

TESTIMONY REGARDING CLIMATE CONSEQUENCES OF BIOENERGY

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LETTER FROM SCIENTISTS TO THE EU PARLIAMENT REGARDING
FOREST BIOMASS

January 9, 2018

To Members of the European Parliament,

As the European Parliament commendably moves to expand the renewable energy directive, we strongly urge members of Parliament to amend the present directive to avoid expansive harm to the world's forests and the acceleration of climate change. The flaw in the directive lies in provisions that would let countries, power plants and factories claim credit toward renewable energy targets for deliberately cutting down trees to burn them for energy. The solution should be to restrict the forest biomass eligible under the directive to residues and wastes.

796 Scientist Letter

Initial signatories:

John Beddington, Professor, Oxford Martin School, former Chief Scientist to the government of the United Kingdom
Steven Berry, Professor, Yale University, former Chairman, Department of Economics, fellow American Academy of Arts and Sciences, winner of the Frisch Medal of the Econometric Society.
Ken Caldeira, Professor, Stanford University and Carnegie Institution for Science, Coordinating lead author or lead author of multiple IPCC reports.
Wolfgang Cramer, Research Director, CNRS, Mediterranean Institute of marine and terrestrial Biodiversity and Ecology, Aix-en-Provence, member Académie d'Agriculture de France, Coordinating lead author and lead author of multiple IPCC reports.
Felix Creutzig, Chair Sustainability Economics of Human Settlement at Technische Universität Berlin, Leader, leader Mercator Research Institute on Global Commons and Climate Change, Lead author of IPCC V Assessment Report and coordinator of appendix on bioenergy.
Phil Duffy, President, Woods Hole Research Center, former Senior Advisor White Office of Science and Technology Policy, Contributing author of multiple IPCC reports
Dan Kammen, Professor University of California at Berkeley, Director Renewable and Appropriate Energy Laboratory, Coordinating lead author or lead author of multiple IPCC reports.
Eric Lambin, Professor Université catholique de Louvain and Stanford University, member European and U.S. Academies of Science, 2014 laureate of Volvo Environment Prize
Simon Levin, Professor Princeton University, Recipient, U.S. National Medal of Science, member U.S. National Academy of Sciences
Wolfgang Lucht, Professor Humboldt University and Co-Chair of Potsdam Institute for Climate Research, lead author of multiple IPCC reports
Georgina Mace FRS, Professor, University College London, Lead author IPCC report and Winner International Cosmos Prize
William Moomaw, Emeritus Professor, Tufts University, Lead author of multiple IPCC reports
Peter Raven, Director Emeritus Missouri Botanical Society, Recipient U.S. National Medal of Science and former President of American Association for Advancement of Science
Tim Searchinger, Research Scholar, Princeton University and Senior Fellow, World Resources Institute
Nils Chr. Stenseth, Professor, University of Oslo, Past president of The Norwegian Academy of Science and Letters, member U.S. National Academy of Science), French Academy of Sciences, and Academia Europaea
Jean Pascal van Ypersele, Professor, Université catholique de Louvain, Former IPCC Vice-chair (2008-2015), member of the Royal Academy of Belgium, lead author or review editor of multiple IPCC reports

European Environment Agency Scientific Committee 15 September 2011

Opinion of the EEA Scientific Committee on Greenhouse Gas Accounting in Relation to Bioenergy



Commentary by the European Academies' Science Advisory Council (EASAC) on Forest Bioenergy and Carbon Neutrality

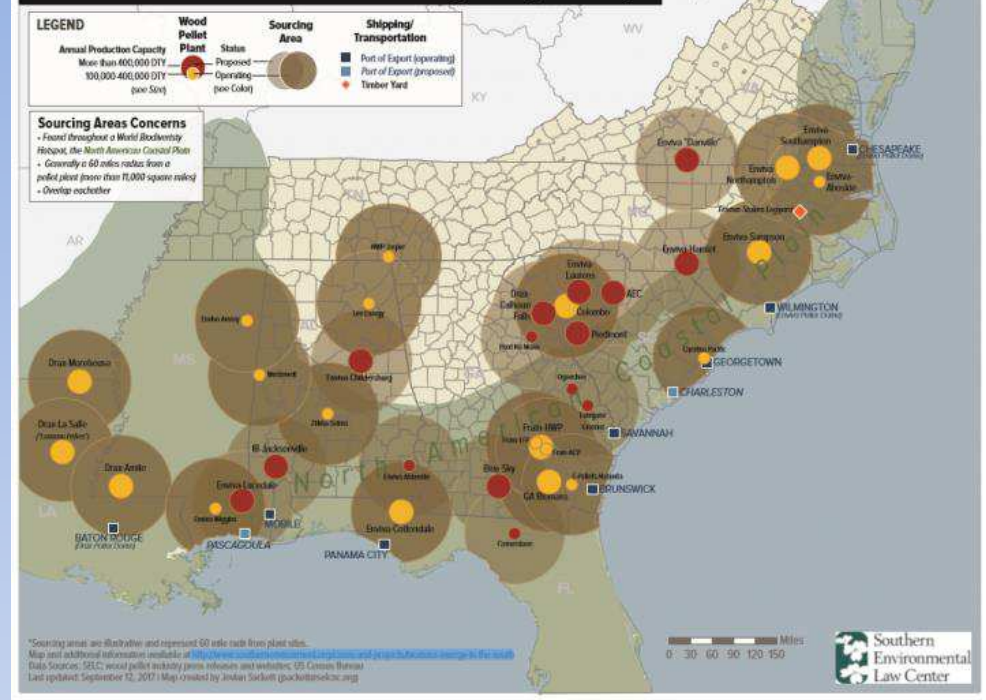
+ at least 15 peer reviewed papers by different authors

**If burning wood is good, we should
burn and not recycle paper**





Southeast U.S. Wood Pellet Plants Exporting to Europe



Enviva Wood Pellet Mill
(Sampson County, North Carolina, February 2017)

WOOD PELLET EXPORTERS RELY ON STANDING HARDWOOD FORESTS IN SOUTHEASTERN U.S.



Trucks entering Enviva Wood Pellet Mill (Sampson County, North Carolina, February 2017)



General Biofuels



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**Picture on Georgia
Biomass' Own Website**



This is what residues look like (not big stems)



Evidence of deforestation is widespread, not isolated to one case

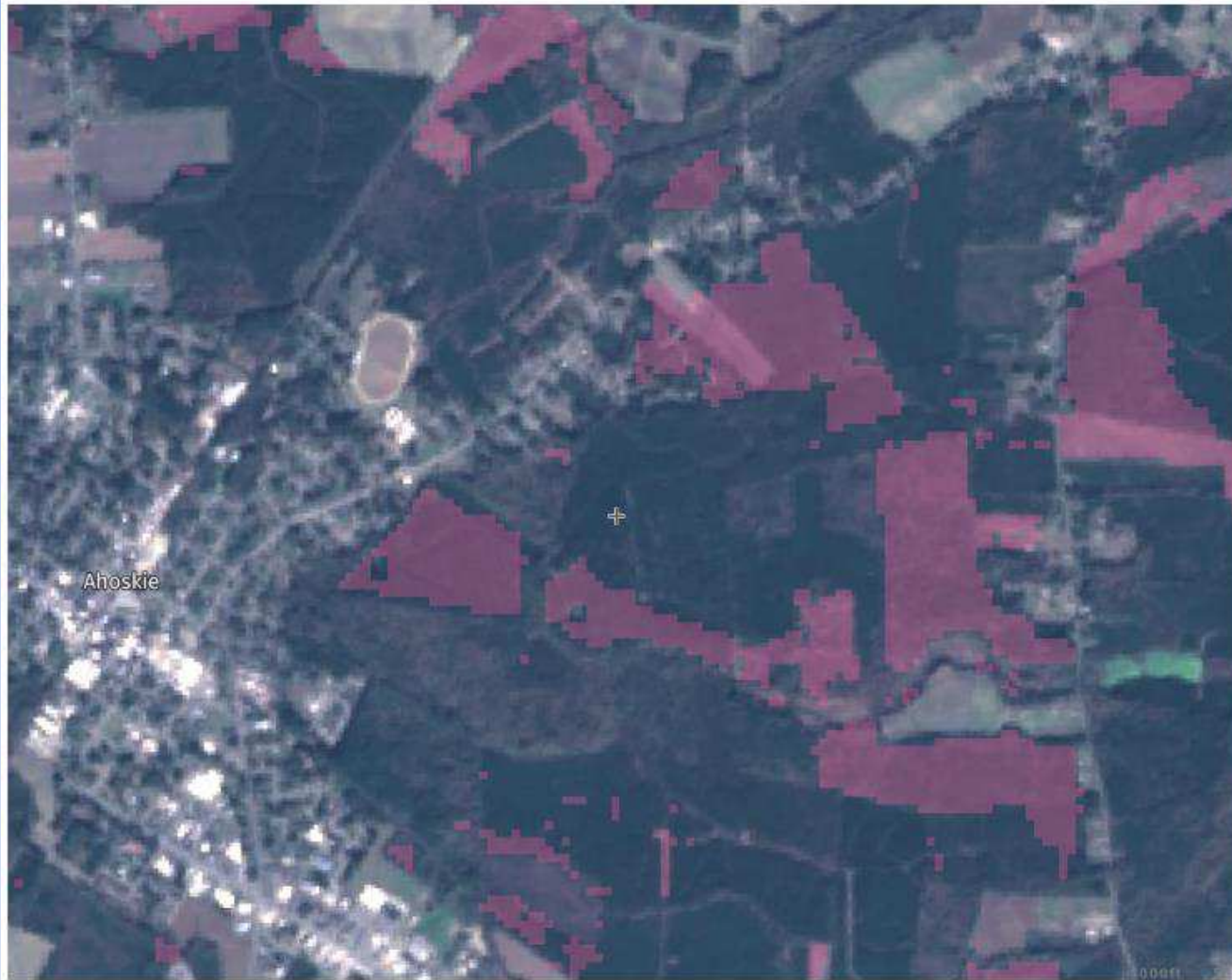


Forest Tree Loss in Georgia (left: 2001-2010, right: 2011-2018)



Forest cover in Ashokie,
North Carolina, United
States

November 18, 2013 -
just before Enviva wood
pellet plant

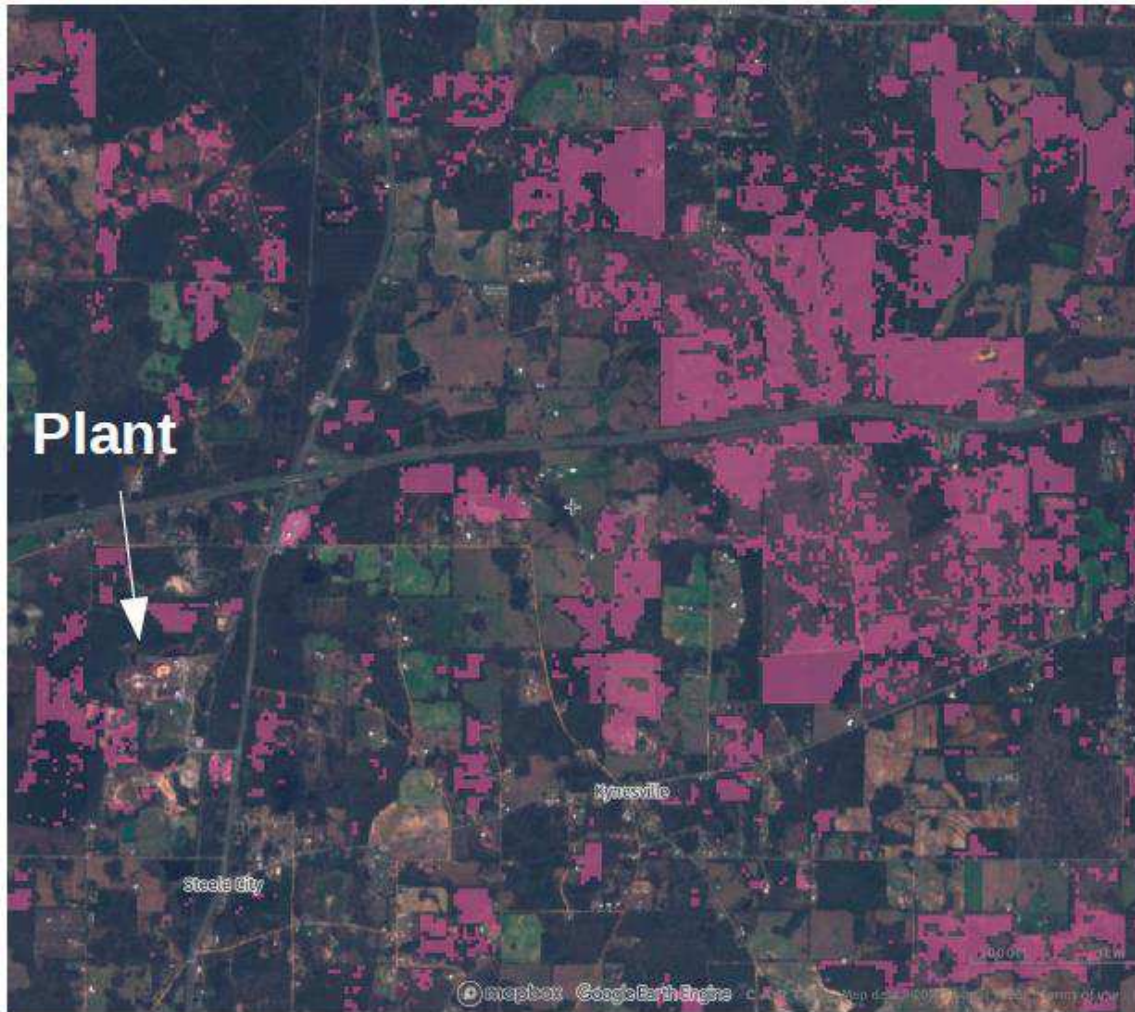


Data Analysis:

- Initial analyses suggest **increase** nearby area **deforestation** after the construction of wood pellet plants.
- **Example:** Tree **loss** for a **3.81kha** area around Enviva Ahoskie:

2005-2011	2012-2018
180ha	290ha

Map highlighting tree loss from 2011 to 2018 (canopy density > 20%)



Imagery around Cottondale, FL (2008-2018)



Imagery close to Cottondale, FL (2008-2018)

WHY CUTTING TREES TO BURN THEM INCREASES EMISSIONS FOR DECADES TO CENTURIES

- Much of every tree (roots & slash) left in forest, decays & emits carbon
- 25%-30% of wood used in wood pellet plant & emits carbon
- Burning wood emits much more carbon up smokestack than natural gas
- For 5-10 years re-growing trees grow slower than most trees if left alone
- Even decades later after first tract of forest regrows enough to payback carbon debt, newer tracts still in debt.

Europe's renewable energy directive poised to harm global forests

Table 1 Wood harvest energy and potential demands

Region	Roundwood production	Harvest volume 2015 (10 ⁶ m ³)	Energy content of harvested wood (EJ)	Total primary energy consumption 2015 (EJ) ^a	Potential % of present primary energy supplied by 2015 roundwood harvests	Plausible primary wood biomass energy required by new directive (EJ) ^b	% of 2015 wood harvest plausibly required for expanded bioenergy in 2030 ^c
Europe	Industrial	333	3	70	4.3%	3.9	130%
	Total	428	3.85	70	5.6%		
World	Industrial	1826	17.9	571	2.1%	3.9	101%
	Total	3688	36.1	571	4.2%		

^aBased on estimate of 0.491DM/m³ for the World and 0.451DM/m³ for Europe and 20 GJ/DM (Supplementary Methods)
^bAssumes roundwood supplies 40% of mandated increase in Europe's final renewable energy from 2015-2030, which would be mandated by RED, 35% used for bioelectricity at 25% efficiency and 65% for heat at 85% efficiency (Supplementary Note 3)
^cAlso assumes Europe meets 32% target increase in European economy-wide energy efficiency from 2007 levels by 2030 (Supplementary Note 3)

5% more EU energy requires 100% of Europe's annual wood harvest

2% more global energy requires 100% of global commercial wood harvest.

Bioenergy is extremely land inefficient



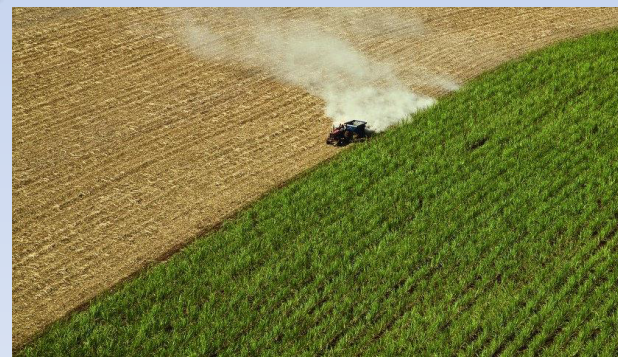
Iowa corn ethanol **0.1%**



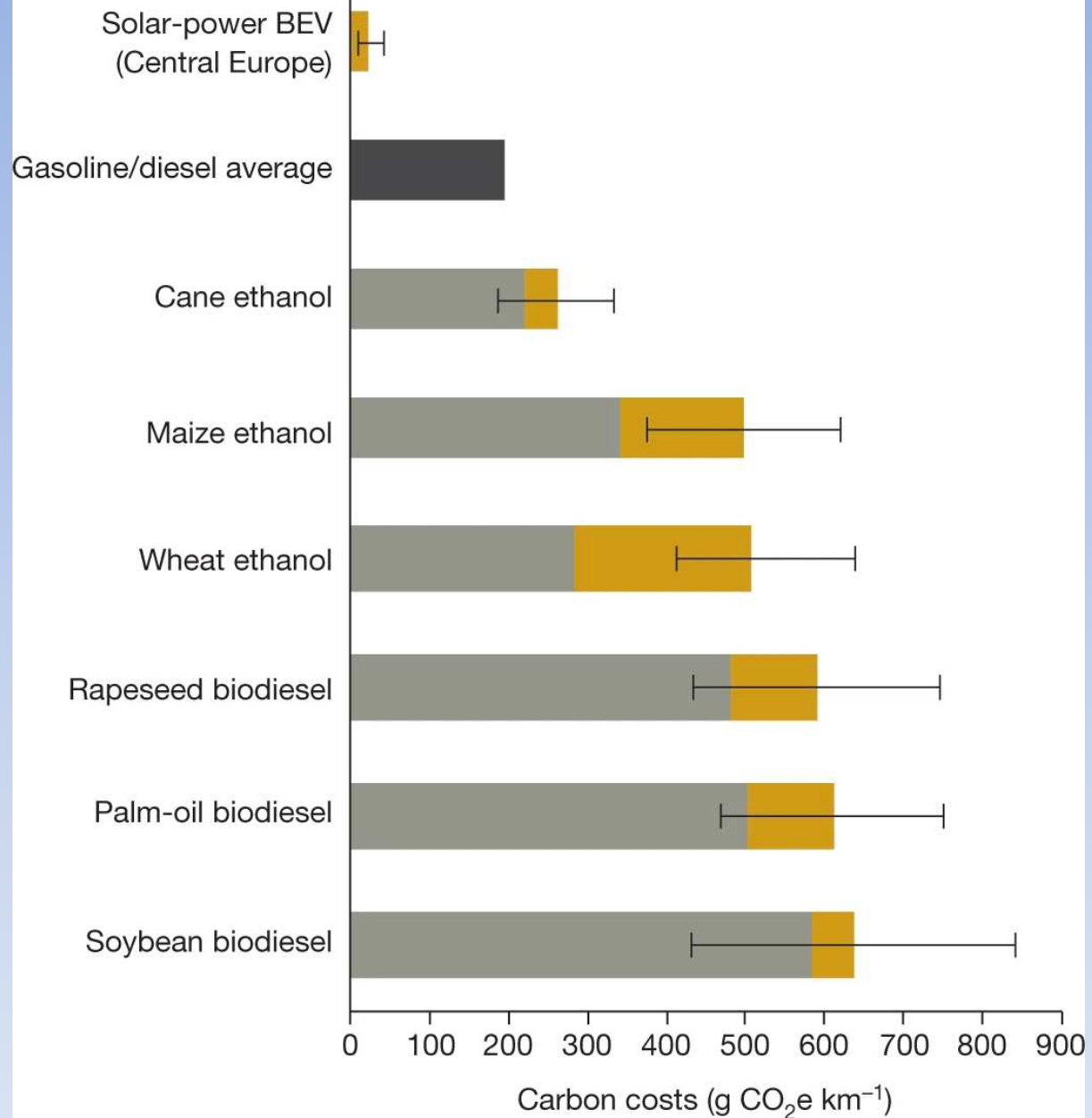
Most optimistic location
future US switchgrass (DOE)
0.35%



PV – **20% gross;**
~15% net



Brazilian sugarcane ethanol **0.2%**



Biofuels cause far more emissions than even gasoline or diesel if food is replaced at the global average land cost.

Searchinger et al., Nature (2018)

Renewable Does Not Equal Carbon Free

		450.00	900.00	RCA - Social Security	25.02	51.84
Gross Pay				Other Deductions		
				Health Insurance	00.00	00.00
				401k	00.00	00.00
				Parking	00.00	00.00
				NET PAY	\$418.00	\$836.00

<p>Your Employer: 1234 Some Street Milwaukee, WI ZIPCODE</p>	<p>Check Number: XXXXXX Pay Date: 06/30/06</p>
<p>PAY ***Four hundred eighteen dollars and 00 cents*****\$418.00</p>	
<p>To the Order of John H. Doe</p>	

IPCC Guidelines

IPCC 2000 Land Use Report (p. 355): Because “fossil fuel substitution is already ‘rewarded’” by excluding emissions from the combustion of bioenergy, “to avoid underreporting . . . any changes in biomass stocks on lands . . . resulting from the production of biofuels would need to be included in the accounts.”