

May 17, 2010

The Honorable Nancy Pelosi  
Speaker  
U.S. House of Representatives  
235 Cannon House Office Building  
Washington, DC 20515-0508  
Fax: (202)225-4188

The Honorable Harry Reid  
Majority Leader  
United States Senate  
522 Hart Senate Office Building  
Washington, DC 20510-2803  
Fax: (202) 224-7327

Dear Speaker Pelosi and Majority Leader Senator Reid,

We write to bring to your attention the importance of accurately accounting for carbon dioxide emissions from bioenergy in any law or regulation designed to reduce greenhouse gas emissions from energy use. Proper accounting can enable bioenergy to contribute to greenhouse gas reductions; improper accounting can lead to increases in greenhouse gas emissions both domestically and internationally.

Replacement of fossil fuels with bioenergy does not directly stop carbon dioxide emissions from tailpipes or smokestacks. Although fossil fuel emissions are reduced or eliminated, the combustion of biomass replaces fossil emissions with its own emissions (which may even be higher per unit of energy because of the lower energy to carbon ratio of biomass). Bioenergy can reduce atmospheric carbon dioxide if land and plants are managed to take up additional carbon dioxide beyond what they would absorb without bioenergy. Alternatively, bioenergy can use some vegetative residues that would otherwise decompose and release carbon to the atmosphere rapidly. Whether land and plants sequester additional carbon to offset emissions from burning the biomass depends on changes both in the rates of plant growth and in the carbon storage in plants and soils. For example, planting fast-growing energy crops on otherwise unproductive land leads to additional carbon absorption by plants that offsets emissions from their use for energy without displacing carbon storage in plants and soils. On the other hand, clearing or cutting forests for energy, either to burn trees directly in power plants or to replace forests with bioenergy crops, has the net effect of releasing otherwise sequestered carbon into the atmosphere, just like the extraction and burning of fossil fuels. That creates a carbon debt, may reduce ongoing carbon uptake by the forest, and as a result may increase net greenhouse gas emissions for an extended time period and thereby undercut greenhouse gas reductions needed over the next several decades<sup>1</sup>.

Many international treaties and domestic laws and bills account for bioenergy incorrectly by treating all bioenergy as causing a 100% reduction in emissions regardless of the source of the biomass. They perpetuate this error by exempting carbon dioxide from bioenergy from national emissions limits or from domestic requirements to hold allowances for energy emissions. Most renewable energy standards for electric utilities have the same effect because bioenergy is viewed as a renewable energy even when the biomass does not eliminate or even reduce greenhouse gas emissions. This general approach

---

<sup>1</sup> J. Fargione, J. Hill, Tilman D., Polasky S., Hawthorne P (2008), Land Clearing and the Biofuel Carbon Debt, *Science* 319:1235-1238

appears to be based on a misunderstanding of IPCC guidance<sup>2</sup>. Under some scenarios, this approach could eliminate most of the expected greenhouse gas reductions during the next several decades.

U.S. laws will also influence world treatment of bioenergy. A number of studies in distinguished journals have estimated that globally improper accounting of bioenergy could lead to large-scale clearing of the world's forests<sup>3</sup>.

The lesson is that any legal measure to reduce greenhouse gas emissions must include a system to differentiate emissions from bioenergy based on the source of the biomass. The National Academy of Sciences has estimated significant potential energy production from the right sources of biomass<sup>4</sup>. Proper accounting will provide incentives for these sources of bioenergy.

Sincerely,

---

<sup>2</sup> T.D. Searchinger, S.P. Hamburg, J. Melillo, W. Chameides, P. Havlik, D.M. Kammen, G.E. Likens, R. N. Lubowski, M. Obersteiner, M. Oppenheimer, G. P. Robertson, W.H. Schlesinger, G.D. Tilman (2009), Fixing a Critical Climate Accounting Error, *Science* 326:527-528

<sup>3</sup> E.g., J.M. Melillo, J.M. Reilly, D.W. Kicklighter, A.C. Gurgel, T.W. Cronin, S. Patsev, B.S. Felzer, X. Wang, C.A. Schlosser (2009), Indirect Emissions from Biofuels: How Important?, *Science* 326:1397-1399; Marshall Wise, Katherine Calvin, Allison Thomson, Leon Clarke, Benjamin Bond-Lamberty, Ronald Sands, Steven J. Smith, Anthony Janetos, James Edmonds (2009), Implications of Limiting CO2 Concentrations for Land Use and Energy, *Science* 324:1183-1186

<sup>4</sup> National Research Council (2009), *Liquid Transportation Fuels from Coal and Biomass: Technological Status, Costs, and Environmental Impacts* (National Academy of Sciences, Washington, D.C.)

**William H. Schlesinger**

(Member, National Academy of Sciences)  
President  
(Past President, Ecological Society of America)  
Cary Institute of Ecosystem Studies  
Millbrook, New York

**Michael Allen**

Director of the Center for Conservation Biology  
Chair of the Department of Plant Pathology and  
Microbiology  
University of California, Riverside  
Riverside, California

**Viney P. Aneja**

Professor Air Quality  
Professor Environmental Technology  
Department of Marine, Earth, and Atmospheric  
Sciences  
North Carolina State University  
Raleigh, North Carolina

**Gary W. Barrett**

Eugene P. Odum Chair of Ecology  
Odum School of Ecology  
University of Georgia  
Athens, Georgia

**Mark Battle**

Associate Professor  
Physics & Astronomy  
Bowdoin College  
Brunswick, Maine

**Sharon Billings**

Associate Professor  
Department of Ecology and Evolutionary  
Biology  
Kansas Biological Survey  
Lawrence, Kansas

**Mark A. Bradford**

Assistant Professor of Terrestrial Ecosystem  
Ecology  
Yale School of Forestry and Environmental  
Studies  
Yale University

**Donald Kennedy**

(Member, National Academy of Sciences)  
Bing Professor Environmental Science and  
Policy  
President, Emeritus  
Stanford University  
Stanford, California  
New Haven, Connecticut

**Phil Camill**

Rusack Associate Professor of Environmental  
Studies  
Earth and Oceanographic Science Director,  
Environmental Studies  
Bowdoin College  
Brunswick, Maine

**Elliott Campbell**

Assistant Professor  
School of Engineering & Sierra Nevada Research  
Institute  
University of California, Merced  
Merced, California

**Joseph Craine**

Assistant Professor  
Division of Biology  
Kansas State University  
Manhattan, Kansas

**Stephen R. Carpenter**

(Member, U.S. National Academy of Sciences)  
Director and Professor  
(Past President, Ecological Society of America)  
Center for Limnology  
University of Wisconsin  
Madison, Wisconsin

**Sallie (Penny) Chisholm**

(Member, National Academy of Sciences)  
Martin Professor of Environmental Studies  
Massachusetts Institute of Technology  
Cambridge, Massachusetts

**Eric Chivian**

(Shared 1985, Nobel Peace Prize)  
Director  
Center for Health and the Global Environment  
Harvard Medical School  
Cambridge, Massachusetts

**Norm Christensen**

(Past President, Ecological Society America)  
Professor of Ecology  
Nicholas School of the Environment  
Duke University  
Durham, North Carolina

**James S. Clark**

Hugo Blomquist Professor  
Nicholas School of the Environment/Dept  
Biology  
Duke University  
Durham, North Carolina

**Jon Cole**

Distinguished Senior Scientist and G.E.  
Hutchinson Chair  
Cary Institute of Ecosystem Studies  
Millbrook, New York.

**Gretchen C. Daily**

(Member, National Academy of Sciences)  
Stanford University  
Stanford, California

**Frank P. Day**

Professor of Biological Sciences and Eminent  
Scholar  
Old Dominion University  
Norfolk, Virginia

**Seth DeBolt**

Assistant Professor  
Horticulture Department  
University of Kentucky  
Lexington, Kentucky

**Evan H. DeLucia**

G. William Arends Professor of Integrative  
Biology & Director,  
School of Integrative Biology  
University of Illinois  
Urbana, Illinois

**Samir Doshi**

Gund Institute for Ecological Economics  
University of Vermont  
Burlington, Vermont

**Dr. Charles T. Driscoll**

(Member, National Academy of Engineering)  
University Professor  
Department of Civil and Environmental  
Engineering  
Syracuse University  
Syracuse, New York

**Paul R. Ehrlich**

(Member, National Academy of Sciences)  
Bing Professor of Biology and  
President, Center for Conservation Biology  
Stanford University,  
Stanford, California

**James Ehleringer**

Distinguished Professor of Biology  
Director, Global Change and Ecosystem Center  
University of Utah  
Salt Lake City, Utah

**Erle C. Ellis**

Associate Professor  
Department of Geography & Environmental  
Systems  
University of Maryland, Baltimore County  
Baltimore, Maryland

**Paul R. Epstein, M.D.**

Associate Director  
Center for Health and the Global Environment  
Harvard Medical School  
Boston, Massachusetts

**Paul Falkowski**  
(Member of the National Academy of Sciences)  
Board of Governors' Professor  
Marine, Earth and Planetary Sciences  
Rutgers University  
New Brunswick, New Jersey

**Adrien Finzi**  
Associate Professor  
Department of Biology  
Boston University  
Boston, Massachusetts

**Andrew J. Friedland**  
The Richard and Jane Pearl Professor in  
Environmental Studies  
Chair, Environmental Studies Program  
Dartmouth College  
Hanover, New Hampshire

**James N. Galloway**  
Department of Environmental Sciences  
University of Virginia  
Charlottesville, Virginia

**Frank S. Gilliam**  
Department of Biological Sciences  
Marshall University  
Huntington, West Virginia

**Christine L. Goodale**  
Assistant Professor  
Department of Ecology & Evolutionary Biology  
Cornell University  
Ithaca, New York

**Nancy B. Grimm**  
(Past President, Ecological Society America)  
Professor,  
Department of Biology  
Arizona State University  
Phoenix, Arizona

**Peter M. Groffman**  
Senior Scientist  
Cary Institute of Ecosystem Studies  
Millbrook, New York

**Nick M. Haddad**  
Associate Professor  
Department of Biology  
North Carolina State University  
Raleigh, North Carolina

**Charles A.S. Hall**  
College of Environmental Science and Forestry  
State University of New York  
Syracuse New York

**John Harte**  
Professor of Ecosystem Sciences  
Energy and Resources Group  
University of California  
Berkeley, California

**Harold Hemond**  
W. E. Leonhard Professor of Civil and  
Environmental Engineering  
Massachusetts Institute of Technology  
Cambridge, Massachusetts

**Sarah Hobbie**  
Associate Professor  
Department of Ecology, Evolution, and Behavior  
University of Minnesota  
Minneapolis, Minnesota

**Kirsten Hofmocker**  
Department of Ecology, Evolution, &  
Organismal Biology  
Iowa State University  
Ames, Iowa

**R.A. Houghton**  
Deputy Director and Senior Scientist  
Woods Hole Research Center  
Falmouth, Massachusetts

**Benjamin Houlton**  
Assistant Professor, Terrestrial Biogeochemistry  
Department of Land, Air and Water Resources  
University of California at Davis  
Davis, California

**Robert W. Howarth**

David R. Atkinson Professor of Ecology and  
Environmental Biology  
Cornell University  
Ithaca, New York

**A. Hope Jahren**

Department of Geology & Geophysics  
University of Hawaii  
Honolulu, Hawaii

**Dan Janzen**

DiMaura Professor of Conservation Biology  
University of Pennsylvania  
Philadelphia, Pennsylvania

**Daniel Kammen**

Class of 1935 Distinguished Professor of Energy  
Professor in the Energy and Resources Group  
and in the Goldman School of Public Policy  
Director, Renewable and Appropriate Energy  
Laboratory  
University of California, Berkeley  
Berkeley, California

**William S. Keeton**

Associate Professor  
Center for Natural Resources  
Rubenstein School of Environment and Natural  
Resources  
University of Vermont  
Burlington, Vermont

**Thomas H. Kunz**

Professor and Director  
Center for Ecology and Conservation Biology  
Department of Biology  
Boston University  
Boston, Massachusetts

**Beverly Law**

Professor, Global Change Forest Science  
Department of Forest Ecosystems & Society  
College of Forestry  
Oregon State University  
Corvallis, Oregon

**John Lichter**

Associate Professor  
Department of Biology  
Bowdoin College  
Brunswick, Maine

**Gene E. Likens**

(Member, National Academy of Sciences)  
Distinguished Senior Scientist  
(Past President, Ecological Society America)  
Founding President, Emeritus  
(Recipient, 2005, National Medal of Science)  
Cary Institute of Ecosystem Studies  
Millbrook, New York

**Thomas Lovejoy**

Heinz Center Biodiversity Chair  
Heinz Center for Environment  
Washington, D.C.

**Daniel Markewitz**

Associate Professor  
Warnell School of Forestry and  
Natural Resources  
University of Georgia  
Athens, Georgia

**Roz Naylor**

Professor, Environmental Earth Science;  
William Wrigley Senior Fellow, and  
Director, Program on Food Security and the  
Environment  
Stanford University  
Stanford, California

**Jason Neff**

Associate Professor  
Geological Sciences and Environmental Studies  
University of Colorado at Boulder  
Boulder, Colorado

**Michael O'Hare**

Professor of Public Policy  
Goldman School of Public Policy  
University of California at Berkeley  
Berkeley, California

**Scott Ollinger**

Associate Professor of Natural Resources  
Complex Systems Research Center  
Institute for the Study of Earth, Oceans and  
Space  
University of New Hampshire  
Durham, New Hampshire

**Michael Oppenheimer**

Albert G. Milbank Professor of Geosciences and  
International Affairs  
Woodrow Wilson School  
Princeton University  
Princeton, New Jersey

**Margaret A. Palmer**

Professor and Director  
Chesapeake Biological Lab  
University of Maryland  
College Park, Maryland

**Todd Palmer**

Department of Biology  
University of Florida  
Gainesville, Florida

**Richard P. Phillips**

Assistant Professor  
Department of Biology  
Indiana University  
Bloomington, Indiana

**Stuart Pimm**

Doris Duke Professor of Conservation Ecology  
Nicholas School of the Environment  
Duke University  
Durham, North Carolina

**Jennifer S. Powers**

Assistant Professor  
Department of Ecology, Evolution & Behavior  
University of Minnesota  
Minneapolis, Minnesota

**James W. Raich**

Professor  
Department of Ecology, Evolution & Organismal  
Biology  
Iowa State University  
Ames, Iowa

**Chantal D Reid**

Assistant Professor of the Practice  
Department of Biology and  
Nicholas School of the Environment  
Duke University  
Durham, North Carolina

**William A. Reiners**

Professor of Botany and  
J.E. Warren Professor of Energy and  
Environment  
University of Wyoming  
Laramie, Wyoming

**Heather Reynolds**

Associate Professor  
Department of Biology  
Indiana University  
Bloomington Indiana

**G. Philip Robertson**

University Distinguished Professor  
W.K. Kellogg Biological Station and  
Department of Crop and Soil Sciences  
Michigan State University  
Hickory Corners, Michigan

**Steve Running**

Regents Professor and Director,  
Numerical Terradynamic Simulation Group  
Department of Ecosystem Sciences  
University of Montana  
Missoula, Montana

**Lee Schipper**

Project Scientist  
Global Metropolitan Studies  
UC Berkeley  
And Senior Research Engineer  
Precourt Energy Efficiency Center  
Stanford University

**Stephen H. Schneider**

(Member, National Academy of Sciences)  
Melvin and Joan Lane Professor for  
Interdisciplinary Environmental Studies,  
Professor, Department of Biology and  
Senior Fellow, Woods Institute for the  
Environment  
Stanford University  
Stanford, California

**H.H. Shugart**

W.W. Corcoran Professor  
Department of Environmental Sciences  
University of Virginia  
Charlottesville, Virginia

**Kirk R. Smith**

(Member, National Academy of Sciences)  
Professor of Global Environmental Health  
Director, Global Health and Environment  
Program  
School of Public Health  
University of California  
Berkeley, California

**Stanley D. Smith**

Associate Vice President for Research  
Professor of Life Sciences  
University of Nevada  
Las Vegas, Nevada

**Robert Socolow**

Department of Mechanical and Aerospace  
Engineering  
Director of the Carbon Mitigation Initiative  
Princeton University  
Princeton, New Jersey

**John Sperry**

Professor  
Biology Department  
University of Utah  
Salt Lake City, Utah

**Dan Sperling**

Professor and Director  
Institute of Transportation Studies  
University of California  
Davis, California

**Jennifer L. Tank**

Galla Associate Professor of Ecology  
Department of Biological Sciences  
University of Notre Dame  
Notre Dame, Indiana

**Pamela Templer**

Assistant Professor  
Boston University  
Boston, Massachusetts

**John Terborgh**

(Member, National Academy of Sciences)  
Nicholas School of the Environment  
Duke University  
Durham, North Carolina

**Thomas P. Tomich**

W.K. Kellogg Endowed Chair in Sustainable Food  
Systems  
Director, UC Davis Agricultural Sustainability  
Institute  
Director, UC Sustainable Agriculture Research  
and Education Program  
Professor of Community Development,  
Environmental Science & Policy  
University of California  
Davis, California

**Alan R. Townsend**

Professor, Institute of Arctic and Alpine  
Research and  
Department of Ecology and Evolutionary  
Biology  
Director, Environmental Studies Program  
University of Colorado  
Boulder, Colorado



**Ross A. Virginia**

Myers Family Professor of Environmental  
Science  
Director, Institute of Arctic Studies  
Dartmouth College  
Hanover, New Hampshire

**Diana H. Wall**

(Past President, Ecological Society of America)  
University Distinguished Professor  
Director, School of Global Environmental  
Sustainability  
Colorado State University  
Fort Collins, Colorado

**Matthew Wallenstein**

Research Scientist  
Natural Resource Ecology Laboratory  
Colorado State University  
Fort Collins, Colorado

**Thomas R. Wentworth**

Alumni Distinguished Undergraduate Professor  
of Plant Biology  
North Carolina State University  
Raleigh, North Carolina

**Donald R. Zak**

Burton V. Barnes Collegiate Professor of Ecology  
University of Michigan  
Ann Arbor, Michigan

Cc: Carol Browner, White House Office of Energy and Climate Change Policy  
Lisa Jackson, Environmental Protection Agency  
Steven Chu, Ph.D, Department of Energy  
John Holdren, Ph.D, President's Council of Advisors on Science and Technology