Bioenergy and Climate

CATF's effort to improve the climate-related impacts of biofuels and biomass-based power production

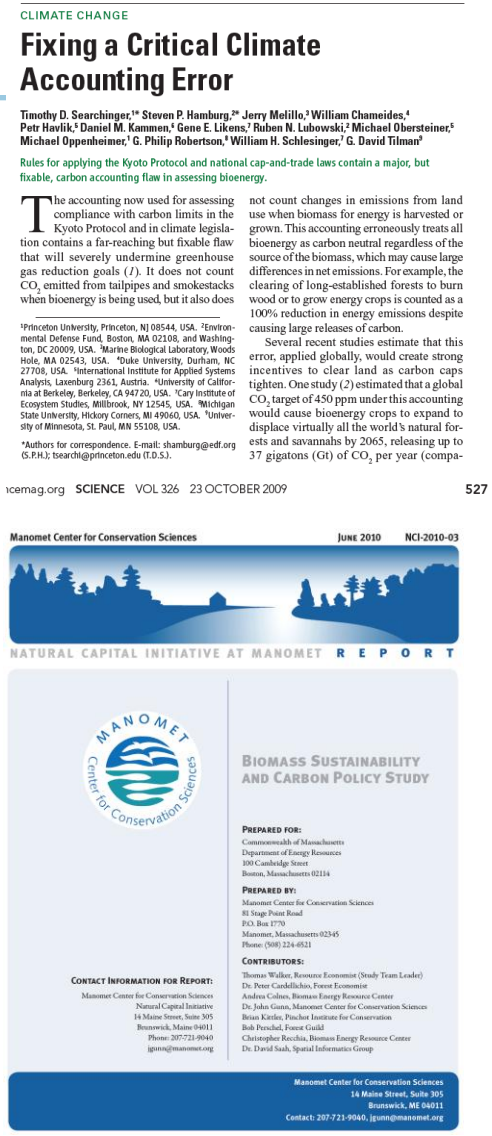
JUNE 2012

Project Overview

- CATF is working to ensure that policies recognize and address the complex climate impacts associated with the production of liquid biofuels and biomass-derived electricity.
  - Project impetus: false assumption that bioenergy is c-neutral
- Science-driven advocacy with a heavy emphasis on supporting and interpreting new research.
  - http://www.catf.us/blogs/biofuels/
  - Giffen's forthcoming assessment of beneficial biomass
- Upshot: bioenergy can provide climate benefits *as long as* carefully designed constraints on scale and feedstocks are in place.
  - Most current policies are *not* appropriately targeted, but it's increasingly difficult to sustain the C-neutral assumption

Bioenergy is not inherently climate neutral

- **Searchinger, *et al*, *"Critical Climate Accounting Error"*** (2009):
  - Policies have wrongly assumed all biomass-based energy is carbon-neutral.
  - "Bioenergy reduces greenhouse emissions only if the growth and harvesting of the biomass for energy captures carbon above and beyond what would be sequestered anyway and thereby offsets emissions from energy use."
- **Manomet** (2010): Even assuming forest regrowth, net CO2 emissions from a biomass-fired EGU will:
  - Exceed the emissions from a like-sized coal plant for 40 years
  - Exceed the emissions from like-sized natural gas plant for 90+ years
- **European Environment Agency Scientific Committee** (2011):
  - "The potential consequences of this bioenergy accounting error are immense."
- **Draft SAB Report on EPA Bioengenic Accounting Framework** (2012)
  - "Only when bioenergy results in additional carbon being sequestered above and beyond the anticipated baseline … can there be a justification for concluding that such energy use results in little or no increase in carbon emissions."



CLIMATE CHANGE

Fixing a Critical Climate Accounting Error

Timothy D. Searchinger,[1]* Steven P. Hamburg,[2]* Jerry Melillo,[3] William Chameides,[4] Petr Havlik,[5] Daniel M. Kammen,[6] Gene E. Likens,[7] Ruben N. Lubowski,[2] Michael Obersteiner,[5] Michael Oppenheimer,[1] G. Philip Robertson,[8] William H. Schlesinger,[7] G. David Tilman[9]

Rules for applying the Kyoto Protocol and national cap-and-trade laws contain a major, but fixable, carbon accounting flaw in assessing bioenergy.

The accounting now used for assessing compliance with carbon limits in the Kyoto Protocol and in climate legislation contains a far-reaching but fixable flaw that will severely undermine greenhouse gas reduction goals (*1*). It does not count CO_2 emitted from tailpipes and smokestacks when bioenergy is being used, but it also does not count changes in emissions from land use when biomass for energy is harvested or grown. This accounting erroneously treats all bioenergy as carbon neutral regardless of the source of the biomass, which may cause large differences in net emissions. For example, the clearing of long-established forests to burn wood or to grow energy crops is counted as a 100% reduction in energy emissions despite causing large releases of carbon.

Several recent studies estimate that this error, applied globally, would create strong incentives to clear land as carbon caps tighten. One study (*2*) estimated that a global CO_2 target of 450 ppm under this accounting would cause bioenergy crops to expand to displace virtually all the world's natural forests and savannahs by 2065, releasing up to 37 gigatons (Gt) of CO_2 per year (compa-

[1]Princeton University, Princeton, NJ 08544, USA. [2]Environmental Defense Fund, Boston, MA 02108, and Washington, DC 20009, USA. [3]Marine Biological Laboratory, Woods Hole, MA 02543, USA. [4]Duke University, Durham, NC 27708, USA. [5]International Institute for Applied Systems Analysis, Laxenburg 2361, Austria. [6]University of California at Berkeley, Berkeley, CA 94720, USA. [7]Cary Institute of Ecosystem Studies, Millbrook, NY 12545, USA. [8]Michigan State University, Hickory Corners, MI 49060, USA. [9]University of Minnesota, St. Paul, MN 55108, USA.

*Authors for correspondence. E-mail: shamburg@edf.org (S.P.H.); tsearchi@princeton.edu (T.D.S.).

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NATURAL CAPITAL INITIATIVE AT MANOMET REPORT

MANOMET Center for Conservation Sciences

BIOMASS SUSTAINABILITY AND CARBON POLICY STUDY

PREPARED FOR:
Commonwealth of Massachusetts
Department of Energy Resources
100 Cambridge Street
Boston, Massachusetts 02114

PREPARED BY:
Manomet Center for Conservation Sciences
81 Stage Point Road
P.O. Box 1770
Manomet, Massachusetts 02345
Phone: (508) 224-6521

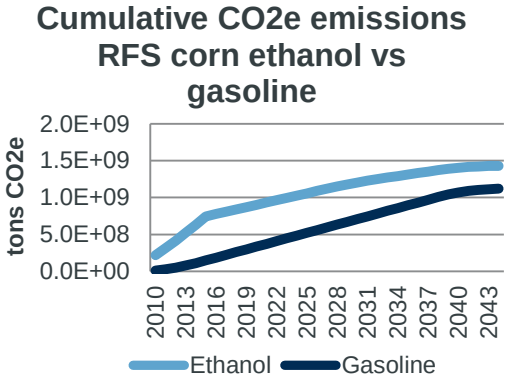
CONTRIBUTORS:
Thomas Walker, Resource Economist (Study Team Leader)
Dr. Peter Cardellichio, Forest Economist
Andrea Colnes, Biomass Energy Resource Center
Dr. John Gunn, Manomet Center for Conservation Sciences
Brian Kittler, Pinchot Institute for Conservation
Bob Perschel, Forest Guild
Christopher Recchia, Biomass Energy Resource Center
Dr. David Saah, Spatial Informatics Group

CONTACT INFORMATION FOR REPORT:
Manomet Center for Conservation Sciences
Natural Capital Initiative
14 Maine Street, Suite 305
Brunswick, Maine 04011
Phone: 207-721-9040
jgunn@manomet.org

Manomet Center for Conservation Sciences
14 Maine Street, Suite 305
Brunswick, ME 04011
Contact: 207-721-9040, jgunn@manomet.org

Biofuels: Significant Costs, Limited Upside?

- Farm-grown, commercial-scale liquid biofuel production is causing **substantial environmental and economic harm** (climate, soil, water, food prices).
- Climate benefits from conventional biofuels are modest compared to the front-end CO2 releases caused by market-mediated land use changes.
- **And for what?** *All* US corn would displace <20% US gasoline use.
- CATF is funding top researchers, engaging policymakers, and litigating misguided regulations.



Greenhouse Gas Emissions from Biofuels' Indirect Land Use Change Are Uncertain but May Be Much Greater than Previously Estimated

RICHARD J. PLEVIN,*,† MICHAEL O'HARE,†,‡ ANDREW D. JONES,† MARGARET S. TORN,†,§ AND HOLLY K. GIBBS∥

Energy and Resources Group, UC Berkeley, 310 Barrows Hall, Berkeley, California 94720, United States, Goldman School of Public Policy, UC Berkeley, 2607 Hearst Avenue, Berkeley, California 94720, United States, Earth Sciences Division, Lawrence Berkeley National Laboratory, 1 Cyclotron Road, MS 90-1116, Berkeley, California 94720, United States, and Woods Institute for the Environment, Program on Food Security and the Environment, Stanford University, Stanford, California 94305, United States

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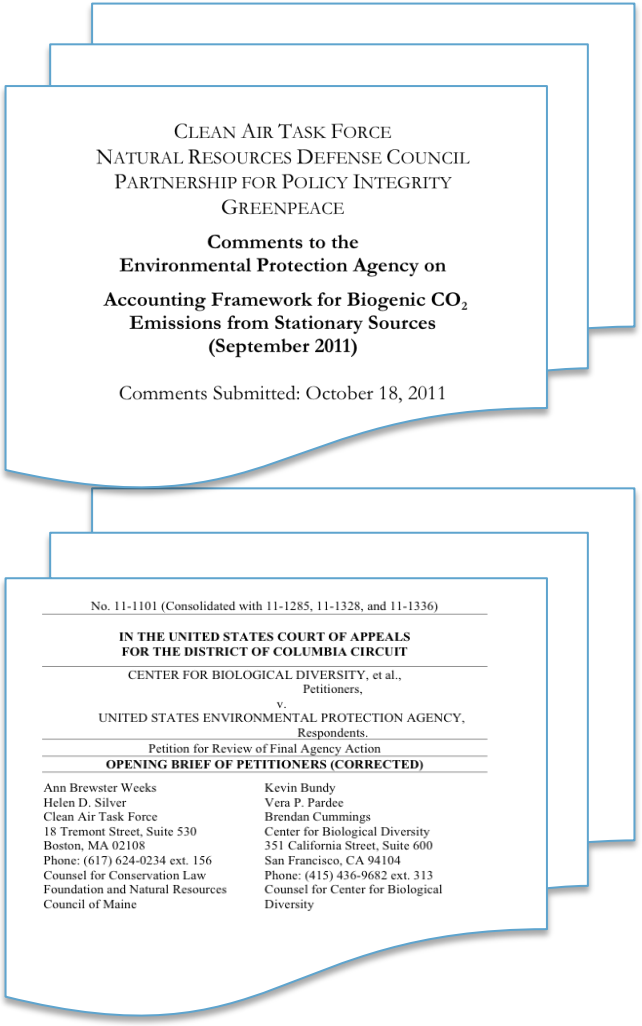
Environ. Sci. Technol. 2010, 44, 8015–8021

Biomass-based energy production

- CATF is pursuing a combination of measures to preserve *and* enhance the climate-related opportunities that forest biomass power can provide.
- Challenge poorly-designed policies:
  - challenge EPA's deferral rule; critique EPA's draft accounting framework
- Identify and advocate climate-friendly forest management practices:
  - identify presumptively beneficial feedstocks/applications
- Promote sensible biomass power options:
  - engage in SAB review process; advise SENR Committee on CES; comment on MA REC analysis; work with EPA on forthcoming Title V / PSD regs



CLEAN AIR TASK FORCE
NATURAL RESOURCES DEFENSE COUNCIL
PARTNERSHIP FOR POLICY INTEGRITY
GREENPEACE

Comments to the Environmental Protection Agency on

Accounting Framework for Biogenic CO_2 Emissions from Stationary Sources (September 2011)

Comments Submitted: October 18, 2011

No. 11-1101 (Consolidated with 11-1285, 11-1328, and 11-1336)

IN THE UNITED STATES COURT OF APPEALS FOR THE DISTRICT OF COLUMBIA CIRCUIT

CENTER FOR BIOLOGICAL DIVERSITY, et al., Petitioners,
v.
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY, Respondents.

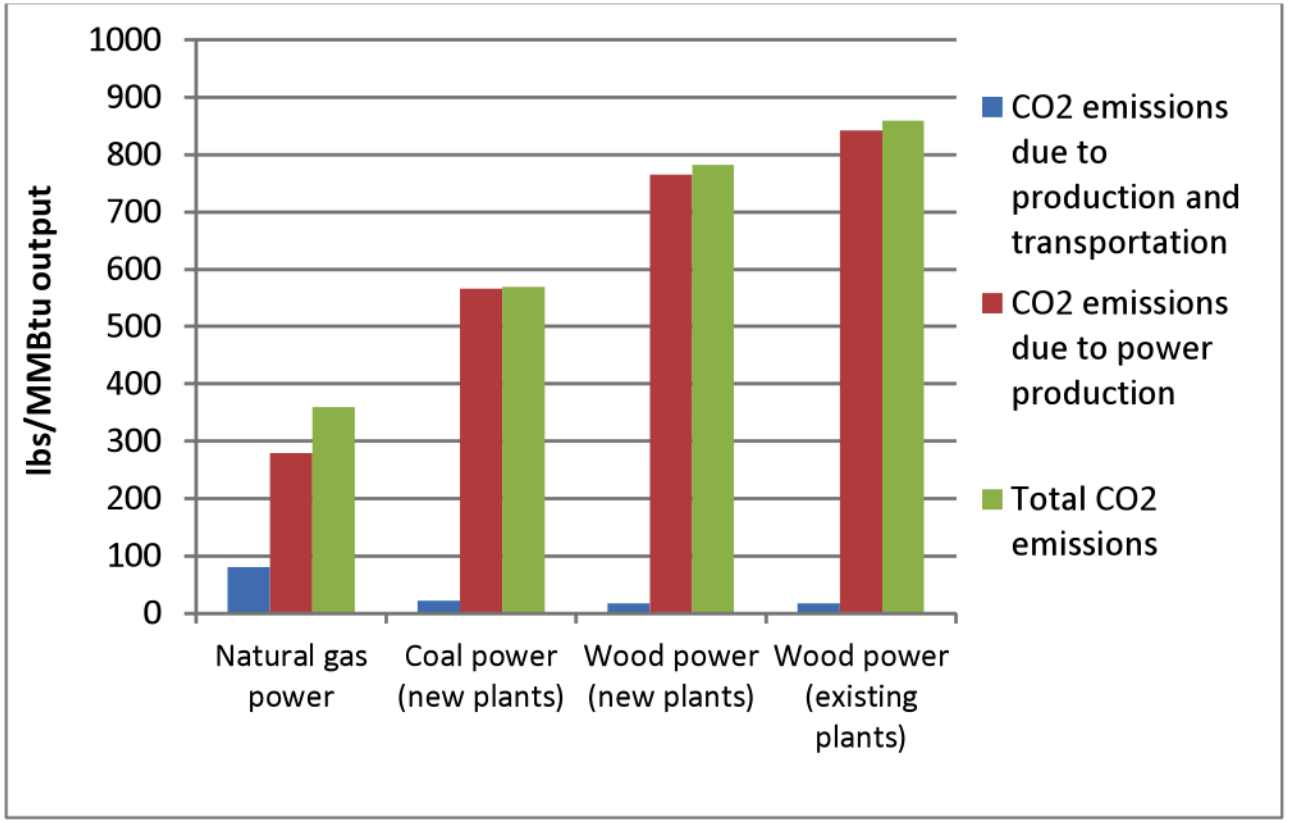
Petition for Review of Final Agency Action

OPENING BRIEF OF PETITIONERS (CORRECTED)

Ann Brewster Weeks
Helen D. Silver
Clean Air Task Force
18 Tremont Street, Suite 530
Boston, MA 02108
Phone: (617) 624-0234 ext. 156
Counsel for Conservation Law Foundation and Natural Resources Council of Maine

Kevin Bundy
Vera P. Pardee
Brendan Cummings
Center for Biological Diversity
351 California Street, Suite 600
San Francisco, CA 94104
Phone: (415) 436-9682 ext. 313
Counsel for Center for Biological Diversity

CO_2 emissions (biomass vs fossil)



Source: Biomass Energy Resource Center. 2012. Biomass supply and carbon accounting for southeastern forests.

THE STARTING POINT FOR ANALYSIS

CLEANAIR TASK FORCE

A comparison of burning sustainably produced biomass versus natural gas to produce electricity

Net effect on atmospheric greenhouse gas levels if biomass is burned rather than natural gas to produce electricity, note if biomass is burned, this reduces the carbon stored by forests

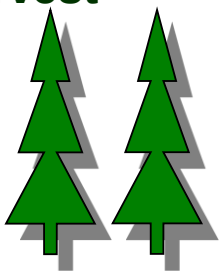
1. Biomass Scenario

@2Z tons of CO_2 emitted*

Y MWHs produced

Growth = Harvest

Harvest of 2Z



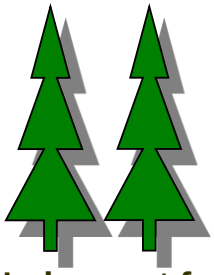
Growth of 2Z

Net effect on atmospheric greenhouse gas levels if natural gas is burned to produce electricity while forest sequestration is increased by the amount of biomass fuels needed to produce the same amount of energy

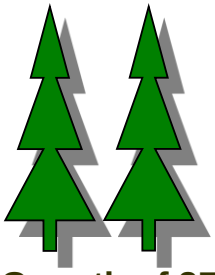
2. Natural Gas Scenario

Z tons of CO_2 emitted*

Y MWHs produced



No harvest for biomass



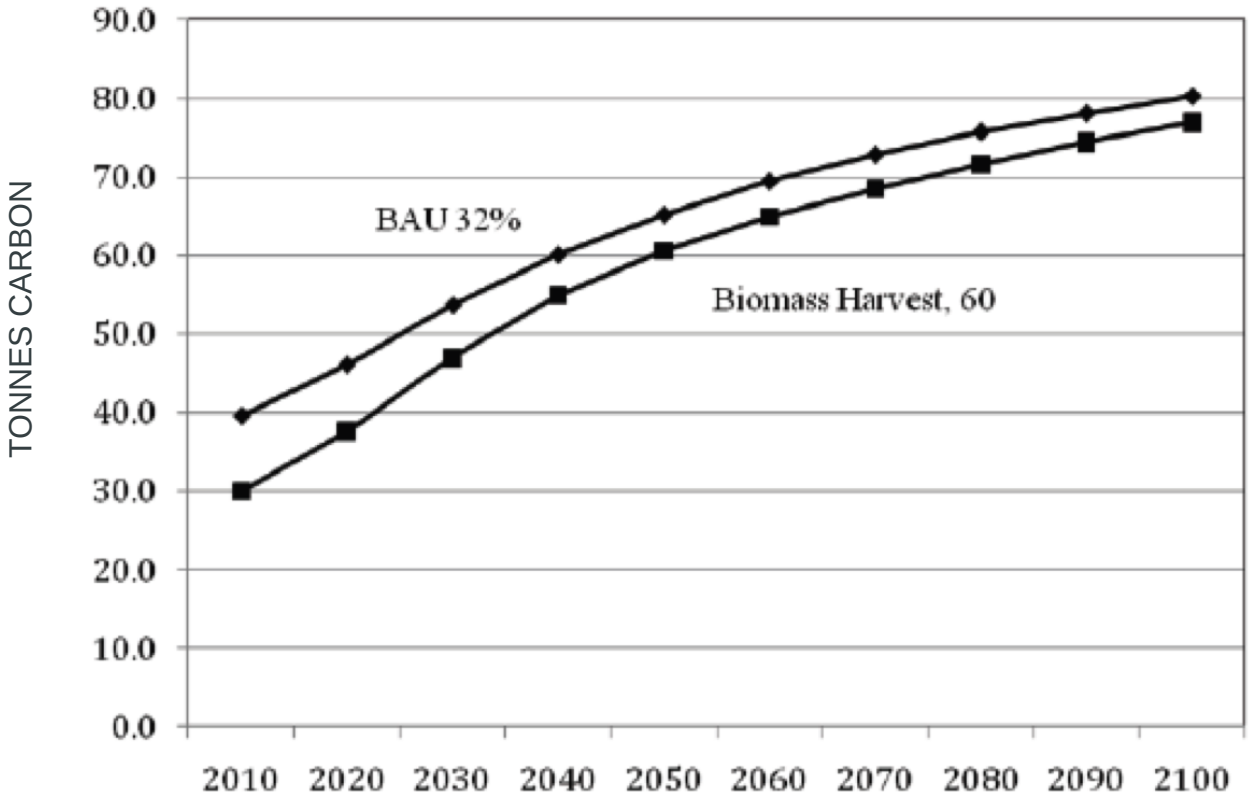
Growth of 2Z

In the short term, net result is that AGHG levels are 2Z higher from burning biomass.

Take Home Message

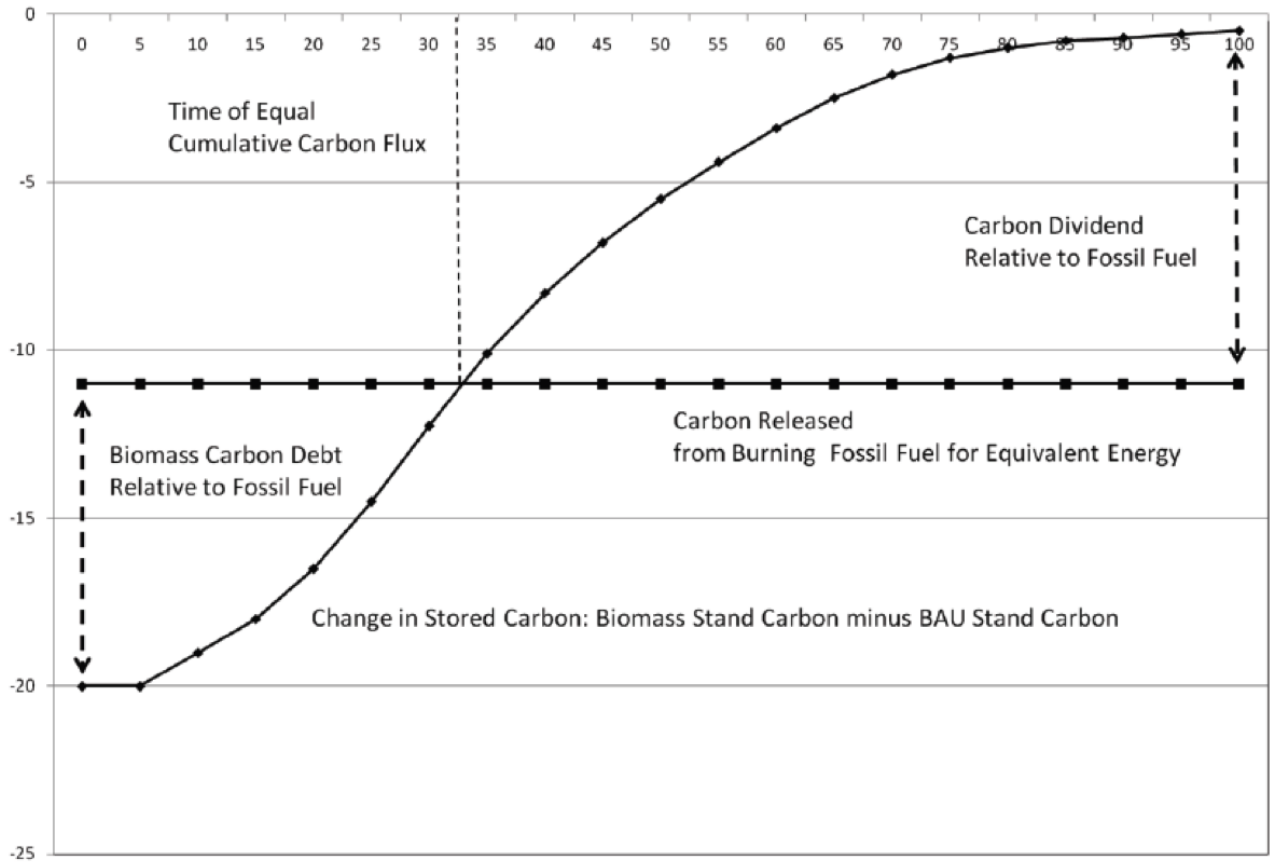
Burning biomass increases short term AGHG levels even if the biomass comes from sustained yield forestry

Forest TSC sequestration rates



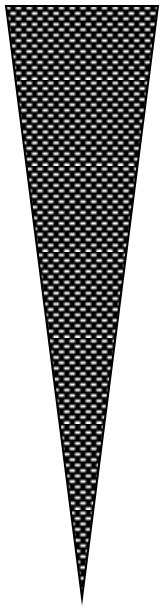
SOURCE: Walker, et al. (2010) (Scenario 1).

Carbon recovery times



SOURCE: Walker, et al. (2010).

Source/uses in Northeast US that are presumptive beneficial for climate (20yrs)

GHG Reduction	Sources of Biomass Fuel	Use Displaced
maximum  minimum	Wood that would otherwise be burned for disposal, e.g., wood from some land clearing operations, wood from some fire hazard reduction operations, some urban wood waste.	Heating with oil (includes thermally led CHP that displaces oil).
	Wood from qualifying biomass plantations	Generating electricity with coal
	Wood that would otherwise be left to decompose, e.g., limbs/tops from trees harvested for sawlogs and other purposes; some land clearing debris, wood from some fire hazard reduction operations, and some urban wood waste.	Heating with natural gas
	Potentially whole tree chips from decadent stands which are replaced with fast growing species (further analysis is required to confirm GHG benefit; these are likely to be beneficial only if used to displace heating with oil).	Generating electricity with natural gas provided that the biomass fuel is from Source 1 or 2 above