

The Role of Forest Products and Bioenergy in Addressing Climate Change

KEY POINTS

1. Atmospheric CO₂ levels are rising primarily because humans have been using carbon that has been locked up in the Earth for millions of years (e.g., geologic carbon) to produce products and energy.
2. Forest products and bioenergy primarily use biogenic carbon, carbon that is already a part of the Earth's carbon cycle. As long as forests are managed sustainably, forest products and bioenergy do not increase atmospheric CO₂ levels.
3. Creating forest products and bioenergy do produce a small amount of geologic-based carbon emissions because equipment runs on fossil fuels. However, these emissions are significantly less than the fossil fuel-based emissions (1) produced by products made of steel, concrete or plastic, or (2) emitted by the burning of coal, oil, or natural gas to produce energy.
4. As long as forests are managed sustainably, which they are in the US and NYS, forest products and bioenergy provide change benefits by reducing fossil fuel-based carbon emissions. In addition, forest products store carbon in those wood products during their useful life.

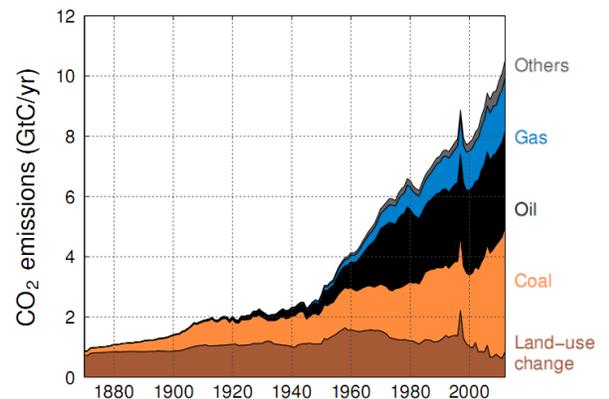


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WHAT IS CAUSING CLIMATE CHANGE?

- Climate change is occurring because greenhouse gases (GHG) levels in the Earth's atmosphere have been increasing for the past 200 years.
- The most important of these GHGs is CO₂. Atmospheric CO₂ levels have been rising for two reasons.¹
- First and most importantly, because humans have been removing what is often referred to as geologic carbon that had been locked up in the Earth for 100s of millions of years in the form of coal, oil, and natural gas. These fossil fuels are then burned to produce products and energy and release CO₂ (and other GHGs) into the atmosphere at a rate faster than it can be assimilated in other places in the carbon cycle. As the figure below indicates, this represents the vast majority of CO₂ emissions during the past 50 years.²

- Second, humans have been clearing forests and turning them into other land uses such as urban and suburban areas and agriculture (referred to as "Land-use change" in the Figure).



- New York and US forests have been sequestering more carbon than they have been emitting into the atmosphere for decades.^{3,4,5} At the same time these forests have supported a wide range of industries that rely on wood as a raw material. Thus, forests sequester carbon, support tens of thousands of jobs, generate billions of dollars for the state's economy, and provide many other services, such as clean water and air, wildlife habitat, and recreational opportunities.

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CLIMATE CHANGE BENEFITS OF FOREST PRODUCTS

- By understanding the basics of climate change, the way to address it becomes clear. Whenever possible, we need to avoid using fossil fuel-based products and energy. Forest products and bioenergy decrease our use of fossil fuels, and thereby provide important climate change benefits.
- The vast majority of carbon emitted to produce forest products and bioenergy is what is called biogenic carbon. This is carbon that is already been circulating in the Earth's carbon cycle. Using biogenic carbon to produce products and energy does *not* increase atmospheric CO₂ levels – recall that increasing atmospheric CO₂ levels is causing climate change.
- Of course, forest products and bioenergy do produce a small amount of geologic-based carbon emissions (e.g., the fossil fuel-based emissions produced by harvesting, transporting, and manufacturing wood). However, these emissions are significantly less than the fossil fuel-based emissions (1) produced by products made of steel, concrete or plastics, or (2) emitted by the burning of coal, oil, or natural gas to produce energy.

Substitution and Sequestration Benefits of Forest Products and Bioenergy

- As long as forests are managed sustainably, which they are in the US and NYS, forest products and bioenergy provide permanent and real climate change benefits.
- Forest-based products: (1) reduce fossil fuel-based geologic carbon emissions, and (2) store carbon in those wood products during their useful life. Note: At the end of a forest product's useful life, the product is either burned in a waste-to-energy facility – which produces energy without using fossil fuels – or is landfilled, where according to the USDA Forest Service, 75% of the carbon in forest products is permanently stored.⁶
- Forest-based bioenergy creates energy that reduces fossil fuel-based geologic carbon emissions.

At SUNY ESF, we are well positioned to enable New York State to utilize forest products and bioenergy to address climate change. For example, we are already:

- Creating innovative solutions for the use of forest products (e.g., how 5 to 20 story mass timber buildings can be deployed across the state); and
- Demonstrating how biomass and biofuels, including dedicated energy crops such as shrub willow, can be used as a feedstock that provides renewable power and transportation fuels.

For more information about how SUNY ESF is enabling forest products and bioenergy to address climate change, contact:

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References:

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- ⁶ Malmshaimer et al., 2011. Managing Forests because Carbon Matter. *Journal of Forestry* 109(S):S7.

ABOUT THE CLIMATE & APPLIED FOREST RESEARCH INSTITUTE

CAFRI is a multi-disciplinary team of forest, energy and climate experts based at SUNY ESF who provide policymakers and the public with science-based and practical solutions to address climate change.

