

March 2, 2009

The Honorable Arnold Schwarzenegger  
Office of the Governor  
State Capitol  
Sacramento, CA 95814

**RE: Opposed to Selective Enforcement of Indirect Effects in CA LCFS**

Dear Governor Schwarzenegger,

We are writing regarding the California Air Resources Board's (ARB) ongoing development of the Low Carbon Fuel Standard (LCFS). With the rulemaking nearing its final stage, we would like to offer comments on the critical issue of how to address the issue of indirect, market-mediated effects.

As you are aware, ARB staff continues to push a regulation that includes an indirect land use change (iLUC) penalty for biofuels. To be clear, this effect is not the direct land conversion from growing crops for fuel. It is the alleged indirect, price-induced land conversion effect that could occur in the world economy as a result of any increase in demand for agricultural production. The ability to predict this alleged effect depends on using an economic model to predict worldwide carbon effects, and the outcomes are unusually sensitive to the assumptions made by the researchers conducting the model runs. In addition, this field of science is in its nascent stage, is controversial in much of the scientific community, and is only being enforced against biofuels in the proposed LCFS.

The push to include iLUC in the carbon score for biofuel is driven at least partially by concerns about global deforestation. There is no question that global deforestation is a problem, and that indirect effects must be looked at very carefully to ensure that future fuels dramatically reduce GHG emissions without unintended consequences. The scientific community is actively seeking ways to mitigate deforestation, enhance efficient land use, feed the poor and malnourished and reduce global warming. Because of the complex and important issues involved, it is critical that we rely on science-based decision-making to properly determine and evaluate the indirect effects of all fuels, as well as any predicted changes in agricultural and forestry practices. In a general sense, it is worth noting that most primary forest deforestation is currently occurring in places like Brazil, Indonesia and Russia as a direct result of logging, cattle ranching and subsistence farming. Adding an iLUC penalty to biofuels will hold the sector accountable to decision-making far outside of its control (i.e. for decisions related to the supply chains of other products), and is unlikely to have any effect on protecting forests or mitigating GHG emissions as a result of land management practices. But because indirect effects are not enforced against any other fuel in the proposed LCFS, an iLUC penalty will chill investment in both conventional and advanced biofuel production, including advanced biofuels made from dedicated energy feedstocks such as switchgrass and miscanthus, which have the potential to make the agricultural sector far less resource-intensive and could provide a significant carbon negative source of transportation fuel.

More than 20 scientists wrote to the ARB in June 2008 suggesting that more time and analysis is required to truly understand the iLUC effect of biofuels. In addition to iLUC, we know very little about the indirect effects of other fuels, and therefore cannot establish a proper relative value for indirect effects among the various compliance fuels and petroleum under the LCFS. In consideration of this and other rulemaking activities and research conducted since June 2008, we, the undersigned 111 scientists, continue to believe that the enforcement of any indirect effect, including iLUC, is highly premature at this time, based on the following two principles:

1) The Science Is Far Too Limited and Uncertain For Regulatory Enforcement

ARB staff is proposing to enforce a penalty on all biofuels for indirect land use change as determined by a computable general equilibrium (CGE) model called GTAP. This model is set to a static world economic condition (e.g. 2006), then shocked with a volume of biofuel to create the perceived land conversion result. The modeling outcome is applicable to the set of assumptions used for that particular run, but is not particularly relevant when there is a shift in policy, weather, world economic conditions or other economic, social or political variables. For example, by definition, these models assume zero innovation, which means they could not have predicted the 500% increase in corn yields since 1940, the tripling of wheat yields since 1960, or the 700% increase in yield that can occur if farmers in developing countries adopt higher yield seed varieties and more efficient farming practices. This inability to predict innovation is not limited to agriculture; similar attempts to use economic equilibrium models in other emerging markets like telephony or computing would have been equally unsuccessful. As discussed, the model runs are unusually sensitive to the assumptions made by the modelers, which is why the iLUC modeling results published thus far differ by a factor of at least four, and under some scenarios, are actually zero for today's biofuels. Even at this late stage in the LCFS process, the GTAP model runs still do not reflect basic on-the-ground realities, such as the use of marginal and idle lands. They do not reflect recent articles about the potential for energy crops to absorb carbon at higher rates than previously thought. A partial solution to this problem is to conduct a series of model runs with different assumptions and adjustments. Unfortunately, this has not occurred at ARB (researchers have run limited sensitivity analysis within the current set of primary assumptions). We are only in the very early stages of assessing and understanding the indirect, market-mediated effects of different fuels. Indirect effects have never been enforced against any product in the world. California should not be setting a wide-reaching carbon regulation based on one set of assumptions with clear omissions relevant to the real world.

2) Indirect Effects Are Often Misunderstood And Should Not Be Enforced Selectively

In basic terms, there is only one type of carbon impact from a commercial fuel: its direct effect. Direct carbon effects are those directly attributable to the production of the fuel, which in the case of biofuel includes the land converted to produce the biofuel feedstock. Indirect effects, on the other hand, are those that allegedly happen in the marketplace as a result of shifting behaviors. As such, penalizing a biofuel gallon for direct *and* indirect land use change is the equivalent of ascribing the carbon impact of land

converted to produce biofuel feedstock as well as the land needed to produce another, allegedly displaced supply chain (e.g. soy production for food). Leaving aside the issue of whether these effects can be predicted with precision or accuracy, or whether such a penalty is appropriate for the LCFS, it is clear that indirect effects should not be enforced against only one fuel pathway. Petroleum, for example, has a price-induced effect on commodities, the agricultural sector and other markets. Electric cars will increase pressure on the grid, potentially increasing the demand for marginal electricity production from coal, natural gas or residual oil. Yet, to date, ARB is proposing to enforce indirect effects against biofuel production only. This proposal creates an asymmetry or bias in a regulation designed to create a level playing field. It violates the fundamental presumption that all fuels in a performance-based standard should be judged the same way (i.e. identical LCA boundaries). Enforcing different compliance metrics against different fuels is the equivalent of picking winners and losers, which is in direct conflict with the ambition of the LCFS.

Proponents of iLUC inclusion claim that all regulations are uncertain. This is true. However, the level of uncertainty implicated here far outweighs that found in other regulatory fields. For example, the European Parliament declared in December that the iLUC of biofuel “is not currently expressed in a form that is immediately usable by economic operators.”<sup>1</sup> They decided not to incorporate iLUC penalties in their biofuel programs and initiated further analysis of the issue. It is also not enough to suggest that iLUC is a significant indirect effect, while other indirect effects are likely smaller. The magnitude of the alleged iLUC effect ranges from zero to very large, depending on the assumptions utilized. This is also likely true for other fuels, especially with regard to the marginal gallons of petroleum that are coming into the marketplace, such as heavy oil, enhanced oil recovery, and tar sands. Either way, even small effects are significant under the LCFS. Just a few g/MJ separate corn ethanol from petroleum in the proposed regulation, and advanced biofuel is very close to CNG and hydrogen under certain scenarios. We agree with the sentiment expressed by many experts that while indirect effects are important to understand, enforcing them prematurely and selectively on only certain fuels in a performance-based standard could have major negative consequences, even for GHG mitigation. Put another way, no level of certainty justifies asymmetrical enforcement of indirect effects.

Given the limited time, a reasonable solution to the challenges discussed above is to submit an LCFS regulation based on direct carbon effects (including direct land use impacts) and support a rigorous 24-month analysis of the indirect, market-mediated effects of petroleum and the entire spectrum of alternative fuels, regardless of source. The analysis could be conducted in collaboration with other institutions and governments implementing carbon-based fuel standards, and should include a consideration of the best way to prevent carbon effects outside the primary system boundary, including promoting sound land use practice with more direct policy solutions. This approach is consistent with the principle that all fuels should be judged through the same lens in a performance-based standard, as well as the approach taken by the European Parliament. It is worth noting that an LCFS

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<sup>1</sup> <http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//TEXT+TA+P6-TA-20080613+0+DOC+XML+V0//EN&language=EN#BKMD-27>

policy based on direct effects already favors non-land intensive, advanced biofuel production over conventional biofuel production.

The LCFS provides an incredible opportunity to reduce the carbon intensity of transportation fuel and promote a more sustainable transportation fuel marketplace. We commend your leadership and the ARB staff for their ability to process a challenging set of scientific data resources into a workable regulation. However, it is critical that the LCFS stay on course with regard to its primary mission of establishing a level, carbon-based playing field for all fuels.

We are writing this letter as researchers in the field of biomass to bioenergy conversion, but the signatories do not represent the official views of the home institutions, universities, companies, the Department of Energy, the United States Department of Agriculture, or any of the National Laboratories. We look forward to working with ARB to ensure that the regulation reflects the best science available, and takes a policy approach that is balanced across all fuel pathways.

Sincerely,

Blake A. Simmons, Ph.D.  
Vice-President, Deconstruction Division  
Joint BioEnergy Institute  
Manager, Biomass Science and Conversion Technology  
Sandia National Laboratories

Jay D. Keasling, Ph.D.  
Director  
Physical Biosciences Division  
Lawrence Berkeley National Laboratory  
Hubbard Howe Distinguished Professor of Biochemical Engineering  
Departments of Chemical Engineering and Bioengineering  
University of California, Berkeley  
Chief Executive Officer  
Joint BioEnergy Institute

Harvey W. Blanch, Ph.D.  
Chief Science and Technology Officer  
Joint BioEnergy Institute  
Lawrence Berkeley National Laboratory  
Member, National Academy of Engineering  
Merck Professor of Chemical Engineering  
University of California, Berkeley

Robert B. Goldberg, Ph.D.  
Distinguished HHMI University Professor &  
Member, National Academy of Sciences  
Department of Cell, Developmental, & Molecular Biology  
University of California, Los Angeles

Pam Ronald, Ph.D.  
Vice-President, Feedstocks Division  
Joint BioEnergy Institute  
Department of Plant Pathology  
University of California, Davis

Paul D. Adams, Ph.D.  
Deputy Division Director, Physical Biosciences Division,  
Lawrence Berkeley National Laboratory  
Adjunct Professor, Department of Bioengineering, U.C. Berkeley  
Vice President for Technology, the Joint BioEnergy Institute  
Head, Berkeley Center for Structural Biology

Bruce E. Dale, Ph. D.  
Distinguished University Professor  
Dept. of Chemical Engineering & Materials Science  
Michigan State University

Charles E. Wyman, Ph.D.  
Ford Motor Company Chair in Environmental Engineering Center for Environmental  
Research and Technology (CE-CERT)  
Professor of Chemical and Environmental Engineering Bourns College of Engineering  
University of California, Riverside

Alvin J.M. Smucker, Ph.D.  
Professor of Soil Biophysics  
MSU Distinguished Faculty  
Michigan State University

Greg Stephanopoulos, Ph.D.  
W.H. Dow Professor of Chemical Engineering and Biotechnology  
Department of Chemical Engineering  
Massachusetts Institute of Technology

Sharon Shoemaker, Ph.D.  
Director  
California Institute for Food and Agriculture Research  
University of California, Davis

Stephen R. Kaffka, Ph.D.  
Extension Agronomist  
Department of Plant Sciences  
University of California, Davis

Terry Hazen, Ph.D.  
Director of Microbial Communities  
Joint BioEnergy Institute  
Scientist/Department Head  
Ecology Department  
Earth Sciences Division  
Lawrence Berkeley National Laboratory

Lonnie O. Ingram, Ph.D.  
Director, Florida Center for Renewable Chemicals and Fuels  
Dept. of Microbiology and Cell Science  
University of Florida

George W. Huber, Ph.D.  
Armstrong Professional Development Professor  
Department of Chemical Engineering  
University of Massachusetts

Kenneth G. Cassman, Ph.D.  
Director, Nebraska Center for Energy Science Research  
Heuermann Professor of Agronomy  
University of Nebraska, Lincoln

Om Parkash (Dhankher), Ph.D.  
Assistant Professor  
Department of Plant, Soil and Insect Sciences  
University of Massachusetts, Amherst

Cole Gustafson, Ph.D.  
Professor  
Department of Agribusiness and Applied Economics  
North Dakota State University

Robert C. Brown, Ph.D.  
Anson Martson Distinguished Professor in Engineering  
Gary and Donna Hoover Chair in Mechanical Engineering Professor, Mechanical  
Engineering, Chemical and Biological Engineering, and Agricultural and Biosystems  
Engineering Director, Bioeconomy Institute Director, Center for Sustainable  
Environmental Technologies  
Iowa State University

John Ralph, Ph.D.  
Professor, Department of Biochemistry and Biological Systems Engineering  
University of Wisconsin-Madison

Daniel G. De La Torre Ugarte, Ph.D.  
Professor, Agricultural Policy Analysis Center  
Department of Agricultural Economics  
The University of Tennessee

Michael A. Henson, Ph.D.  
Co-Director  
Institute for Massachusetts Biofuels Research (TIMBR)  
University of Massachusetts, Amherst

Danny J. Schnell, Ph.D.  
Professor and Head  
Dept. of Biochemistry & Molecular Biology  
University of Massachusetts, Amherst

Jeffrey L. Blanchard, Ph.D.  
Assistant Professor, Department of Microbiology  
Morrill Science Center  
University of Massachusetts, Amherst

Y-H Percival Zhang, Ph.D.  
Biological Systems Engineering Department  
Virginia Tech University

Venkatesh Balan, Ph.D.,  
Assistant Professor  
Department of Chemical Engineering and Material Science  
Michigan State University

Gemma Reguera, Ph.D.  
Assistant Professor of Microbiology and Molecular Genetics  
Michigan State University

Wayne R. Curtis, Ph.D.  
Professor of Chemical Engineering  
Penn State University

James C. Liao, Ph.D.  
Chancellor's Professor  
Department of Chemical and Biomolecular Engineering  
University of California, Los Angeles

Brian G. Fox, Ph.D.  
Marvin Johnson Professor of Fermentation Biochemistry  
Department of Biochemistry  
Great Lakes Bioenergy Research Center  
University of Wisconsin

Robert Landick, Ph.D.  
Dept. of Biochemistry  
Univ. of Wisconsin-Madison

Prof. dr. ir. Christian V. Stevens  
Professor Chemical Modification of Renewable Resources  
Faculty of Bioscience Engineering  
Director of the Center of Renewable Resources  
Ghent University, Belgium

Alexander J. Malkin, Ph.D.  
Scientific Capability Leader for BioNanoSciences  
Physical and Life Sciences Directorate  
Lawrence Livermore National Laboratory

Dennis J. Miller, Ph.D.  
Department of Chemical Engineering and Materials Science  
Michigan State University

David Keating, Ph.D.  
Great Lakes Bioenergy Research Center  
University of Wisconsin-Madison

Susan Leschine, Ph.D.  
Professor  
University of Massachusetts, Amherst  
Qteros, Inc.

David T. Damery, Ph.D.  
Associate Professor  
Dept. of Natural Resources Conservation  
University of Massachusetts, Amherst

Kenneth Keegstra, Ph.D.  
University Distinguished Professor  
Department of Plant Biology  
Michigan State University

Tobias I. Baskin, Ph.D.  
Biology Department  
University of Massachusetts

Christopher M. Saffron, Ph.D.  
Assistant Professor  
Dept. of Biosystems and Agricultural Engineering  
Dept. of Forestry  
Michigan State University

Emily Heaton, Ph.D.  
Asst. Prof. of Agronomy  
Iowa State University

Kurt D. Thelen, Ph.D.  
Associate Professor  
Dept. of Crop & Soil Sciences  
Michigan State University

Bin Yang, Ph.D.  
Associate Research Engineer  
Bourns College of Engineering  
Center for Environmental Research and Technology (CE-CERT)  
University of California, Riverside

Andrea Festuccia, Ph.D.  
Professor  
University of Rome-Italy

Francesca del Vecchio, Ph.D.  
Professor  
Cambridge University  
St. John Biochemistry Department  
Cambridge, UK

David Shonnard, Ph.D.  
Department of Chemical Engineering  
Michigan Technological University

R. Mark Worden, Ph.D.  
Professor  
Dept. of Chemical Engineering and Materials Science  
Michigan State University

Satish Joshi, Ph.D.  
Associate Professor  
Department of Agricultural Economics  
Michigan State University

Timothy Volk, Ph.D.  
Senior Research Associate  
346 Illick Hall  
Faculty of Forest and Natural Resources Management  
SUNY-ESF

Henrik Scheller, Ph.D.  
Director of Plant Cell Wall Biosynthesis  
Joint BioEnergy Institute  
Lawrence Berkeley National Laboratory

Joshua L. Heazlewood, Ph.D.  
Director of Systems Biology  
Joint BioEnergy Institute  
Lawrence Berkeley National Laboratory

Dominique Loque, Ph.D.  
Director of Cell Wall Engineering  
Joint BioEnergy Institute  
Lawrence Berkeley National Laboratory

David A. Grantz, Ph.D.  
Director, University of California Kearney Agricultural Center  
Plant Physiologist and Extension Air Quality Specialist Department of Botany and Plant  
Sciences and Air Pollution Research Center University of California at Riverside

Rajat Sapra, Ph.D.  
Director of Enzyme Engineering  
Joint BioEnergy Institute  
Biomass Science and Conversion Technology  
Sandia National Laboratories

Masood Hadi, Ph.D.  
Director of High-Throughput Sample Prep  
Joint BioEnergy Institute  
Biomass Science and Conversion Technology  
Sandia National Laboratories

Swapnil Chhabra, Ph.D.  
Director of Host Engineering  
Joint BioEnergy Institute  
Lawrence Berkeley National Laboratory

Seema Singh, Ph.D.  
Director of Dynamic Studies of Biomass Pretreatment  
Joint BioEnergy Institute  
Biomass Science and Conversion Technology  
Sandia National Laboratories

Bradley Holmes, Ph.D.  
Director of Biomass Pretreatment and Process Engineering  
Joint BioEnergy Institute  
Biomass Science and Conversion Technology  
Sandia National Laboratories

Manfred Auer, Ph.D.  
Director Physical Analysis  
Joint BioEnergy Institute  
Physical Biosciences Division  
Lawrence Berkeley National Laboratory

Phil Hugenholtz, Ph.D.  
Senior Scientist  
Joint BioEnergy Institute  
Joint Genome Institute  
Lawrence Berkeley National Laboratory

Chris Petzold, Ph.D.  
Scientist  
Joint BioEnergy Institute  
Lawrence Berkeley National Laboratory

Steven Singer, Ph.D.  
Scientist  
Joint BioEnergy Institute  
Lawrence Livermore National Laboratory

Michael Thelen, Ph.D.  
Senior Scientist  
Joint BioEnergy Institute  
Lawrence Livermore National Laboratory

David A. Grantz, Ph.D.  
Director, University of California Kearney Agricultural Center  
Plant Physiologist and Extension Air Quality Specialist Department of Botany and Plant  
Sciences and Air Pollution Research Center University of California at Riverside

David Reichmuth, Ph.D.  
Scientist, Sandia National Laboratories

Amy J. Powell, Ph.D.  
Scientist, Department of Computational Biology  
Sandia National Laboratories

Anthe George, Ph.D.  
Post-doctoral Fellow  
Joint BioEnergy Institute  
Biomass Science and Conversion Technology  
Sandia National Laboratories

Özgül Persil Çetinkol  
Post-doctoral Fellow  
Joint BioEnergy Institute  
Lawrence Berkeley National Laboratory

Supratim Datta, Ph.D.  
Post-doctoral Fellow  
Joint BioEnergy Institute  
Biomass Science and Conversion Technology  
Sandia National Laboratories

Zhiwei Chen, Ph.D.  
Post-doctoral Fellow  
Joint BioEnergy Institute  
Biomass Science and Conversion Technology  
Sandia National Laboratories

Joshua Park, Ph.D.  
Post-doctoral Fellow  
Joint BioEnergy Institute  
Biomass Science and Conversion Technology  
Sandia National Laboratories

Chenlin Li, Ph.D.  
Post-doctoral Fellow  
Joint BioEnergy Institute  
Biomass Science and Conversion Technology  
Sandia National Laboratories

Hanbin Liu, Ph.D.  
Post-doctoral Fellow  
Joint BioEnergy Institute  
Biomass Science and Conversion Technology  
Sandia National Laboratories

Richard Hamilton, Ph.D.  
Chief Executive Officer  
Ceres, Inc.

Richard B. Flavell, Ph.D.  
Chief Scientific Officer  
Ceres, Inc.

Robert J. Wooley, Ph.D., P.E.  
Director, Process Engineering  
Abengoa

Tim Eggeman, Ph.D., P.E.  
Chief Technology Officer, Founder  
ZeaChem Inc.

Dan W. Verser, Ph.D.  
Co-Founder  
EVP R&D  
ZeaChem Inc

José Goldemberg, Ph.D.  
Professor Emeritus University of São Paulo  
São Paulo, Brazil and Former Secretary for the Environment

Neal Gutterson, Ph.D.  
President and CEO  
Mendel Biotechnology Inc

James Zhang, PhD  
VP of Tech Acquisition and Alliances  
Mendel Biotechnology Inc

Mark D. Stowers, Ph.D.  
Vice President, Research and Development  
POET

Steen Skjold-Jørgensen, Ph.D.  
Vice-President of Biofuels R&D  
Novozymes North America, Inc.

Claus Fuglsang, Ph.D.  
Senior Director of Bioenergy R&D  
Novozymes, Inc.

John Pierce, Ph.D.  
Vice President-Technology, DuPont Applied BioSciences &  
Director, Biochemical Sciences and Engineering  
E.I. du Pont de Nemours & Company, Inc.

Mike Arbige, Ph.D.  
SVP Technology Genencor,  
a Danisco Division

Joe Skurla , Ph.D.  
President, DuPont Danisco Cellulosic Ethanol

David Mead, Ph.D.  
CEO, Lucigen Corporation

Bernie Steele, Ph.D.  
Director, Operations  
MBI International

Stephen del Cardayre, Ph.D.  
Vice President, Research and Development  
LS9, Inc.

Douglas E. Feldman, Ph.D.  
Corporate Development  
LS9, Inc.

Matt Carr, Ph.D.  
Director, Policy  
Industrial and Environmental Section  
Biotechnology Industry Organization (BIO)

R. Michael Raab, Ph.D.  
President  
Agrivida, Inc.

Philip Lessard, Ph.D.  
Senior Scientist  
Agrivida, Inc.

Jeremy Johnson, Ph.D.  
Co-Founder  
Agrivida, Inc.

Humberto de la Vega, Ph.D.  
Senior Scientist  
Agrivida, Inc.

David Morris, Ph.D.  
Vice-President  
Institute for Local Self Reliance (ILSR)

Gregory Luli, Ph.D.  
Vice-President, Research  
Verenium Corporation

Kevin A. Gray, Ph.D.  
Sr. Director, Biofuels R&D  
Verenium Corporation

Gregory Powers, Ph.D.  
Executive VP, Research & Development  
Verenium Corporation

Keith A. Krutz, Ph.D.  
Vice-President, Core Technologies  
Verenium Corporation

Nelson R. Barton, Ph.D.  
Vice-President, Research and Development  
Verenium Corporation

Hiroshi Morihara, Ph.D.  
Chairman of HM3 Ethanol

Kulinda Davis, Ph.D.  
Director of Product Development  
Sapphire Energy

Neal Briggi, Ph.D.  
Global Head of Enzymes  
Syngenta Biotechnology Inc.

Jeffrey Miano, Ph.D.  
Global Business Director Biomass  
Syngenta Biotechnology, Inc.

Ian Jepson, Ph.D.  
Head of Enzyme R&D  
Syngenta Biotechnology Inc

Patrick B. Smith, Ph.D.  
Consultant, Renewable Industrial Chemicals  
Archer Daniels Midland Research

Terry Stone, Ph.D.  
Senior Manager, Regulatory Affairs  
Syngenta Biotechnology, Inc.

Ramnik Singh, Ph.D.  
Director, Cellulosic Processing & Pretreatment  
BioEnergy International

Cenan Ozmeral, Ph.D.  
SVP and General Manager  
BioEnergy International

Cary Veith, Ph.D.  
Vice-President  
BioEnergy International

Cc: Mary Nichols, Chairman, Air Resources Board  
David Crane, Special Advisor for Jobs & Economic Growth, Office of Governor  
Schwarzenegger  
Linda Adams, Secretary, Cal-EPA  
A.G. Kawamura, Secretary, California Department of Food & Agriculture  
Mike Scheible, Deputy Director, Air Resources Board  
Karen Douglas, Chair, California Energy Commission