

International Scientists and Economists Statement on Biofuels and Land Use

A letter to the European Commission

As scientists and economists involved in the field of climate, energy, and land use, we are writing to you to recommend that policies recognize and account for indirect land use change as a part of the lifecycle analyses of greenhouse gas (GHG) emissions from biofuels. This will encourage development of sustainable, low-carbon fuels that avoid conflict with food production and minimize harmful environmental impacts.

Our comments are relevant to your deliberations on indirect land use change emissions in the context of the Renewable Energy and Fuel Quality Directives. For policies like these to successfully reduce GHG emissions, it is critical to include all major sources of emissions, including those associated with changes in land use.

Peer-reviewed research over the last several years, including studies commissioned by the European Commission, indicates that conventional biofuels can directly or indirectly result in substantial GHG emissions through the conversion of forests and grasslands to croplands or pasture to accommodate biofuel production. Increased demand for crops to make fuel results in higher global commodity prices that can induce farmers in other countries to plow up new ground, including sensitive, high-carbon ecosystems such as tropical forests in South America and Southeast Asia or peatland in Southeast Asia. The conditions for this to occur are not relegated to the future, but are already in place. The Directives do not currently account for these emissions in their lifecycle analysis or elsewhere, giving biofuels credit for greater carbon savings than actually achieved.

There are uncertainties inherent in estimating the magnitude of indirect land use emissions from biofuels, but a policy that implicitly or explicitly assigns a value of zero is clearly not supported by the science. All the studies of land use change indicate that the emissions related to biofuels expansion are significant and can be quite large. Exhaust pipe emissions for biofuels are, by convention, ignored in performing lifecycle GHG emissions analysis for biofuels. This accounting convention is flawed, as was described in the opinion of the European Environment Agency Scientific Committee on 15 September 2011.¹ To justify the omission of exhaust pipe emissions, it is essential to account for changes in land use.

The current scientific understanding is sufficient to warrant immediate action, as has already been recognized in the U.S. federal Renewable Fuel Standard and California Low Carbon Fuels Standard. A regulation based on a robust framework of science can be adjusted as the analysis matures. Without addressing land use change, the European Union's target for renewable energy in transport may fail to deliver genuine carbon savings in the real world. It could end up as merely an exercise on paper that promotes widespread deforestation and higher food prices.

It has been suggested that higher GHG thresholds for direct emissions are an adequate substitute for accounting for indirect land use change emissions. However, a problem in the accounting cannot be fixed by changing the threshold. A complete accounting is essential to assuring that promised carbon reductions

¹ <http://www.eea.europa.eu/about-us/governance/scientific-committee/sc-opinions/opinions-on-scientific-issues/sc-opinion-on-greenhouse-gas>

International Scientists and Economists Statement on Biofuels and Land Use
Preliminary list of signers – Does not include all signers and signer information/awards.
Organizations are listed for identification purposes only.

are credible. Flawed accounting could even encourage greater expansion of biofuels that cause damaging changes in land use, as described in the September 15 EEA Scientific Committee opinion.

Biofuels policies should encourage a growing clean energy market and create jobs producing low carbon biofuels that avoid land use change. Strategic investment decisions must be based upon the best available assessments of the GHG emissions of alternative fuel pathways. Promptly establishing a credible framework that includes indirect land use change will signal the market to invest in biofuels that minimize deforestation and competition with food.

The president of the commission has pledged "a fundamental review of the way EU institutions access and use scientific advice."² We urge you to align the EU biofuels policy with the best scientific knowledge and take into account emissions from indirect changes in land use.

Sincerely,

Daniel Kammen, Ph.D.
Chief Technical Specialist for Renewable Energy and Energy Efficiency
World Bank
Washington, DC United States

Stuart Pimm, Ph.D.
Doris Duke Professor of Conservation Ecology
Duke University
Durham, NC United States

Thomas Lovejoy, Ph.D.
Heinz Center Biodiversity Chair
The H. John Heinz III Center for Science, Economics and the Environment
Washington, DC United States

Peter Frumhoff, Ph.D.
Director of Science and Policy
Chief Scientist, Climate Campaign
Union of Concerned Scientists
Cambridge, MA United States

Kenneth Arrow, Ph.D.
Professor Emeritus
Stanford University
Stanford, CA United States
Nobel Memorial Prize in Economics
Lead Author for Intergovernmental Panel on Climate Change

²<http://europa.eu/rapid/pressReleasesAction.do?reference=SPEECH/09/391&format=HTML&aged=0&language=EN&guiLanguage=en>

International Scientists and Economists Statement on Biofuels and Land Use
Preliminary list of signers – Does not include all signers and signer information/awards.
Organizations are listed for identification purposes only.

William Schlesinger, Ph.D.
President
Cary Institute of Ecosystem Studies
Millbrook, NY United States

William Laurance, Ph.D.
Distinguished Research Professor
James Cook University
Smithfield, Australia

James Fay, Ph.D.
Professor Emeritus
Massachusetts Institute of Technology
Weston, MA United States

Helmut Haberl, Ph.D.
Professor
Alpen-Adria Universitat
Vienna, Austria

Daniel Tan, Ph.D.
Senior Lecturer
The University of Sydney
Sydney, Australia

Matteo Campioli, Ph.D.
University of Antwerp
Antwerp, Belgium

Rudy van Diggelen, Ph.D.
Professor
University of Antwerp
Antwerpen, Belgium

Aviel Verbruggen, Ph.D.
Full Professor
University of Antwerp
Antwerp, Belgium

Sara Vicca, Ph.D.
University of Antwerp
Wilrijk, Belgium

Judi Krzyzanowski, Ph.D.
Krzyzanowski Consulting / UBC
Stirling-Rawdon, ON Canada

Jyrki Jauhiainen, Ph.D.
Research Coordinator
University of Helsinki
Helsinki, Finland

Jan Kunnas, Ph.D.
University of Jyvaskyla
Jyvaskyla, Finland

Ilkka Savolainen, Ph.D.
VTT Technical Research Centre of Finland
Espoo, Finland

Bruno Dorin, Ph.D.
Researcher
Cirad
Montpellier, France

Tonya Lander, Ph.D.
INRA
Avignon, France

Philippe Quirion, Ph.D.
Researcher
CNRS
Paris, France

Karlheinz Knickel, Ph.D.
Sustainability Strategies and Innovation
SD INNOVATION
Frankfurt, Germany

Karachepone Ninan, Ph.D.
Professor
Institute for Social and Economic Change
Bangalore, India

International Scientists and Economists Statement on Biofuels and Land Use
Preliminary list of signers – Does not include all signers and signer information/awards.
Organizations are listed for identification purposes only.

Eswaran Somanathan, Ph.D.
Professor
Indian Statistical Institute
New Delhi, India

Henry Neufeldt, Ph.D.
ICRAF
Nairobi, Kenya

Jose Luis Martinez, Ph.D.
Universidad de Tabasco
Villahermosa, Mexico

Prem Bindraban, Ph.D.
Director ISRIC
ISRIC - World Soil Information
Wageningen, Netherlands

Aljosja Hooijer, Ph.D.
Senior Adviser
Deltares
Delft, Netherlands

Agata Klimkowska, Ph.D.
Researcher
Foundation Bargerveen
Nijmegen, Netherlands

Dirk Strijker, Ph.D.
Professor
Groningen University
Groningen, Netherlands

Eirik Romstad, Ph.D.
Senior Research Fellow
Norwegian University of Life Sciences
Aas, Norway

Daigee Shaw, Ph.D.
Research Fellow
Academia Sinica
Taipei, Taiwan

Simon Lewis, Ph.D.
Royal Society Research Fellow
University of Leeds
London, United Kingdom

Susan Page, Ph.D.
Head of Department
University of Leicester
Leicester, United Kingdom

Jorn Scharlemann, Ph.D.
Senior Scientist
UNEP-WCMC
Cambridge, United Kingdom

Bruce Wright, Ph.D.
Executive Director
Conservation Science Institute
Palmer, AK United States

Carolyn Enquist, Ph.D.
University of Arizona
Tucson, AZ United States

Justin Schmidt, Ph.D.
Biologist
Southwestern Biological Institute
Tucson, AZ United States

Richard Ambrose, Ph.D.
Professor
University of California, Los Angeles
Agoura Hills, CA United States

Linda Anderson, Ph.D.
Researcher
UCSC
Felton, CA United States

Nathah Carlson, Ph.D.
California Lutheran University
Thousand Oaks, CA United States

International Scientists and Economists Statement on Biofuels and Land Use
Preliminary list of signers – Does not include all signers and signer information/awards.
Organizations are listed for identification purposes only.

Anne Cohen, Ph.D.
Honorable Research. Fellow,
California Academy Science
San Rafael, CA United States

Erin Conlisk, Ph.D.
University of California, Riverside
San Diego, CA United States

Jed Fuhrman, Ph.D.
Professor (endowed chair)
University of Southern California
Topanga, CA United States

David Gallo, Ph.D.
Professor Emeritus
California State University, Chico
Chico, CA United States

Megan Hall, Ph.D.
Project Scientist
University of California, Berkeley
Berkeley, CA United States

John Harte, Ph.D.
Professor of Ecosystem Sciences
University of California, Berkeley
Berkeley, CA United States

Karen Holl, Ph.D.
Professor
University of California, Santa Cruz
Felton, CA United States

John Holtzclaw, Ph.D.
San Francisco, CA United States

Julie Jedlicka, Ph.D.
Postdoctoral Fellow
University of California, Berkeley
El Cerrito, CA United States

Sherman Lewis, Ph.D.
Professor Emeritus
California State Univeristy, East Bay
Hayward, CA United States

Dustin Mulvaney, Ph.D.
Professor of Sustainable Energy Resource
San Jose State University
San Jose, CA United States

Michael O'Hare, Ph.D.
Professor of Public Policy
University of California, Berkeley
Berkeley, CA United States

Richard Plevin, Ph.D.
Assistant Research Engineer
University of California, Berkeley
Berkeley, CA United States

Mathias van Thiel, Ph.D.
Hayward, CA United States

Howard Wilshire, Ph.D.
Research Geologist
Sebastopol, CA United States

Julie Witcover, Ph.D.
University of California - Davis
Davis, CA United States

David Armstrong, Ph.D.
Professor Emeritus
Unversity of Colorado-Boulder
Loveland, CO United States

JoAnne Howe, Ph.D.
Professor Emeritus of Economics
University of Colorado-Boulder
Boulder, CO United States

International Scientists and Economists Statement on Biofuels and Land Use
Preliminary list of signers – Does not include all signers and signer information/awards.
Organizations are listed for identification purposes only.

John McKean, Ph.D.
Professor Emeritus
Colorado State University
Masonville, CO United States

Robin Chazdon, Ph.D.
Professor
University of Connecticut
Storrs, CT United States

Jeremy Martin, Ph.D.
Senior Scientist
Union of Concerned Scientists
Washington, DC United States

Jeffrey O'Hara, Ph.D.
Agricultural Economist
Union of Concerned Scientists
Washington, DC United States

Linda Winston, Ph.D.
Seaford, DE United States

Dick Glick, Ph.D.
President
CFR
Tallahassee, FL United States

Gustav Paulay, Ph.D.
Professor
University of Florida
Gainesville, FL United States

Tom Poulson, Ph.D.
Jupiter, FL United States

Armando Tasistro, Ph.D.
University of Georgia
Watkinsville, GA United States

Michael Parke, Ph.D.
University of Hawaii
Honolulu, HI United States

Gabriel Peckham, Ph.D.
Principal Investigator
Black Ivory Biotech
Honolulu, HI United States

Russ Benedict, Ph.D.
Associate Professor
Central College
Pella, IA United States

Erwin Klaas, Ph.D.
Professor Emeritus
Iowa State University
Ames, IA United States

Leslie Duram, Ph.D.
Professor and Chair
Southern Illinois University
Carbondale, IL United States

Karen Glennemeier, Ph.D.
Science Director
National Audubon Society
Wilmette, IL United States

Jason Koontz, Ph.D.
Associate Professor and Co-Chair
Augustana College
Rock Island, IL United States

Gregory Owens, Ph.D.
Richland Community College
Decatur, IL United States

Lauren Quinn, Ph.D.
Postdoctoral Researcher
University of Illinois
Urbana, IL United States

James Shapiro, Ph.D.
Professor
University of Chicago
Chicago, IL United States

International Scientists and Economists Statement on Biofuels and Land Use
Preliminary list of signers – Does not include all signers and signer information/awards.
Organizations are listed for identification purposes only.

Edmond Zaborski, Ph.D.
Visiting Research Scientist
University of Illinois, Urbana-Champaign
Mahomet, IL United States

George Bakken, Ph.D.
Professor of Biology
Indiana State University
Terre Haute, IN United States

David Burress, Ph.D.
President
Ad Astra Institute of Kanss
Lawrence, KS United States

Gilford Ikenberry, Ph.D.
McPherson College
McPherson, KS United States

Deborah Hill, Ph.D.
Professor
Univeristy of Kentucky
Lexington, KY United States

Alfred Eipper, Ph.D.
Ecologist
Easthampton, MA United States

Susan Goldhor, Ph.D.
Director
Center for Applied Regional Studies
Cambridge, MA United States

Elske Smith, Ph.D.
Professor Emeritus
Lenox, MA United States

D. Snyder, Ph.D.
Professor Emeritus
Amherst, MA United States

W. Reid Goforth, Ph.D.
Port republic, MD United States

Amy Mckinney, Ph.D.
Postdoctoral Research Associate
Rocky Mountain Biological Laboratory
United States

Tom Tietenberg, Ph.D.
Mitchell Family Professor of Economics,
Emeritus
Colby College
Waterville, ME United States

Edward Parson, Ph.D.
Professor
University of Michigan
Ann Arbor, MI United States

Cyrus Bina, Ph.D.
Distinguished Research Professor of
Economics
University of Minnesota, Morris
Morris, MN United States

Margaret Kuchenreuther, Ph.D.
University of Minnesota, Morris
Morris, MN United States

Peter Reich, Ph.D.
Professor
University of Minnesota
St Paul, MN United States

Tim Dickson, Ph.D.
Michigan State University
Hickory Corners, MO United States

Stephen Mudrick, Ph.D.
Associate Professor Emeritus
University of Missouri
Columbia, MO United States

James Lazell, Ph.D.
President
The Conservation Agency
Jackson, MS United States

International Scientists and Economists Statement on Biofuels and Land Use
Preliminary list of signers – Does not include all signers and signer information/awards.
Organizations are listed for identification purposes only.

Richard Bilborrow, Ph.D.
Professor
University of North Carolina
Chapel Hill, NC United States

Jo Ellen Brandmeyer, Ph.D.
Research Environmental Engineer 3
RTI International
Chapel Hill, NC United States

Daniel Graham, Ph.D.
Adjunct Professor
North Carolina State
Chapel Hill, NC United States

David Grant, Ph.D.
Professor Emeritus of Biology
Davidson College
Davidson, NC United States

Carol Seagle, Ph.D.
Professor
University of North Carolina, Chapel Hill
Chapel Hill, NC United States

Thomas Struhsaker, Ph.D.
Adjunct Professor
Duke University
Durham, NC United States

Nicanor Saliendra, Ph.D.
Ecologist
USDA ARS
Mandan, ND United States

Hendrik Van Den Berg, Ph.D.
Professor of Economics
University of Nebraska
Lincoln, NE United States

Ahmet Baytas, Ph.D.
Professor of Economics
Montclair State University
Montclair, NJ United States

Ron Hutchison, Ph.D.
Associate Professor of Biology
Richard Stockton College
Northfield, NJ United States

Vincent Gutschick, Ph.D.
Director
Global Change Consulting Consortium
Las Cruces, NM United States

Rebecca Summer, Ph.D.
Gila Regional Information Project
Silver City, NM United States

Antonio Bento, Ph.D.
Professor
Cornell University
Ithaca, NY United States

David Borton, Ph.D.
RPI
Troy, NY United States

Christopher Jensen, Ph.D.
Assistant Professor
Pratt Institute
Brooklyn, NY United States

Andrew Nelson, Ph.D.
State University of New York at Oswego
Oswego, NY United States

Richard Ostfeld, Ph.D.
Senior Scientist
Cary Institute of Ecosystem Studies
Red Hook, NY United States

Judith Weis, Ph.D.
Professor
Rutgers University
New York, NY United States

Paula Gonzalez, Ph.D.
Cincinnati, OH United States

International Scientists and Economists Statement on Biofuels and Land Use
Preliminary list of signers – Does not include all signers and signer information/awards.
Organizations are listed for identification purposes only.

David Gorchov, Ph.D.
Professor
Miami University
Oxford, OH United States

David Modarelli, Ph.D.
University of Akron
Akron, OH United States

Stacy Philpott, Ph.D.
University of Toledo
Toledo, OH United States

Theresa Pretlow, Ph.D.
Professor Emerita
Case Western Reserve University
Cleveland, OH United States

Gerald Sgro, Ph.D.
John Carroll University
Cleveland Heights, OH United States

Peter Bayley, Ph.D.
Oregon State University
Corvallis, OR United States

Frank Benford, Ph.D.
Salem, OR United States

Kenneth Bergman, Ph.D.
Ashland, OR United States

David Fuller, Ph.D.
Brookings, OR United States

Barbara Roy, Ph.D.
Professor
University of Oregon
Eugene, OR United States

William Stephen, Ph.D.
Professor Emeritus
Oregon State University
Corvallis, OR United States

John Sorrentino, Ph.D.
Associate Professor
Temple University
Ambler, PA United States

Edward Thornton, Ph.D.
Professor of Chemistry
University of Pennsylvania
Swarthmore, PA United States

Eric Vonwettberg, Ph.D.
Assistant Professor
Florida International University
Providence, RI United States

Vsevolod Gurevich, Ph.D.
Professor
Vanderbilt University
Nashville, TN United States

Elin Pierce, Ph.D.
Wildlife Biologist
Millington, TN United States

Craig Linder, Ph.D.
Associate Professor
University of Texas at Austin
Austin, TX United States

David Newburn, Ph.D.
Assistant Professor
Texas A&M University
College Station, TX United States

Brian Shmaefsky, Ph.D.
Professor of Biology
Lone Star College, Kingwood
Kingwood, TX United States

Phyllis Coley, Ph.D.
Distinguished Professor of Biology
University of Utah
Salt Lake City, UT United States

International Scientists and Economists Statement on Biofuels and Land Use
Preliminary list of signers – Does not include all signers and signer information/awards.
Organizations are listed for identification purposes only.

John Cairns, Ph.D.
University Distinguished Professor
Virginia Tech
Blacksburg, VA United States
Member, National Academy of Sciences

John Cannon, Ph.D.
Conservation Biologist
Front Royal, VA United States

Robert Nadeau, Ph.D.
Professor Environmental Science Public
George Mason University
Fairfax Station, VA United States

Marc Lapin, Ph.D.
Middlebury College
Cornwall, VT United States

Margaret Alic, Ph.D.
Eastsound, WA United States

Bob Gillespie, Ph.D.
Wenatchee Valley College
Wenatchee, WA United States

David nelson, Ph.D.
Ritzville, WA United States

Suzanne Hagell, Ph.D.
Research Associate
University of Wisconsin, Madison
Madison, WI United States

Erica Young, Ph.D.
University of Wisconsin
Milwaukee, WI United States

Bart Geerts, Ph.D.
Professor
University of Wyoming
Laramie, WY United States