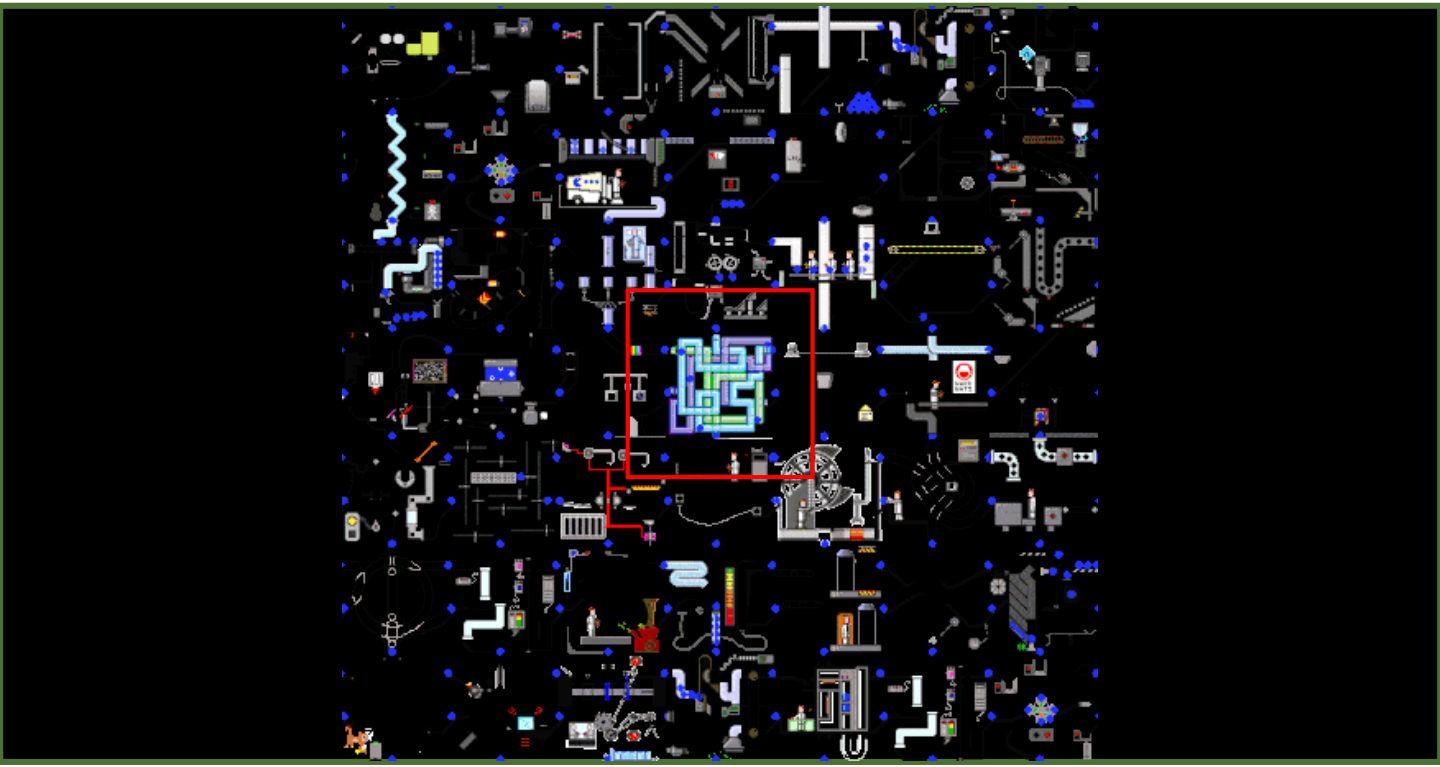
1.5°C requires **net zero by 2040**

2°C requires **net zero by 2055**

A Need for Sustainable Materials

BROOM STICKS WOODEN UTENSILS
PENCILS BOOKS TOOTHPICKS
CUTTING BOARDS GROCERY BAGS
HOCKEY STICKS TURPENTINE
PLYWOOD FLOORING
PAPER PLATES COFFEE FILTERS
NOTEBOOK PAPER DECKING
BOWLING ALLEY LANES ANIMAL BEDDING
FENCE POSTS PALLETS
CABINETS RAILROAD TIES
MULCH GOLF TEES DIAPERS
TRIM
LUMBER BASEBALL BATS
MUSICAL INSTRUMENTS
FURNITURE EGG CARTONS
WINDOW FRAMES

A Systemic Problem Requires A Systemic Solution



A Systems Approach

End Forest Conversion to maintain CO_2 already stored

+

Exemplary Forestry to remove and store CO_2

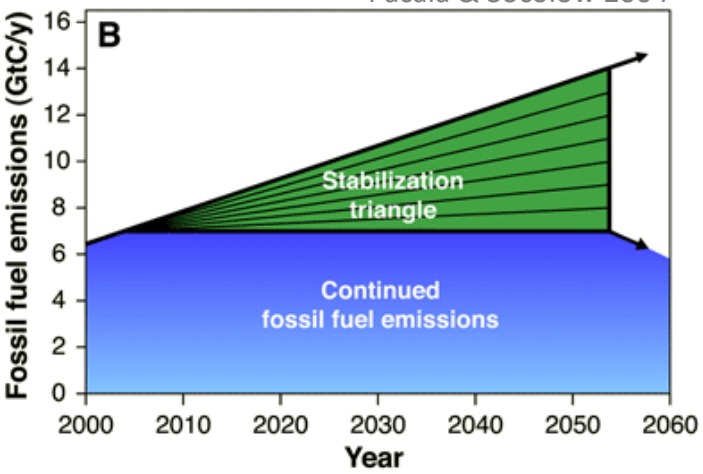
+

Long-lived wood products to reduce emissions and store more CO_2

=

A New Climate Wedge

Pacala & Socolow 2004



End Forest Conversion to maintain CO_2 already stored

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Exemplary Forestry to remove and store CO_2

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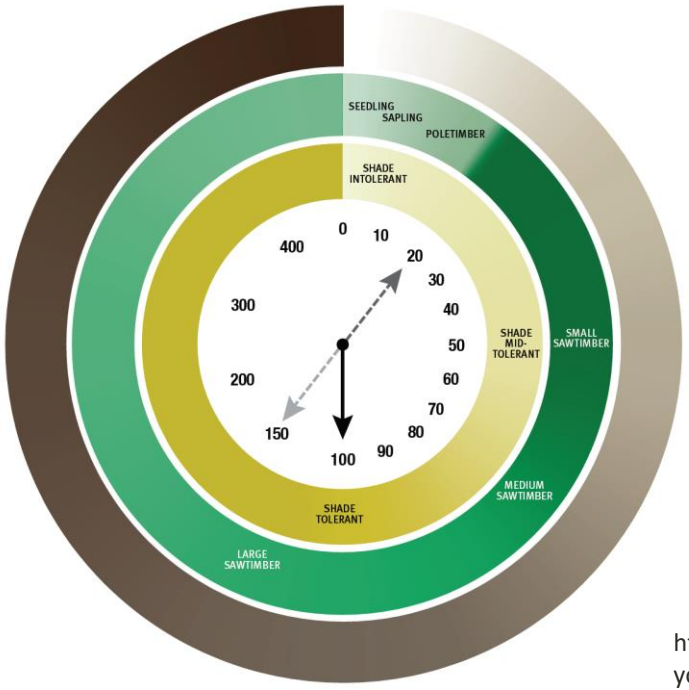
A New Climate Wedge

FOREST SUCCESSION & DEVELOPMENT CLOCK



LEGEND

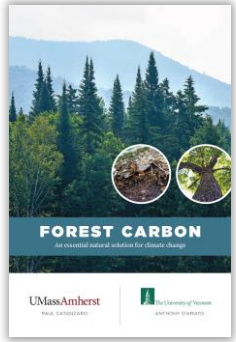
0–400 Age of the forest in years

Changes in carbon storage over time. The darker the brown, the more carbon storage.

Changes in carbon sequestration over time. The darker the green, the more forest level carbon sequestration.

Changes in tree species shade tolerance over time. The darker the yellow, the more likely shade-tolerant trees (e.g., hemlock, sugar maple, and beech) are to be competitive.

https://masswoods.org/caring-your-land/forest-carbon



Part 1: End Forest Conversion

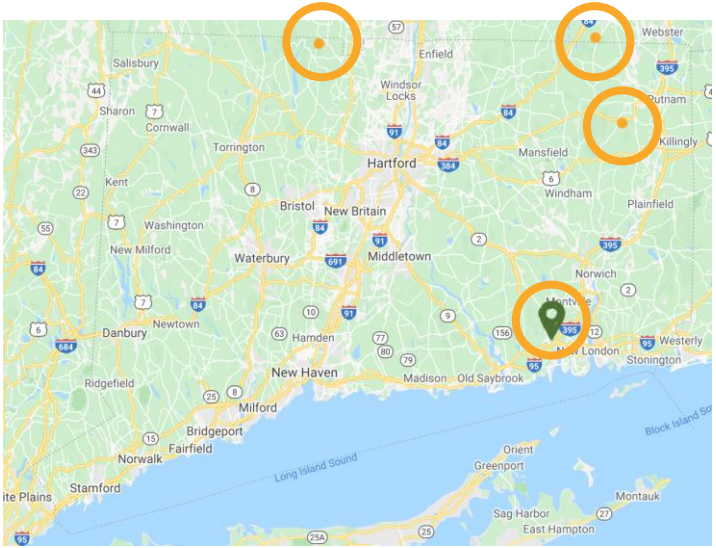
Whether for agriculture in the Amazon or for homes near Andover deforestation releases carbon already stored and eliminates future potential to store more

Video still from NY Times: https://www.nytimes.com/video/world/americas/100000006721982/amazon-rainforest-fires-burning.html

End Forest Conversion to maintain CO_2 already stored + Exemplary Forestry to remove and store CO_2 + Long-lived wood products to reduce emissions and store more CO_2 = A New Climate Wedge

Part 1: End Forest Conversion

- ✓ NEFF has conserved over 1.1 million acres of forestland across N.E. since 1944
- ✓ Four community forests in CT
- ✓ Land conservation is a key strategy, but land use policy is also important

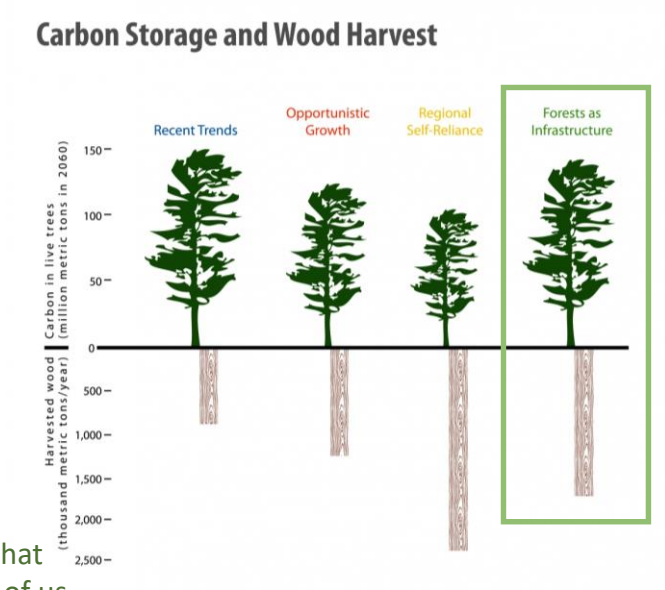


End Forest Conversion to maintain CO_2 already stored + **Exemplary Forestry** to remove and store CO_2 + Long-lived wood products to reduce emissions and store more CO_2 = A New Climate Wedge

Part 2: Manage Forests Better*

Address climate change through improved forest management on existing forest lands

- ✓ Maintain or increase stocking
- ✓ Increase productivity



Changes to the Land, Harvard Forest

* By "better" we mean management that addresses that critical 20-30 year climate mitigation window in front of us (while providing wildlife habitat and high quality wood)

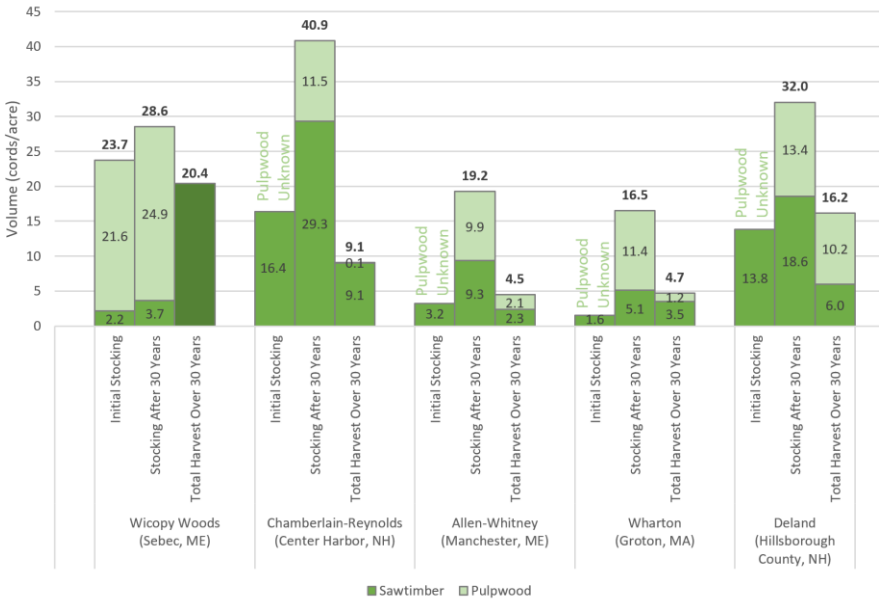
End Forest Conversion to maintain CO_2 already stored + **Exemplary Forestry** to remove and store CO_2 + Long-lived wood products to reduce emissions and store more CO_2 = A New Climate Wedge

Part 2: Manage Forests Better

Q: Is it possible to increase carbon storage AND maintain harvest?

A: YES

Real-world examples



End Forest Conversion to maintain CO_2 already stored + **Exemplary Forestry** to remove and store CO_2 + Long-lived wood products to reduce emissions and store more CO_2 = A New Climate Wedge

Exemplary Forestry

- ✓ Three co-equal goals:

Enhance Wildlife Habitat for full suite of species present	**↑ Wood Quality & Quantity** produced & retained in stands over time	**Enhance Role of Forests in Mitigating Climate Change**

- ✓ Operating at landscape scale
- ✓ Specific, measurable metrics
- ✓ Forest mgmt that is positive for full suite of forest values

Up Next…

Exemplary Forestry Standards for the North Central Hardwoods Region

End Forest Conversion to maintain CO_2 already stored + **Exemplary Forestry** to remove and store CO_2 + Long-lived wood products to reduce emissions and store more CO_2 = A New Climate Wedge

Part 2: Manage Forests Better

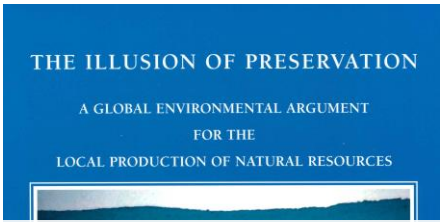
Achieving exemplary forestry outcomes in northern New England could store 1.9 Gt* of CO_2 in new living wood.

If achieved over 20 years this would be equivalent to removing all vehicles in New England from the roads for the same time period or longer.

* Disclaimer: This is a preliminary estimate and may be revised as part of on-going analysis

End Forest Conversion to maintain CO_2 already stored + Exemplary Forestry to remove and store CO_2 + **Long-lived wood products** to reduce emissions and store more CO_2 = A New Climate Wedge

- ✓ Substitute for more carbon-intensive materials (plastic, steel, concrete)
- ✓ Long-term carbon storage in the products themselves



"…reducing domestic production with no corresponding change in consumption simply requires other parts of the globe to supply the resources. […] natural resource preservation is but an *illusion* if it only serves to shift the source of resources, especially to locations where extraction is less environmentally sound. In order to achieve true environmental protection, it is essential to consider both consumption **and** the global distribution of resource production."

Growing what we need where we live

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Exemplary Forestry to remove and store CO_2

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Long-lived wood products to reduce emissions and store more CO_2

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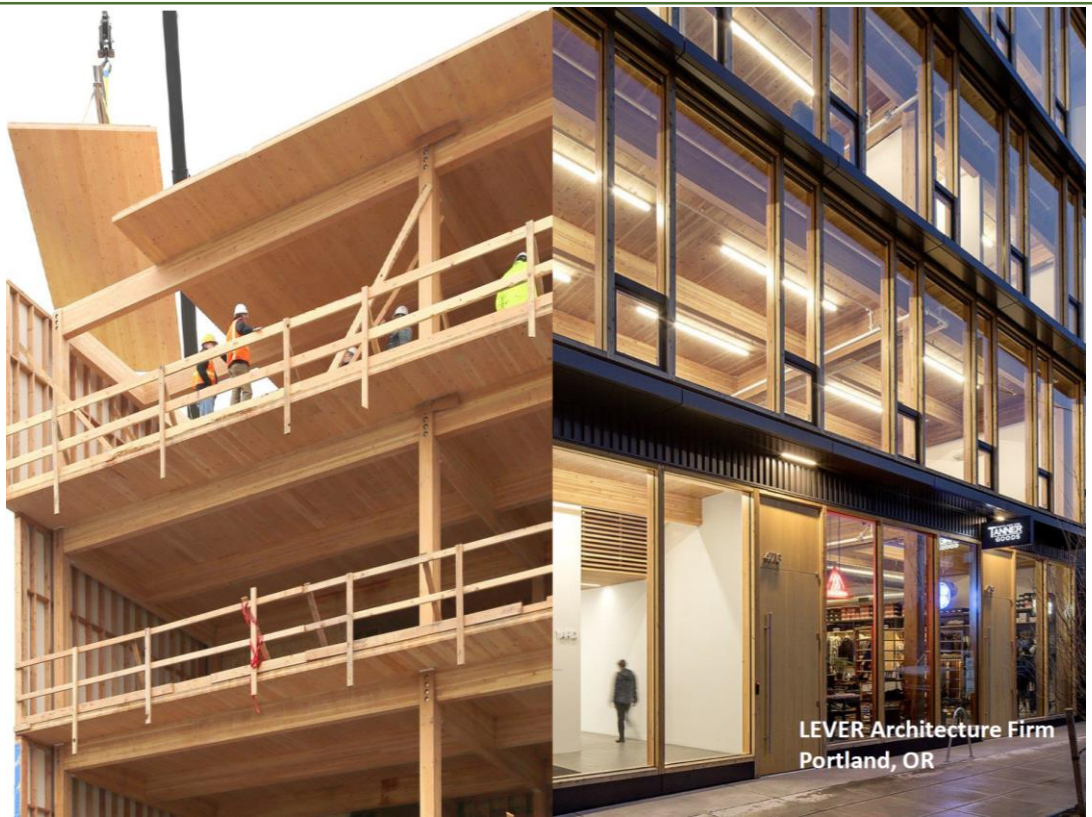
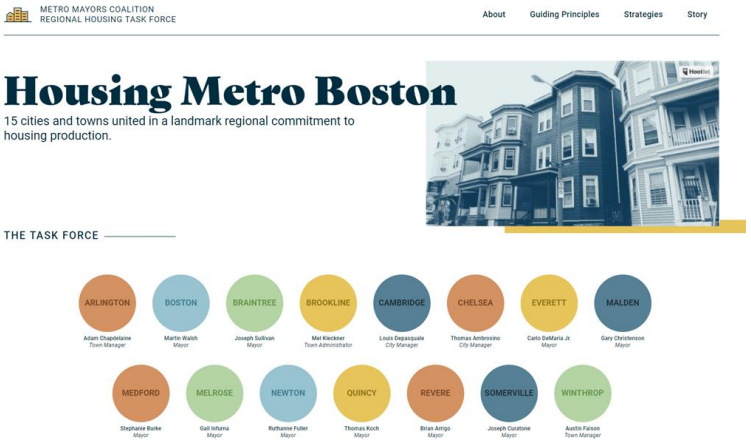
A New Climate Wedge



Part 3: Build Wood Buildings



"The Metro Mayors Coalition will need to add 185,000 housing units from 2015 – 2030 in order to meet demand and reduce – or at least stabilize -- housing costs."

End Forest Conversion to maintain CO_2 already stored + Exemplary Forestry to remove and store CO_2 + **Long-lived wood products** to reduce emissions and store more CO_2 = A New Climate Wedge

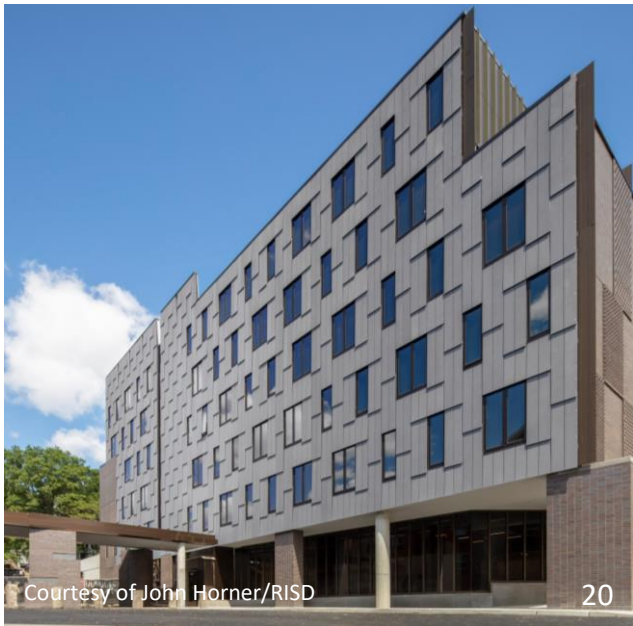
Part 3: Build Wood Buildings

✓ Lower emissions

Based on a comparison of equivalent 40,000 square foot 2-story wood, steel + concrete buildings, each assumed to have a concrete foundation and slab.

Source: ATHENA ECOCALCULATOR

Image Source: "Wood and Environmental Benefits Infographic" https://www.thinkwood.com/building-better/sustainability



Courtesy of John Horner/RISD

End Forest Conversion to maintain CO_2 already stored + Exemplary Forestry to remove and store CO_2 + **Long-lived wood products** to reduce emissions and store more CO_2 = A New Climate Wedge

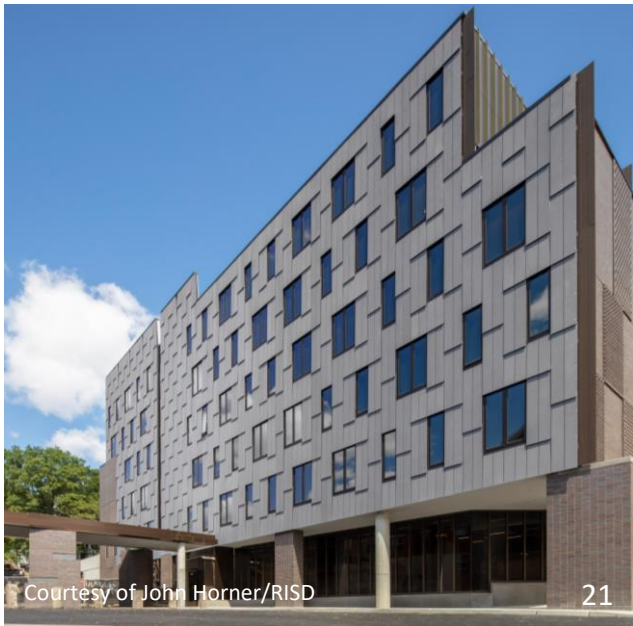
Part 3: Build Wood Buildings

✓ Lower emissions

Oliver et al. 2014:
↓ global carbon emissions 14 - 31%

Churkina et al. 2020
Strong transition to wood buildings over 30 years =
↓ global carbon emissions 4%

Life Cycle Assessments
NEFF LCA underway…


Courtesy of John Horner/RISD

End Forest Conversion to maintain CO_2 already stored + Exemplary Forestry to remove and store CO_2 + **Long-lived wood products** to reduce emissions and store more CO_2 = A New Climate Wedge

Part 3: Build Wood Buildings

- ✓ Lower emissions
- ✓ Carbon storage in the building

Source → **Sink**

Brock Commons,
Univ. of British Columbia
1,753 metric tons CO_2 stored
in the wood of the building

Photo courtesy of UBC

Part 3: Build Wood Buildings

- ✓ Lower emissions
- ✓ Carbon storage in the building
- ✓ Different pattern of development

- ↑ density near transit
- ↑ housing supply/ affordability
- ↓ sprawl
- ↓ transportation emissions
- ↓ development pressure on forests

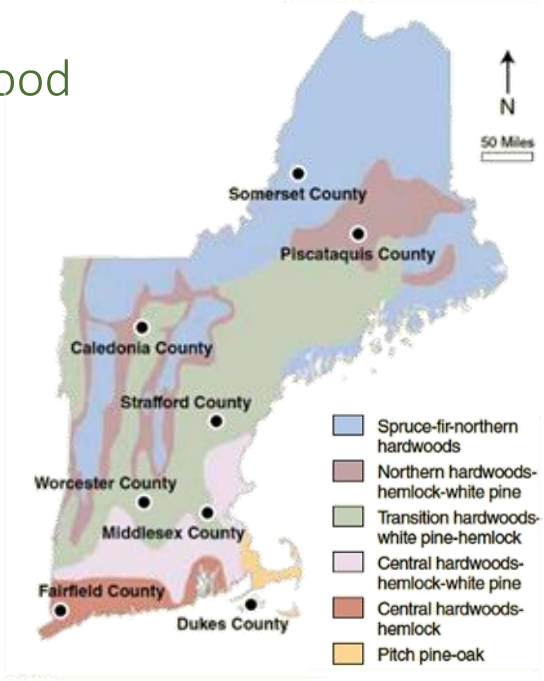
Example Mass Timber Buildings in CT

- **Mill River Park Carousel Pavilion**, Stamford
- **Thompson Exhibit Building at Mystic Seaport**, Mystic
  - 2018 CTGBC Green Building Institutional Award of Merit Winner
- **Common Ground High School**, New Haven




Mass Timber Species

- Mass timber is made from softwood lumber (e.g. pine, spruce, fir)
  - New Research: Potential for hemlock
- US softwood lumber production:
  - 63% from the Southeast
  - 29% from the West (Rockies, West Coast, Alaska)*

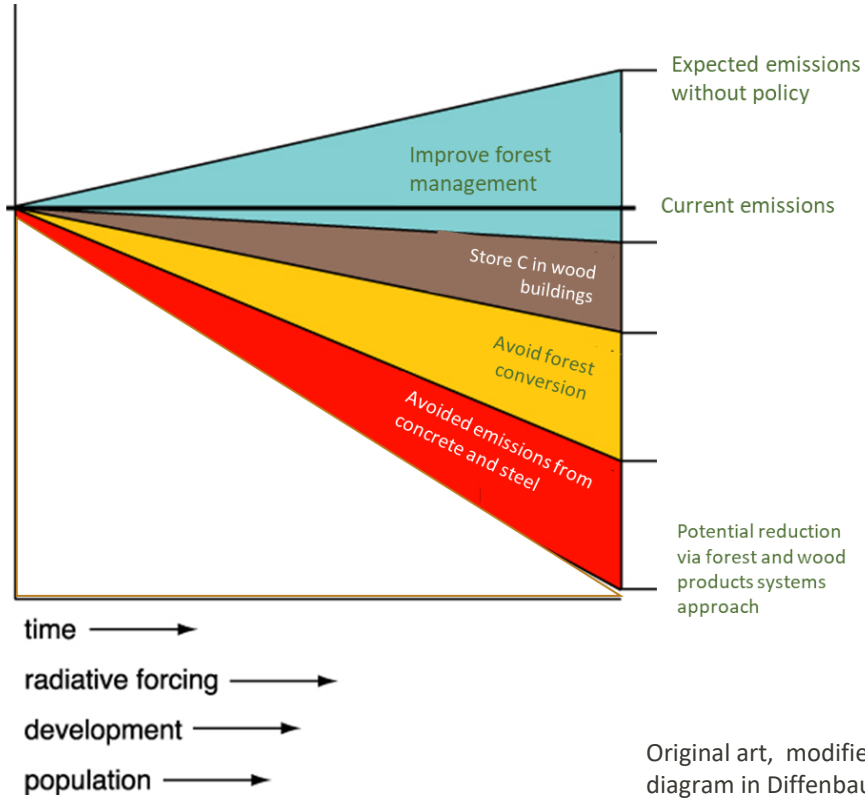


Map Source: Wildlands & Woodlands

* Forest Resources of the United States, 2017: a technical document supporting the Forest Service 2020 RPA Assessment. Gen. Tech. Rep. WO-GTR-97.

Carbon Benefits Depend on Sourcing

- E.g. Oliver et al. 2014 presumed harvesting limited to growth on annual basis
- Lands where harvesting greatly exceeds growth creates a carbon debt



Original art, modified from a diagram in Diffenbaugh et al. 2011

- ✓ Achieve a significant climate mitigation wedge
- ✓ Forest products at the center of climate-driven development
- ✓ Support forest-based jobs in rural communities
- ✓ More housing, with more affordable pricing
- ✓ Improve mobility and reduce future sprawl
- ✓ Maintain wildlife habitat, clean air, clean water

A Systemic Solution in Action

Solutions that recognize how
our natural, economic, and socio-political systems are interconnected
are the only way to tackle a problem of this scale.

We need cross-sector collaboration.

For example…

Forest-to-Cities Climate Challenge

www.ForesttoCities.org

QUESTIONS?

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