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09-4-4

April 22, 2009

CCAT

California Communities
Against Toxics

Mary Nichols, Chairman
Board Members
California Air Resources Board
1001 I Street
Sacramento, CA 95812

RE: Comments on Low-Carbon-Fuel-Standard

Dear Chairman Nichols and Board Members:

We submit these comments in response to the proposed Low-Carbon Fuel Standard (LCFS). We seek to ensure that the LCFS complies with § 38562(b)(2) of the AB32 Global Warming Solutions Act requiring that all "activities undertaken to comply with the regulations do not disproportionately impact low-income communities," and submitted recommendations along with the AB32 Environmental Justice Advisory Committee (EJAC)[1] outlining how the proposed LCFS will disproportionately impact low-income and traditionally overburdened communities. California Communities Against Toxics submits these additional comments to raise other specific concerns with the proposed regulation, ARB staff's lifecycle analysis, and other areas where we do not believe ARB staff made determinations with the requisite level of certainty with which AB32 requires emission reductions to be "real, permanent, quantifiable, verifiable, and enforceable" under § 38562(d)(1). We focus on corn-based ethanol under most discussions because currently, the main biofuel in the United States is ethanol derived from corn kernels.[2] At the end of these comments is a list of attachments and appendices compiled on a CD for simultaneous submission.

ARB Staff's Lifecycle Analysis is Incomplete

To assess the GHG balance associated with different forms of fuels and to determine actual emission reduction potential, it is essential to consider emissions throughout the full life-cycle.[3] We believe that the proposed fuel pathways[4] still require further analysis, and disagree with ARB staff's conclusion that, "[n]o other significant indirect effects that result in large GHG emissions have been identified that would substantially affect the LCFS framework for reducing the carbon intensity of transportation fuels."[5] The current lifecycle analysis fails to account for GHG emissions from the following sources:

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[1] The EJAC was created through § 38591(a) of the AB32 statute. For more information, see, http://www.arb.ca.gov/cc/ejac/ejac.htm.

[2] "Currently, corn is the primary feedstock for ethanol production in the United States. Studies indicate that approximately 98 percent of current ethanol production in the United States uses corn..." California Air Resources Board, "Proposed Regulation to Implement the Low Carbon Fuel Standard," (ISOR) Vol. 1, p. III-2, May 5, 2009, http://www.arb.ca.gov/fuels/lcfs/030409lcfs_isor_vol1.pdf

[3] UN Energy, *Sustainable Bioenergy: A Framework for Decision Makers*, p. 50, http://esa.un.org/un-energy/Publications.htm

[4] "Tables ES–8 and ES-9 presents the adjusted carbon intensities for gasoline and fuels that substitute for gasoline and diesel and fuels that substitute for diesel, respectively. Staff is proposing that the pathways listed in these tables be approved as part of this rulemaking." ISOR, ES-18.

[5] ISOR, ES-2.

- The energy used to move water to process biofuels
- Equivalent CO2 emissions of particulate black carbon (BC), the second-leading cause of global warming. BC has a global-warming potential of 90-190 times that of carbon dioxide. The largest sources of BC in the U.S. are agricultural equipment, construction machines, diesel trucks, and ships all of which are used in the corn-ethanol process.[6]
- "CO2, BC, CH4, and N2O emissions associated with transporting ethanol by rail, truck, or barge from the midwest to coastal areas."[7] These emissions must be evaluated for their contributions to GWI values for all biofuel and diesel blends.[8]
- The combined carbon contributions from PM10, PM2.5, ultrafines and blackcarbon in diesel can have the same CO2 equivalent as HFCs, resulting in artificially deflated GWI values.
- "[M]any refineries now rely on coal rather than gas or oil for energy. Coal has the highest carbon content (25.4 tonnes of carbon per terajoule compared to 19.9 tonnes per TJ for mineral oil)."[9] Most ethanol plants have traditionally used natural gas to power their operations, but as this becomes more expensive, some are switching to coal... Because coal-fired plants are not as energy efficient as natural gas-fired plants (and also release more pollutants during combustion), the ethanol produced from coal plants loses the [potential] climate benefits that come from using gas plants and can actually contribute to global warming..."[10]
- The extraction, production and distribution of natural gas when calculating GHG emissions; not just only looking at the power plant's emissions.
- "Climate impacts from nitrous oxide have been highlighted recently in a paper by Nobel prize winner Paul Crutzen and others who suggest that nitrous oxide emissions from nitrate fertilisers have been underestimated in biofuel greenhouse gas emissions calculations. Crutzen challenges the IPCC estimate that just 2% of nitrogen which is applied to soils in the form of nitrate fertilisers is transformed by soil microbes into nitrous oxide arguing that after comparing the increase in nitrous oxide in the atmosphere to the known inputs by humans, and accounting for changes due to deforestation, that 3-5% of nitrate fertilisers must be converted to N2O. However, most life-cycle studies for biofuels also wrongly ignore part of the IPCC figure - they consider the approximately 1% of direct emissions from the field where the fertilisers are applied but ignore c.1% indirect emission from the much wider area which will be 'fertilised' through rainfall and runoffs from fields."[11]
- Increased fertilizer and pesticides use to gain higher corn yields must be accounted for in biofuel pathways. A UN Energy report concluded that "In general, crops that require high fossil energy inputs (such as conventional fertilizer) and valuable (farm) land, and that have relatively low energy yields per hectare, should be avoided..."[12] Corn-based ethanol clearly meets all of these prohibitive criteria; corn uses the most conventional fertilizer,[13] requires the highest quality farmland,[14] and yields little energy per acre planted.[15]
- The ISOR identifies "Uncertainties associated with the nitrogen cycle. Stakeholders have commented that significant uncertainty exists in the estimates for N2O release used in lifecycle analysis models such as GREET. The non-trivial

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[6] *See*, Jacobson, Mark, "Addressing Global Warming, Air Pollution Health Damage, and Long-Term Energy Needs Simultaneously," Dept. of Civil and Environmental Engineering Stanford University, May 9, 2006, p. 5-6, http://www.stanford.edu/group/efmh/jacobson/

[7] Jacobson, Mark, "Addressing Global Warming, Air Pollution Health Damage, and Long-Term Energy Needs Simultaneously," p. 5-6.

[8] *See* Leo Petrilli, "Biodiesel and diesel chemicals in comparison," http://healthandenvironment.org/articles/doc/2883

[9] Boswell, Dr. Andrew; Ernsting, Almuth; Rughani, Deepak, "Agrofuels threaten to accelerate global warming," Biofuelwatch, Updated Dec. 2007, *UNFCCC, Bali version*, p. 1, http://www.biofuelwatch.org.uk/docs/biofuels-accelerate-climate-change.pdf

[10] Widenoja, Raya, "Destination Iowa: Getting to a Sustainable Biofuels Future," Worldwatch Institute, Oct. 2007, p. 13, http://www.sierraclub.org/energy/biofuels/iowa/IowaBiofuelsReport.pdf

[11] Boswell, p. 3.

[12] UN Energy, p. 50.

[13] "Of the potential feedstocks, the greatest application rates of both fertilizer and pesticides per hectare are for corn." *Water Implications of Biofuels Production in the United States*, Committee on Water Implications of Biofuels Production in the United States, National Research Council, p.3-4, http://www.nap.edu/catalog/12039.html.

[14] "Many of the crops currently used as biofuel feedstock require high-quality agricultural land and significant inputs of fertilizers, pesticides, and water." UN Energy, p. 35.

[15] Each acre of corn yields not enough ethanol to even fill-up twice for an SUV. Kelly, William J., "Driving Under the Influence: The ethanol lobby buys its way into the California Legislature," *Los Angeles City Beat*, Aug. 23, 2007, http://www.lacitybeat.com/article.php?id=6043&IssueNum=220

impact of N2O emissions on the direct carbon intensity calculated by GREET and the large uncertainty in actual measurements of N2O emissions suggests we need more research in this area."[16]

- Biofuels needs for new infrastructure and transport. There are many additions to the cumulative emissions of a given fuel necessitated by its needs for new infrastructure, distribution, and transport. Energy is required for post-harvest value-added activities such as processing, packaging, and transport.[17] A full lifecycle analysis for a fuel will need to account for all factors in a biofuel facility, including the properties and energy efficiency of a feedstock chosen; proximity to carriers, blenders, processors and end markets; and company objectives, such as whether the fuel will generate local energy versus production for export.[18] Accounting for emissions in the creation of unknown and un-quantified distribution channels is a serious challenge, requiring the creation of new infrastructure, such as the coordination of a new system of E85 pumps.[19] For regional dedicated vehicle fleets running on E100 and B100 (i.e. pure ethanol and biodiesel) as well as on bio-compressed natural gas (CNG) or bio-SNG, additional investments in gas station pumps will be required.[20] Ethanol must be distributed separately from gasoline, creating a whole separate transportation path of emissions, and not blended until just before delivery to fuel stations.[21] Gaseous biofuels require processing plants for gas cleanup, carbon dioxide removal, and compression,[22] infrastructure that must be quantified into an emissions factor as well both in construction and during processing use.

Executive Order S-01-07 directs ARB to measure the LCFS on "a full fuels cycle basis" to "reduce emissions of greenhouse gases, criteria pollutants, and toxic air contaminants," and it is of critical importance to not ignore known contributions of GWI along a particular fuel's lifecycle. To ignore values will artificially deflate the fuel's overall GWI, thus obstructing the realization of actual GHG reductions. We recommend overestimating emissions contributions in times of scientific or pathway uncertainty.

ARB Staff's Co-product Deduction Methodology Results in Artificially Deflated GWI Values

We oppose ARB Staff's methodology of subtracting emissions generated during the production of co-products as falsely deflating the GWI value of a given fuel. The ISOR states:

> "For a current generation ethanol plant, a co-product produced is dry distiller's grain soluble (DDGS). This *can be* used as a replacement for traditional feed for livestock. A complete lifecycle analysis requires an appropriate GHG credit be provided to the pathway since the use of this co-product *will displace the need to produce* the displaced product. For corn ethanol, DDGS *could* replace feed corn that is used as animal feed. The model therefore has provided a GHG credit to the pathway equivalent to producing 1 lb. of feed corn for every lb. of DDGS produced."[23]

The logic behind either co-product credit approach, Displacement ("where co-products from a pathway avoid the production of this from another source or replace the need for an equivalent product") or Allocation by attribute ("products of the most value allocated the most burden in the pathway" measured by market value), can underestimate emissions actually generated or purportedly reduced. First, the generation of a co-product does not necessarily lessen the GHG emissions during a particular fuel's lifecycle in reality. The emissions generated during the co-products' production are still occurring as a direct result of the fuel's generation, and just because the co-product is being generated incident to fuel production does not mean that the co-product *will* avoid production elsewhere even if it "*could* replace feed corn." For example, if animal feed is generated in tandem with corn-based ethanol, it is not

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[16] ISOR, IV-48.
[17] UN Energy, p. 26.
[18] *See*, UN Energy, p. 13.
[19] UN Energy, p. 20.
[20] UN Energy, p. 18.
[21] UC Berkeley Policy Report, p. 40.
[22] UN Energy, p. 18.
[23] ISOR, IV-12 (emphasis added).

necessarily "displacing" the production of animal feed elsewhere; it is merely adding additional feed to the market, and may cause additional emissions. This is particularly so considering new evidence about the negative effects of corn ethanol regarding antibiotic resistant bacteria growth in ethanol refineries and distillers grains causing increases in E. coli 0157 in the guts of cows.[24] The ISOR also states that "[i]n fact, DDGS appears to face significant barriers to widespread adoption as a replacement for corn and soybean meal."[25] In order to justify subtracting the emissions from a co-product's generation from the GWI value of a fuel, the fuel provider would have to somehow guarantee prevention against the generation of an equal amount of emissions elsewhere in the co-product's market.

Second, allowing co-product credits, (even if it is "discounted" by a percentage for the "new market effect"), artificially deflates a given fuel's GWI value making it appear as if the fuel is "cleaner" than it actually is. The danger of this co-product methodology was evidenced when Dr. Caswell with the University of Nebraska presented his BESS model at the January 17, 2008 LCFS workshop, asserting that within his model, "Co-product credits represent 20-40% of life-cycle GHG emissions." Only through the allowance of such a high ratio of co-product credit was Dr. Caswell able to calculate that "Compared to gasoline, typical USA corn-ethanol systems reduce GHG emissions by an average of 43-58%, but the full range is 17-65% due to different biorefinery designs, energy sources, and crop production practices." As was noted at the workshop, his model fails to include emissions from criteria and toxic pollutants and any land use change values at all, and thus, his GWI calculations fail for these reasons as well. Fundamentally, however, co-product credits should not be allowed to manipulate the GWI value of a given fuel when they do not reflect "real," "verifiable," nor "quantifiable" emissions reductions, as required under § 38562(d)(1) of AB32.

Third, awarding co-products credit in the default value of a fuel assumes that all fuel providers of that particular fuel engage in equivalent co-product generation as well. For example, the ISOR estimates that "new plants are projected to be dry-mill only" and that "newer plants in operation or under construction in California are energy efficiency, maximize co-product value, and produce lower-carbon-intensity ethanol."[26] Thus, a producer of corn-based ethanol would benefit from the assumption in corn-based ethanol's default value that it was "maximizing co-product value," when it is not in fact doing so, falsely reflecting the GWI of its fuel. Meanwhile, an ethanol company that was actually producing more animal feed than the default assumption would be given the option of providing a "better value for its feed" and awarded an even lower GWI value for its ethanol, again, not reflecting actual emissions reductions in the real world if it was merely adding more feed to the market.

Fourth, if the same logic in awarding co-product credits were applied across the board, then the increased GHG emissions caused by biofuel expansion should not only be reflected in land use change values (which only account for the change in the land say, to deforestation), but should also account for

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[24] *See*, Steil, Mark, "Antibiotics pose concern for MN ethanol producers," *Forbes.com*, Apr. 4, 2009, http://www.forbes.com/feeds/ap/2009/04/04/ap6255845.html; http://minnesota.publicradio.org/display/web/2009/03/24/distrillersantibiotics/; http://minnesota.publicradio.org/display/web/2008/10/17/e_coli/; *see also*, The ISOR recognizes that there may be "[r]educed enteric fermentation in livestock fed with distillers grains. Stakeholders have commented that a recent report from Argonne National Laboratory indicates that use of distillers grains as livestock feed reduces enteric fermentation. ARB staff has not included an emissions adjustment for reduced enteric fermentation but will continue to analyze relevant scientific studies and make appropriate adjustments in the future if deemed necessary." IV-48.

[25] ISOR, IV-46.

[26] ISOR, III-2.

the increased emissions from increased crop production. For example, in the case of corn-based ethanol, where to "feed the ethanol machine, farmers planted almost 93 million acres of corn in 2007, a 19 percent increase over the previous year"[27], the 19% increase in production of corn, and all of the associated GHG emissions during production, should be factored into corn-based ethanol's GWI value as well. Or, a "displacement" method could be adopted, where if the "134 ethanol plants now in operation [in 2008] consume close to 1.6 billion bushels of grain, about 15 percent of our total corn production"[28], then ethanol's default value should be charged the 15% displacement (or adjusted percentage) of corn production, causing corn production elsewhere. Thus, in order to reflect the reality of corn-based ethanol production, its GWI value should reflect direct emissions, the emissions from causing land use changes (which mostly account for the loss of carbon sinks only), *and* the increased emissions from corn production on that changed land that would not be in production were it not for the market-price incentives of turning food into fuel.

Expanded Biofuel Production Threatens Water Supply

Water availability, use, and shortage is a considerable factor and limitation on agricultural biofuel production to be evaluated in a fuel's lifecycle analysis,[29] particularly considering the great regional differences of water supply, increased demand for irrigation with expanded bioethanol production, competing residential, industrial and other agricultural uses as population grows, and droughts already exacerbated by global warming. All of these factors should be thoroughly addressed *before* implementation of the LCFS and not after when it will be too late. The ISOR identifies that: "A refinery that produces 100 million gallons of corn ethanol uses as much water as a town of 5,000. More intensely managing land to improve yields may also exacerbate water quality problems: soil erosion along with fertilizer and pesticide runoff can increase as crop management intensifies (68, 69). Bringing non-agricultural lands into production can also increase erosion and runoff." We submit the following list of additional considerations:

- Officials in Tampa, Florida, got a surprise recently when a local firm building the state's first ethanol-production factory put in a request for 400,000 gallons (1.5m litres) a day of city water. The request by US Envirofuels would make the facility one of the city's top ten water consumers overnight, and the company plans to double its size. Florida is suffering from a prolonged drought. Rivers and lakes are at record lows and residents wonder where the extra water will come from.[30]
- States such as water rich Minnesota and Iowa complain that the ethanol industry is mining their groundwater, causing some plants to be closed because the groundwater supply has been so depleted. In many places in California, especially in the San Joaquin Valley, the ground has already subsided many feet because of groundwater mining... Approximately 14 percent of the U.S. corn crop is irrigated and this irrigated acreage consumes almost 18 million acre-feet per year of water—much of which is overdrafted from the Ogallala aquifer in the Great Plains. To put this water requirement in perspective, the average annual flow of the Colorado River at Lee's Ferry is only about 14 million acre-feet per year. Almost all of California's agriculture is dependent on irrigation. Diverting millions of gallons of water from California farms to ethanol will disrupt the nation's food supply for growing since corn is a very water intensive crop, and it will also add to the problem of pesticide and fossil fuel fertilizer run-off polluting our waterways. Shifting our valuable

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[27] Meigs, James B., "The Ethanol Fallacy: Op-Ed," *Popular Mechanics*, Feb. 2008, http://popularmechanics.smartmoney.com/science/earth/4237539.html?series=46

[28] Meigs, 2008.

[29] *See*, UN Energy, p. 47.

[30] "Water-loving greens chafe at ethanol," *The Economist*, Feb. 28, 2008, http://www.economist.com/world/unitedstates/displaystory.cfm?story_id=10766882&CFID=14231797&CFTOKEN=bb64624d0f2f920a-A02D6C06-B27C-BB00-01297CB597365EE8; *see also*, "Ethanol: By the Way, You'll Need Water," *Solveclimate.com*, Mar. 11, 2008, http://solveclimate.com/blog/20080311/ethanol-way-youll-need-water

farmland from vegetables to mono-cropping corn is already happening in Kern County. If all the vehicles in California operated on E85… the ethanol required would consume 70 percent of the entire U.S. corn crop...[31]

- "Corn is a very water-intensive crop—one estimate puts usage at 20,800 gallons per bushel—and additional demand could stress Iowa's water systems… In neighboring Nebraska, which is drier, the increased acreage in corn is contributing to the depletion of aquifers and brewing a political conflict with Kansas, with which it shares a river and aquifer system."[32]
- Water deliveries from the Colorado River to the desert growing area in CA are expected to be cut back due to the persistent drought in the Southwest.[33]
- Typical ethanol plants consume 4 to 5 gallons of water per gallon of ethanol produced. That doesn't even count the water used to grow the crops, or the groundwater that is polluted by pesticide runoff. No wonder a recent National Research Council report found that if ethanol production keeps growing, "the effect on water quality could be considerable, and water supply problems could develop."[34]
- If biofuel feedstock production competes for water supplies, it could make water less readily available for household use, threatening the health status and thus the food security status of affected individuals.[35]
- Severe water shortages are already occurring at the local level, particularly in the Near East and North Africa. Agriculture currently uses 70% of the world's (and 85% of the developing world's) available fresh water, primarily for the production of food and non-food raw material… ¾ of the world's irrigated land is in developing countries, where it accounts for about 20% of all agricultural land and provides about 40% of all crop production.[36]
- If projected future increases in the use of corn for ethanol production do occur, the increase in harm to water quality could be considerable. Expansion of corn on marginal lands or soils that do not hold nutrients can increase loads of both nutrients and sediments.[37]
- There are likely to be significant regional and local impacts where water resources are already stressed. The water resource is already stressed in many agricultural areas. For example, large portions of the Ogallala (or High Plains) aquifer, which extends from west Texas up into South Dakota and Wyoming, show water table declines of over 100 feet. Deterioration in water quality may further reduce available supplies. Increased biofuels production adds pressure to the water management challenges the nation already faces.[38]
- Colorado River reservoirs are at their lowest levels in about 40 years. And overirrigation in areas such as the San Joaquin Valley of California has led to salinization of the soils. This should be kept in mind when utilizing today's water use as a baseline for comparison of future water-availability scenarios.[39] It seems likely that biofuels will push into a number of other regions, including regions that currently support little agriculture. Biofuels expansion beyond current irrigated agriculture, or even current agriculture in general, especially into dry western areas, has the potential to dramatically affect water use in such areas. The actual impact would be crop specific, and would be especially great where irrigation is introduced to an area that previously did not employ it.[40]
- The large recent increases in U.S. corn acreage have already led to increased rates of N and P loading into surface and groundwaters. If projected future increases in use of corn for ethanol production do occur, the increase in harm to water quality could be considerable.[41]
- Fertilizers applied to increase agriculture yields can result in excess nutrients (nitrogen [N] and to a lesser extent, phosphorous [P]) flowing into waterways via surface runoff and infiltration to groundwater. Nutrient pollution can have significant impacts on water quality. Excess nitrogen in the Mississippi River system is known to be a major cause of the oxygenstarved "dead zone"… Corn, soybeans, and other biomass feedstocks differ in current or proposed rates of

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[31] Anthony, Juliette, "Corn Ethanol & its Unintended Consequences for California," Sept. 10, 2007, http://www.renewableenergyaccess.com/rea/news/story?id=49878

[32] Widenoja, p. 10.

[33] Kelly, 2007.

[34] Romm, Joseph, "The fuel on the hill," Dec. 20, 2007, http://www.salon.com/news/feature/2007/12/20/biofuel/print.html, *citing*, EPA, "Regulatory Impact Analysis: Renewable Fuel Standard Program," Assessment and Standards Division, Office of Transportation and Air Quality, Apr. 2007, http://www.epa.gov/otaq/renewablefuels/420r07004chap5.pdf

[35] UN Energy, p. 33.

[36] UN Energy, p. 47.

[37] *Water Implications of Biofuels Production in the United States*, p. 45.

[38] *Water Implications of Biofuels Production in the United States*, p. 2.

[39] *Water Implications of Biofuels Production in the United States*, p. 14.

[40] *Water Implications of Biofuels Production in the United States*, p. 15.

[41] *Water Implications of Biofuels Production in the United States*, p. 25.

application of fertilizers and pesticides. One metric that can be used to compare water quality impacts of various crops are the inputs of fertilizers and pesticides *per unit of the net energy gain* captured in a biofuel. Per unit of energy gained, biodiesel requires just 2 percent of the N and 8 percent of the P needed for corn ethanol. Pesticide use differs similarly. Low-input, high-diversity prairie biomass and other native species would also compare favorably relative to corn using this metric.[42] ... regionally the highest stream concentrations occur where the rates of application are highest, and that these rates are highest in the U.S. "Corn Belt." These stream flows of nitrate mainly represent application to corn, which is already the major source of total N loading to the Mississippi River.[43]

- All else being equal, the conversion of other crops or non-crop plants to corn will likely lead to much higher application rates of nitrogen (Figure 3-1). Given the correlation of nitrogen application rates to stream concentrations of total nitrogen, and of the latter to the increase in hypoxia in the nation's waterbodies, the potential for additional corn-based ethanol production to increase the extent of these hypoxic regions is considerable. Since the dead zone in the Gulf of Mexico is already on the order of 10,000 square kilometers, the economic stakes are high.[44]
- In addition to the water required to grow crops, biofuel facilities require significant process water.[45] All biofuel facilities require process water to convert biomass to fuel. Water used in the biorefining process is modest in absolute terms compared to the water applied and consumed in growing the plants used to produce ethanol. However, because this water use is concentrated into a smaller area, its effects can be substantial locally. A biorefinery that produces 100 million gallons of ethanol per year would use the equivalent of the water supply for a town of about 5,000 people. Consumptive use of water in biorefineries is largely due to evaporation losses from cooling towers and evaporators during the distillation of ethanol following fermentation.[46] Current estimates of the consumptive water use from these facilities are in the range of 4 gallons of water per gallon of ethanol produced (gal/gal) (Pate et al., 2007). For perspective, consumptive water use in petroleum refining is about 1.5 gal/gal (Pate et al., 2007). Overall water use in biorefineries may be as high as 7 gal/gal, but this number has been consistently decreasing over time and as of 2005 was only slightly over 4 gal/gal in 2005 (Phillips et al., 2007). Thus for a 100 million gallon per year plant, a little over 400 million gallons of water per year would be withdrawn from aquifers or surface water sources (1.1 million gallons per day).[47]

The Proposed Default & Opt-in System Will Undermine the Achievement of "Real" Emission Reductions

We oppose averaging of values that may in effect ignore important emissions factors in a fuel's pathway. We support the most accurate assessment of total emission impacts as possible. The ISOR states: "The first method, referred to as Method 1, establishes default values for a number of specified fuel pathways. Regulated parties may choose to use the default pathways to calculate credits and deficits."[48] We oppose the adoption of default emission estimates as "poor surrogates for actual measurements. With margins of error ranging from fifty percent to one hundred percent, emissions factors are highly uncertain, making claimed emission reduction difficult to verify. They can readily be adjusted to report emissions as being higher or lower, since at best they represent educated guesses of actual emissions.[49]" Thus, to the maximum extent feasible based upon the "most accurate" and "best available" climate science available, we recommend that ARB measure actual emissions of each fuel provider versus an averaging system. If ARB chooses to adopt a default estimate system, we recommend that default values should be as "pessimistic" as possible.

Also, we oppose the proposal to allow the Executive Officer to amend and approve subsequent amendments to the default "Lookup Table" at will. "The proposed regulation establishes that the

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[42] *Water Implications of Biofuels Production in the United States*, p. 3-4.
[43] *Water Implications of Biofuels Production in the United States*, p. 21.
[44] *Water Implications of Biofuels Production in the United States*, p. 23.
[45] *Water Implications of Biofuels Production in the United States*, p. 34.
[46] *Water Implications of Biofuels Production in the United States*, p. 4-5.
[47] *Water Implications of Biofuels Production in the United States*, p. 35.
[48] ISOR, ES-14.
[49] Drury, Richard; Belliveau, Michael, et. al, "Pollution Trading and Environmental Injustice: Los Angeles' Failed Experiment in Air Quality Policy," *Duke Environmental Law & Policy Forum*, Vol. 9:231, Spring 1999, p. 259-260.

Executive Officer may approve subsequent amendments to the Lookup Table after a specified public process… Following a formal public review process as identified in the regulation, the Executive Officer may approve additional carbon intensity values to be added to the Lookup Table."[50] The proposed regulatory language grants the Executive Officer the authority to "add to the Lookup Table any new carbon intensity values and their associated pathways, either at the Executive Officer's initiative or Executive Officer approval of a new fuel and pathway proposed by a regulated party pursuant to Method 2A or 2B."[51] First, we note that there is no prior legal authority or precedent to grant the Executive Officer such unilateral regulatory authority. Second, we note the great magnitude of discretion that this new and novel proposal would grant to the Executive Officer.

> "A regulated party that proposes to use Method 2A or 2B bears the sole burden of demonstrating to the Executive Officer's satisfaction, that the proposed method is scientifically defensible… For each of its transportation fuels for which a regulated party is proposing to use Method 2A, the regulated party must demonstrate, to the Executive Officer's satisfaction, that the proposed Method 2A meets both of the [] substantiality requirements…"[52]

> "To account for indirect effects, including land-use changes, regulated parties using Method 2A or 2B would need to petition the Executive Officer to conduct the appropriate modeling analysis as set forth in the LCFS regulation. The results of these analyses will be added to the applicable carbon intensity values in the Lookup Table."[53]

> "Alternately, the regulated party could use the standard Lookup Table value for CARBOB, gasoline, or diesel for fuel derived from non-high carbon intensity crude oil, but only if the regulated party can demonstrate to the Executive Officer that its crude production and transport carbon-intensity value has been reduced to a specified level and meets other specified criteria. To this end, staff is proposing that any regulated party, using a high carbon-intensity crude oil (> 15 g CO2e/megajoule) brought into California that is not already part of the California baseline crude mix, would have to report and use the actual carbon intensity for that crude oil unless the party demonstrates that it has reduced the crude oil's carbon intensity below 15 g CO2e/megajoule using carbon-capture-and-sequestration (CCS) or other method. Upon this demonstration, the regulated party would be permitted to use the average carbon intensity value for the California baseline crude mix (i.e., crude oils currently used in California refineries)."[54]

Because the "carbon intensity values represent the currency upon which the LCFS is based,"[55] the proposed regulation would enable one individual the Executive Officer to essentially pick fuel winners and losers based upon widely varying data determining significant impacts such as land use change. Already ARB staff is picking winners and losers every day as they pick which values to employ among competing self-interests. For instance, the ISOR describes that in computing one input "ARB staff and GTAP modelers assume that 25 percent of the carbon stored in the soil is released when land is cultivated. **We *believe* this value is a *reasonable* compromise given the variability in data** (emphasis added)."[56] When there are marginal differences in values between particular fuels on the Lookup Chart, we believe the ARB invites financial incentives for fraud, being flooded with opt-in values to get under the baseline, and the agency having to make a "compromise" situation, subject to competition from new

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[50] ISOR, ES-14; *see also*, "Under specified conditions, regulated parties may also obtain Executive Officer approval to either modify the CA-GREET model inputs to reflect their specific processes (Method 2A) or to generate an additional pathway using CA-GREET (Method 2B)." ISOR, V-25.
[51] ISOR, A-41.
[52] ISOR, A-45.
[53] ISOR, IX-4.
[54] ISOR, V-25.
[55] ISOR, ES-13.
[56] ISOR, IV-47.

fuel challengers.[57] The proposed LCFS regulation worsens this dynamic by affording the discretion to make these "compromise" decisions in one individual, even if it is after a public review process.

Third, we note that the agencies' new "nimbleness"[58] in not having to go to the ARB Board for approval for each new or changed value to the pathway would be at the expense of any consistency for regulated parties to base their investment decisions upon.[59] The default values could change drastically at any time after "a minimum 30-calendar day, public review process,"[60] or not at all until 2012 when the Executive Officer decides the "exact scope and content" of the first review of implementation of the LCFS program.[61] This is a critical point when many of the proposed default fuel values have marginal differences, and any one change to a relatively significant input for that particular fuel's pathway could easily push a fuel over the gas or diesel baseline edge wiping out its investments overnight. For instance, the simple switch of methodologies to account for release of emissions over time when there is a land use change, from the amortization to the Fuel Present Value method, as ARB staff contemplates, this one input change would push all but one of the eleven corn-based ethanol pathways as worse than gasoline in the first compliance year. Such a dynamic would risk billions of dollars of wasted investments in what is a critical time to reshape the new energy future in a coordinated and complementary manner.

ARB Staff's Proposed Default Values Underestimate Emissions from Land Use Change

The ISOR states:

> "As part of the LCFS, ARB has committed to determining the total direct and indirect emissions associated with production, distribution, and use of all fuels through conducting complete lifecycle analyses based on the best available science. Although one may argue that there is no scientific consensus as to the precise magnitude of land use change emissions and that the methodologies to estimate these emissions are still being developed, scientists generally agree that the impact is real and significant. Our analyses support this conclusion. We believe that we have conducted a fair and balanced process for determining reasonable values for land use change carbon intensity and

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[57] *See e.g.*, "The Ethanol Scam: One of America's Biggest Political Boondoggles," *Rolling Stone*, http://www.rollingstone.com/politics/story/15635751/ethanol_scam_ethanol_hurts_the_environment_and_is_one_of_americas_biggest_political_boondoggles/1; "Driving Under The Influence: The ethanol lobby buys its way into the California legislature," *Los Angeles City Beat*, http://www.lacitybeat.com/cms/story/detail/?id=6043&IssueNum=220; "Critics charge ex-official uses influence to drive alternative energy policy," *Mercury News* , Dec. 4, 2007, http://www.mercurynews.com/vc/ci_7630212

[58] *See e.g.*, "The Lookup Table contained in the proposal is intended to be a 'living document,' representing the starting point for carbon intensity values and specific fuel pathways. However, the proposal contains provisions for regulated parties to generate modified or additional fuel pathways with associated carbon intensity values; these provisions are intended to accommodate innovations in producing lower carbon intensity fuels in the future. As these modified or additional fuel pathways are approved by the Executive Officer in a public process, the modified or additional approved carbon intensity values will become incorporated into the Lookup Table." ISOR, V-2.

[59] *See,* ISOR, V-25.

[60] *See*, ISOR, A47.

[61] "The Executive Officer will conduct a review of the implementation of the LCFS program by January 1, 2012. The review may cover areas impacting the design and enforcement of the LCFS regulation, such as the gasoline and diesel average carbon-intensity requirements; data and other information used for the carbon intensity lookup table and vehicle energy economy ratios; availability of biofuels and advanced vehicle technologies; and lifecycle and land-use change models, methods, and data. Special attention will be focused on indirect land use change… The exact scope and content of this review will be determined by the Executive Officer. Although not specified in the proposed regulation, staff intends to review the LCFS regulation approximately every three years after January 1, 2012." ISOR, V-36.

we will continue to investigate many of the issues presented above through discussion with stakeholders and analysis of current and new scientific data."[62]

We believe that ARB staff has grossly underestimated land use change values in its proposed default Lookup Table,[63] and due to the admitted scientific uncertainty, the proposed fuel pathways are not ripe for ARB Board adoption. In explaining ARB's proposed land use change values at the January 30, 2009 LCFS workshop, ARB staff stated that we "would see higher carbon intensities if [ARB staff] just followed peer-reviewed numbers," and "to be honest some numbers were higher, but [staff] thought that this was a compromise." However, such compromises blatantly ignores ARB's legal requirement to ensure that emissions reductions are "real" when default values are falsely deflated from the outset. Even ignoring tropical deforestation, initial estimates by UC Berkeley presented at the January 2008 LCFS workshop calculated that corn-based ethanol would be 2.4 times worse than gasoline if corn grown on CRP land is used for ethanol. Including indirect land use changes from tropical deforestation, UC Berkeley estimated that corn-based ethanol could be 6 times worse than gasoline. In the February 2008 peer-reviewed LUC study, Searchinger found that "Projected corn ethanol in 2016 would use 43% of the U.S. corn land harvested for grain in 2004—overwhelmingly for livestock—requiring big land use changes to replace that grain."[64] In a more recent study, a researcher found that "between 1980 and 2000, more than half of new cropland came from intact rainforests and another 30 percent from disturbed forests," by analyzing 600 satellite images from the FAO and other organizations.[65] "What we found was that indeed forests were the primary source for new croplands as they expanded across the tropics during the 1980s and 1990s. So cropland expansion, whether it's for fuel, feed or food, has undoubtedly led to more deforestation, and evidence is mounting that this trend will continue."[66] While true that the above studies did not employ the GTAP model,[67] ARB staff's chosen methodology to assess land use change, the ISOR reveals by its own admissions that ARB's land use change assessment is an incomplete analysis. For instance, ARB staff chose to use the "annualized" method to account for GHG emissions that occur over time such as land use change from biofuel production.[68] Even though the Staff Report knows that the GHG emissions happen over a period of years where

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[62] ISOR, IV-48.

[63] Searchinger, Timothy, et. al., Princeton University, "Use of U.S. Croplands for Biofuels Increases Greenhouse Gases Through Emissions from Land Use Change," *ScienceExpress*, Feb. 7, 2008; *see also*, Fargione, Joseph, The Nature Conservancy, et. al., "Land Clearing and the Biofuel Carbon Debt," *ScienceExpress*, Feb. 7, 2008; "Biofuels deemed a greenhouse threat," *New York Times* (cover story), Feb. 8, 2008, http://www.nytimes.com/2008/02/08/science/earth/08wbiofuels.html?_r=2&pagewanted=1&hp; "The Clean Energy Scam," *Time*, Mar. 27, 2008, http://www.time.com/time/magazine/article/0,9171,1725975,00.html; "Studies Say Clearing Land for Biofuels Will Aid Warming," *The Washington Post*, Feb. 8, 2008, http://www.washingtonpost.com/wp-dyn/content/article/2008/02/07/AR2008020704230.html; "Corn Can't Save Us," *St. Louis Post-Dispatch*, Mar. 18, 2008; "Top scientists warn against rush to biofuel," *Guardian News, UK*, Mar. 25, 2008, http://www.guardian.co.uk/environment/2008/mar/25/biofuels.energy1

[64] Searchinger, Timothy, et. al., Princeton University, "Use of U.S. Croplands for Biofuels Increases Greenhouse Gases Through Emissions from Land Use Change," *ScienceExpress*, Feb. 7, 2008.

[65] "Biofuels Boom Could Fuel Rainforest Destruction, Researcher Warns," *ScienceDaily*, Feb. 14, 2009, http://www.sciencedaily.com/releases/2009/02/090214162758.htm; *see also*, "New satellite photos show Amazon deforestation exploding," *McClatchy Washington Bureau*, Jun. 4, 2008, http://www.mcclatchydc.com/255/story/39634.html

[66] "Biofuels Boom Could Fuel Rainforest Destruction, Researcher Warns," *ScienceDaily*, Feb. 14, 2009, http://www.sciencedaily.com/releases/2009/02/090214162758.htm

[67] We note that the GTAP model is limited by the 2001 baseline year, whereas Gibbs' study incorporates data from prior decades. "GTAP employs the 2001 world economic database as the analytical baseline. This is the most recent year for which a complete global land use database exists." ISOR, IV-19.

[68] *See*, ISOR, IV-27.

"larger emissions occur during the first few years, followed by declining releases,"[69] ARB staff chose the "annualization" method because it "is the simplest to apply: it does not depend upon the development of an emissions time profile."[70] The Staff Report states that "Staff will continue to analyze the FWP method, however, and may reconsider this decision after a more thorough analysis has been completed."[71] The choice of which time accounting method to use is critical considering that Table IV-7 reflects a pivotal range of land use change carbon intensity values based solely upon this factor. If Staff used the Fuel Warming Potential method over the same covered 30-year period as the annualization method, this factor alone would increase all but one of the proposed carbon intensity values for corn-based ethanol as worse than the baseline for gasoline on the default Lookup Table. Additionally, in order to arrive at the 30 gCO2e/MJ land use change value assessed for a corn-based ethanol pathway, ARB staff applied the "external adjustment for increase in corn yield,"[72] without accounting for increased use of fertilizers and pesticides to achieve that increased yield. Also, the "GTAP modelers assumed that no CRP land would be converted in response to increased biofuel demand... The staff is continuing to analyze the effects of including CRP land in the land pool used by the GTAP model."[73] Yet, the ISOR admits that "some CRP land has been released for cultivation," despite the assumption that "penalties for breaking CRP contracts are steep enough to prevent CRP lands from being used before their contracts expire."[74] This omission in LUC analysis is significant considering that the ISOR also identifies "contracts are currently expiring on two million acres due to provisions contained in the recent Farm Bill... If sufficient CRP land is not available to indirectly support an expansion of corn acreage, a large supply of non-CRP pasture land that was formerly in crops could be brought back into production."[75]

Considering that ARB staff is "committed to ensuring that all relevant inputs, factors, etc. necessary to compute the carbon intensities of the recommended pathways have been locked into the model and are invariant,"[76] and that potentially, after adoption the proposed "default Lookup Table" could remain invariant until the first proposed review of the LCFS in 2012,[77] it is imperative that ARB completes every aspect of its lifecycle analysis before Board approval that the carbon intensity values represent real reductions. In order for a LCA to reflect the reality of emissions generated, the ARB should account for direct, indirect, and cumulative land use change values to the greatest extent possible,[78] to protect against the possibility of advancing fuels that are worse than gasoline, undermining the entire

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[69] ISOR, IV-21.
[70] ISOR, IV-26.
[71] ISOR, IV-26.
[72] ISOR, IV-31.
[73] ISOR, IV-40.
[74] *Id.* We also note that the skyrocketing price of corn, due to numerous factors such as agrofuel expansion and oil price spikes causing the price of corn to reach $9/ bushel this past summer, abnegates ARB's assumption that CRP contracts will not be broken due to penalty costs.
[75] ISOR, IV-40.
[76] ISOR, IV-14.
[77] *See*, ISOR, ES-21.
[78] We note that we question the following assumption in the ISOR: "Not all biofuels have been linked to indirect land use change impacts. The use of corn stover as a feedstock for cellulosic ethanol production, for example, is not likely to produce a land use change effect. Feedstocks such as native grasses grown on land that is not suitable for agricultural production are unlikely to cause land use change impacts. Waste stream feedstocks such yellow grease, waste cooking oils and municipal solid waste, are also unlikely to lead to land use change impacts." ISOR, IV-17. Removing any plant cover, such as corn stover for cellulosic ethanol, changes soil composition and must be measured, while planting even native grasses on land not suitable for agricultural production still changes the land in the maintenance and removal of the feedstock.

LCFS program. California's contribution to land use change patterns will be particularly significant considering that much publicity has heralded California as "laying important groundwork for other states" in developing its LCFS, and having a leadership role on a global scale. The ISOR states that "At this time, ARB staff understands that the WCI is awaiting California's development of the LCFS regulation before the WCI establishes its regional regulation."[79] Thus, the significance of ARB staff's analysis cannot be understated and the importance of getting it right is amplified by California's leadership role directly influencing other states' and national policy. Considering the high stakes and high variability of land use change research, the ARB cannot afford an incomplete analysis of land use change emissions. We submit the following list of land use change implications for consideration:

- Indonesia has lifted a yearlong moratorium on the use of peatland forests by palm oil companies, a senior Agriculture Ministry official said Wednesday [Feb. 18, 2009] ... [80]
- [R]ising corn prices have led farmers to stretch their production capacity where they can and to work land that they might otherwise have put into the [Conservation Reserve Program]. Farming these lands not only causes more sediment loss, but also degrades already-critical water quality. Additionally, it means the loss of biodiversity, quality of life, and revenues from tourists, fishers, and hunters who enjoy Iowa's conservation lands... the efforts that went into reserve land programs and the creation of buffers along waterways could be lost in only a few years with indiscriminate farming practices. Not only could the investment be erased, but the yearly revenues generated by hunters and other outdoor tourists could fall... "Farmers are farming closer to the road and fences, and are now taking land out of conservation reserve programs because farming the land will pay landowners more..." In 2007, 500,000 (26 percent) of the 1.9 million acres enrolled in the Conservation Reserve Program (CRP) will be up for renewal, and it seems likely that many farmers will choose not to renew... meaning that a quarter or more of the CRP lands could go into production as soon as 2008.[81]
- Our concern is that any small reduction in greenhouse gas emissions from fossil fuel use due to agrofuel expansion will be at the expense of large increases in greenhouse gas emissions from deforestation, from other land-use change, nitrous oxide emissions, carbon emissions from the loss of soil organic carbon, peat fires and oxidation, and potentially the loss of major carbon sinks... A recent scientific symposium on the Amazon puts the probability of continued deforestation together with rising temperatures triggering large-scale Amazon rainforest dieback within the next few decades at 10-40%.[82]
- Commercial production of biofuels may target high-quality lands-due to better profit margins and high soil requirements of first-generation crops—such that biofuels as the "next big cash crop" will be grown on the best lands, leaving cereals and subsistence crops to the low-quality lands.[83]
- As long as there are no proven safeguards that agrofuel expansion will not trigger further deforestation or ecosystem destruction, the risks involved are far too high. Small-scale 'greenhouse gas savings' which can be measured in micro-studies do not outweigh the very real risk of triggering catastrophic forest die-back in the Amazon and elsewhere, which could cause massive carbon releases, trigger other irreversible climate feedbacks, and potentially disrupt rainfall patterns and thus agriculture over very large areas.[84]
- The Intergovernmental Panel on Climate Change estimate that soil carbon emissions have historically accounted for 55 billion tonnes of carbon. Soil carbon emissions vary according to soil type, climate and agricultural methods. One study estimates that, when land in temperate zones is converted from natural vegetation to crop land, emissions from the loss of soil organic carbon are around 3 tonnes per hectare, but far higher on peaty soils. A 2006 Wells-to-Wheels study by

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[79] ISOR, X-4.

[80] "Indonesia opens peatland forests for palm oil," *The Associated Press*, Feb. 18, 2009, http://www.thejakartapost.com/news/2009/02/18/indonesia-opens-peatland-forests-palm-oil.html; *see also*, "Once a Dream Fuel, Palm Oil May Be an Eco-Nightmare," *New York Times*, Jan. 31, 2007, http://www.nytimes.com/2007/01/31/business/worldbusiness/31biofuel.html?_r=1; "How the palm oil industry is Cooking the Climate," *Greenpeace*, Nov. 8, 2007, http://www.greenpeace.org/international/press/reports/palm-oil-cooking-the-climate

[81] Widenoja, p. 11.

[82] Boswell, p. 2.

[83] UN Energy, p. 34.

[84] Boswell, p. 5.

the Joint Research Council of the European Union... states: 'We already warned that increase of arable area would cause loss of soil organic carbon from grassland or forest: we assume it will not be allowed.'[85]

- According to figures contained in the most recent IPCC Assessment Report Four, emissions from degraded peatlands have exceeded those from deforestation in the period since 1990. Peat destruction is most rapid and extensive in south-East Asia, with Indonesia alone holding 60% of all tropical peatlands in the world. Palm oil expansion is particularly rapid in the peatland areas of both Indonesia and Malaysia, and scientists expect that nearly all of the peat will be drained, mostly for plantations, in coming years or decades. This will eventually lead to the emission of virtually all the carbon held in South-east Asia's peat – 42-50 billion tonnes, which is the equivalent of around six years of global fossil fuel emissions. The Indonesian government is planning a 43-fold increase in palm oil production, largely in response to the growing global demand for agrofuels, with around 20 million hectares more land to be converted to oil palm plantations, as well as further concessions for sugar cane and jatropha for agrofuels. A [] study by Wetlands International, Delft Hydraulics and Alterra estimates that one tonne of biodiesel made from palm oil from South-east Asia's peatlands is linked to the emission of 10-30 tonnes of carbon dioxide. Once emissions from peat fires and the loss of carbon sink capacity are taken into account, we estimate that one tonne of palm oil biodiesel from South-east Asia would therefore have 2-8 times more life-cycle carbon emissions than the amount of mineral diesel it replaces. South-east Asia's peatlands are one of the largest single carbon sinks worldwide, and their destruction is one of the largest single sources of carbon emissions worldwide – with the emission of up to 2.57 billion tonnes of carbon having been released in the worst fire season so far.[86]
- In September 2006, NASA published a study which showed that the rate of Amazon deforestation correlates with the price of soya. Agrofuel expansion is likely to push up the price of soya, both by creating additional demand for soya biodiesel and by US farmers switching from soya production to corn for ethanol. The Amazon forest holds an estimate 100-120 billion tonnes of carbon, equivalent to 13-15 years of global fossil fuel emissions, and if it was destroyed or died back, it would dramatically increase global warming.[87]
- The expansion of soya, palm oil and sugar cane, however, is also linked to deforestation in many parts of Asia, Latin America and Africa, with disastrous consequences in terms of carbon emissions, loss of carbon sinks, and regional drying and warming trends. Soya expansion is linked to deforestation in the Brazilian Cerrado, the Pantanal, South America's Atlantic Forest and a portion of the Paranaense forest in Paraguay and North of Argentina. In Argentina, more than 500 thousand hectares of forest land were converted to soya plantations between 1998 to 2002. Sugar cane expansion is impacting on many forests, including the Amazon, the Pantanal, South America's Atlantic Forest, rainforests in Uganda, and in the Philippines. Palm oil is linked to large-scale deforestation in South-east Asia, Colombia, Ecuador, Brazil, Central America, Uganda, Cameroon and elsewhere... Primary forests in Indonesia have been found to hold 306 tonnes of carbon per hectare, whereas mature oil palm plantations hold 63 tonnes per hectare, but are not expected to survive more than 25 years at the most.[88]
- There is a historic precedent for rapid desertification linked to vegetation loss: Around 6,000 years ago, the southern part of the Sahara was covered in savannah and lakes. It appears that the ecosystem had withstood an initial shift towards a drier climate, caused by changes in the North Atlantic heat transfer, but later rapidly collapsed and turned into desert, after extreme weather events had reduced the vegetation below a certain threshold. [] This strongly suggests that the vegetation played a major role in attracting regular rainfall over the region and that the biosphere and the atmosphere are closely coupled. This evidence raises concerns not only over the direct destruction of the Amazon forest, but also over the conversion of the Cerrado, the Pantanal and other South American ecosystems to monoculture plantations, since those ecosystems could be crucial for drawing in rain clouds from the tropical Atlantic and feeding them into the Amazon basin by evapotranspiration. Ecosystems therefore maintain the climate not just by storing and sequestering carbon, but also by regulating convection, cloud formation and rainfall patterns.[89]
- Policy decisions should take into account of IPCC climate change predictions and must not be based on studies which fail to take these into account. The 2007 IPCC Summary for Policymakers predicts significant drying over large parts of northern and southern Africa, most of Brazil and parts of neighbouring countries, Chile and Argentina, Central America, large parts of Australia, the Middle East, Europe and Central Asia, with seasonal drying over much of South and South-east Asia. Together with temperature rises, those drying trends will inevitably reduce agricultural production in the very countries where monoculture expansion for agrofuels is being promoted most strongly... In Europe, per hectare yields of

[85] Boswell, p. 3.
[86] Boswell, p. 4.
[87] Boswell, p. 4.
[88] Boswell, p. 5.
[89] Boswell, p. 5.

oilseed rape have been falling for three years running because of 'extreme weather impacts' []. Climate change is expected to intensify those extreme weather trends. Falling per hectare yields will either lead to the expansion of cropland into land under natural vegetation, or to reduced output, or both.[90]

- There is a proven link between monoculture expansion and deforestation, and further deforestation can result in non-linear feedbacks which would be impossible to stop and which could, in the worst case, push global warming beyond human control and devastate agriculture and the lives of hundreds of millions of people. These are not risks that policymakers can afford to take. Those are not simply 'negative impacts' which can be reduced – they are not comparable to limited pollution over a small area, for example, which could be mitigated… The impacts of deforestation will be the same whether agrofuels are grown directly at the expense of primary forests, or whether they displace other types of agriculture into those forests. There is an established link between commodity prices and deforestation rates, and there are no credible proposals as to how this link can be broken. Nor can certification make monoculture expansion sustainable or 'climate friendly'.[91]
- Most of the world's arable land is already used for agriculture. Any attempt to replace a significant proportion of fossil fuels with agrofuels will greatly increase human pressure on the biosphere at a time when the extent of habitable and arable land is already shrinking due to global warming and fresh water depletion. The 2005 Millennium Ecosystem Assessment warned that 60% of global ecosystem services have been degraded or destroyed. According to G Huppes and E van der Voet of the University of Leiden, large-scale bioenergy expansion will inevitably reduce and eventually eliminate the space available for ecosystems and biodiversity.[92]
- Developing countries may lose 334 million acres of prime farm land to climate change in the next 50 years, scientists estimate. After mid-century, continuing temperature rises, expected to be nine degrees Fahrenheit or more by then, are expected to start adversely affecting northern crops as well, tipping the whole world into a danger zone, the authors say. "Many people assume that we will never have a problem with food production on a global scale. But there is a strong potential for negative surprises," said Francesco Tubiello, a physicist and agricultural expert at NASA's Goddard Institute of Space Studies who coauthored all three papers. Goddard is a member of Columbia University's Earth Institute. The authors say that existing research fails to account for seasonal extremes of heat, drought or rain, multiplier effects of spreading diseases or weeds, and other ecological upsets. All are believed to be more likely in the future due to climate change. In order to keep pace with population growth, current production of grain will probably have to double, to four billion tons a years before 2100, the authors say.[93]
- [S]tudies published [] demonstrate that these gains likely will be canceled by agricultural declines in the tropics, where even modest one to two degree rises are expected to evaporate rainfall and push staple crops over their survival thresholds.[94] The authors of the PNAS studies say that much previous research work is oversimplified, and as a consequence, the potential for bigger, more rapid problems remains unexplored. [95]
- Global production of biofuels alone has doubled in the last 5 years and will likely double again in the next 4. Among countries that have enacted new, pro-biofuel policies in recent years are Argentina, Australia, Canada, China, Colombia, Ecuador, India, Indonesia, Malawi, Malaysia, Mexico, Mozambique, the Philippines, Senegal, South Africa, Thailand, and Zambia.[96] Soaring palm oil demand may be leading industrialists in Southeast Asia to clear tropical forests for new plantation.[97]

ARB Should Maximize Public Disclosure of LCFS Compliance

The ISOR states that "Output reporting tools will provide regulated parties with access to their data. Our goal is to provide public access to summary reports of LCFS data and related information without disclosing confidential business information or trade secrets."[98] While the ISOR gave a brief overview of ARB's options to manage transactions, it does not propose which role ARB will fill. According to

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[90] Boswell, p. 5.
[91] Boswell, p. 6.
[92] Boswell, p. 6.
[93] "Warming Climate Undermines World Food Supply," *Environment News Service*, Washington, D.C., Dec. 3, 2007, http://www.ens-newswire.com/ens/dec2007/2007-12-03-05.asp
[94] *Environment News Service*, 2007.
[95] *Environment News Service*, 2007.
[96] UN Energy, p. 5.
[97] UN Energy, p. 7.
[98] ISOR, IX-3.

the earlier August 2007 UC Berkeley Policy Analysis Report, "Buyer and seller typically do not communicate the price of the allowance or any other information about the transaction to the regulators."[99] The ARB would "tend to be record keepers only" while "LCFS credit transactions may be with third parties" like many "firms [who] have entered the allowance trading market and provide services of various types including bringing buyers and sellers together in developing derivative products."[100] The effect of this would be to transfer the day-to-day operation of the LCFS from the ARB, who would be the record keepers only, to the regulated entities and third-party private firms for hire who may not have any interest in pollution reduction at all. Because only the buyer, seller, and/or anonymous third-party would know the price and details of trades, and the ARB records may only reflect cryptic serial numbers and summary reports, the effect of such a system would be to shut-out the public.

Pollution trading schemes have historically and strategically excluded the public, and even the very government agencies charged with the directive to regulate the pollution, from the decision-making process, effectively excluding the very communities that will be affected by industrial pollution.[101]

> In fact, the public faces numerous difficulties finding out what companies are trading to avoid compliance with pollution control standards… In this way, the democratic will, as represented in permit and regulatory requirements imposed after full public review and comment, can be reversed by a simple economic transaction.[102]

Public accountability is vital when pollution trading programs create strong incentives for regulated entities to manipulate numbers and cheat so long as fraudulently-created credits are still opportunities to profit.[103] The Los Angeles car-scrapping program was plagued by widespread under-reporting of *actual* emissions from industry and an over-reporting of *claimed* emissions reductions from cars, when pollution trading programs rely upon industry self-reporting of emission reductions.[104] Similarly, the UC Berkeley Policy Report identifies self-reporting of annual fuel sales as the principle mechanism of enforcement under the LCFS, and identifies "fraud in their handling" as "possible" because "LCFS credits are likely to be valuable[.]"[105] However, the UC Report's proposed solution, having the ARB serve as a record keeper only tracking serial numbers on accounts, does not address the over-arching concern for public accountability, when not even the ARB may know the details of the transactions. We oppose the UC Berkeley Policy Report's proposal to not communicate the price and transaction to the regulator.

In addition, we oppose the UC Berkeley report's assumptions about confidential business information. "Importantly, the Energy Commission holds confidential the data reported by individual companies under PIIRA. The Energy Commission aggregates the data to ensure confidentiality of information about individual companies. This may be important for the LCFS because data to certify the carbon intensity of fuels may be considered proprietary and would require the sort of handling that the PIIR program already provides."[106] If the CEC can handle CBI with requisite confidentiality protections the

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[99] p. 54.
[100] p. 54.
[101] Drury, p. 278-279.
[102] Drury, p. 278-279.
[103] Drury, p. 259.
[104] Drury, p. 259.
[105] p. 54.
[106] UC Berkeley Policy Report, p. 76.

ARB can as well. Not all fuel-providers, such as electricity, natural gas, and hydrogen, are presumably already registered and tracked in the Petroleum Industry Information Reporting Act (PIIRA), meant only for businesses that "ship, receive, store, process, and sell crude oil and petroleum products in California." Because the ARB will already be setting up record keeping accounts and will calculate and issue credits under a trading scheme, we would urge the ARB to take additional oversight over traded transactions to ensure compliance with AB32 requirements. We oppose a credit trading system for numerous reasons. However, if one is established, the ARB must provide additional oversight over the credit trading transactions and third parties so that the agency will know when proposed trades will disproportionately impact historically overburdened communities.

ARB Should Incorporate Wasted Investments In Its Evaluation of "Cost-effectiveness"

While ARB staff did evaluate "cost-effectiveness" by developing values for each compliance scenario modeled, their methodology ignores the substantial investments that will be wasted after it is eventually determined that a particular fuel type fails updated requirements, such as additional fuel specifications, sustainability criteria, etc. "Staff calculated cost-effectiveness values for each compliance scenario developed for the proposed regulation. The values were calculated for each compliance year for 2010 to 2020 and were determined by dividing the net compliance cost for the year by the total metric tons of CO2 equivalent expected to be reduced for the same year."[107] The ISOR identifies that "to accommodate the lower-CI fuels in the market, businesses will have to invest in the necessary infrastructure to produce, distribute, and dispense those fuels."[108] "The costs associated with the expected biorefineries in the State are borne by the investors of those facilities. These investors have risked capital with the expectation of being rewarded with profits commensurate with the risk."[109] While we agree with this assertion, ARB staff's proposed methodology to update fuel pathway values at inconsistent times, potentially causing a sporadic reshuffling of the default value deck will directly cause stranded investments that could be avoided. By excluding highly-polluting or questionable fuels with marginal GWI savings (e.g. agrofuels) from the outset, ARB would avoid these costly stranded investments from the outset as well, instead directing investments towards more sustainable lower-carbon alternatives and long-term emissions reductions goals.[110] The ARB also needs to consider issues of state indemnification and liability if fuels under the LCFS damage private property or infrastructure,[111] and the net fiscal impact this and stranded investments will cause amidst California's budget crisis.

Meanwhile, the ISOR bases its compliance scenario models upon the assumption that cellulosic sources will be proven on a commercial scale. "ARB staff recognizes that RFS2 [lower-CI] fuels will have to be available in significant quantities for the proposed LCFS to succeed."[112] "Staff estimates that, when cellulosic ethanol production is proven on a commercial scale, market forces will result in waste-derived cellulosic ethanol being more cost-effective than corn-based ethanol nationally; the LCFS will attract

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[107] ISOR, VIII-33.
[108] ISOR, VIII-45.
[109] ISOR, VIII-43.
[110] *See e.g.*, "Producers look to next generation of biofuels," *San Francisco Chronicle*, Apr. 5, 2009, http://www.sfgate.com/cgi-bin/article.cgi?f=/c/a/2009/04/05/MN4916RJ4C.DTL; Bryce, Robert, "14 Studies Have Exposed the High Cost of Ethanol and Biofuels: The Unraveling of the Ethanol Scam," Feb. 5, 2009, http://www.counterpunch.org/bryce02052009.html.
[111] *See e.g.*, "Boater sues over ethanol-laced gasoline's effect on fiberglass fuel tank," *LA Times*, Apr. 14, 2008, http://articles.latimes.com/2008/apr/15/business/fi-boat15
[112] ISOR, VIII-40.

more volume to the State..."[113] However, the ISOR also recognizes that "[g]iven the technical challenges of scaling up pilot-project size biorefineries and the high capital costs of some of the lower-CI-fuel technologies—such as Fischer-Tropsch diesel (at nearly a billion dollars for a 50 MGY plant)—potential investors may require a more attractive rate-of-return before risking capital."[114] Indeed, the proposed default value for the proposed new pathway "California Low CI Ethanol" is below the comparable baseline for gasoline with a 10% reduction required in 2020. In effect, an entity could meet the LCFS using this new "best practices" corn blend up until the expired term of the regulation, and the regulation would not force any significant innovation to truly low or zero-carbon sources because no advanced biofuel pathways are proposed for approval at this time and may not be proposed until they become commercially viable. In the near-term the absence of appropriate vehicle, fuel transport, or distribution systems for electricity or other truly low-carbon alternatives will incentivize the food-crop biofuel options.

ARB Should Delay Adoption of the LCFS Until ALL Analyses Are Complete

At the March 27, 2009 LCFS workshop, ARB staff stated that they expect that all of the analyses and reports will be finished by 2011 when the requirement takes effect. Because the analysis and reports are incomplete at this time, the LCFS regulation is not ripe for adoption by the ARB Board. The ISOR itself identifies several significant areas of ARB staff's incomplete analyses that should be completed before adoption of the LCFS, including:

- "Efforts to model indirect land use impacts indicate that the full lifecycle carbon intensities of some biofuels may be similar to or even higher than the carbon intensities of conventional petroleum-based fuels. ARB staff has been and will continue to work with modelers at the University of California and Purdue University to derive indirect land use change estimates that are empirically based, defensible, and fully open to public scrutiny and comment... Because the tools for estimating land use change are few and relatively new, biofuel producers argue that land use change impacts should be excluded from carbon intensity values pending the development of better estimation techniques. Based on its work with university land use change researchers, however, ARB staff has concluded that the land use impacts of crop-based biofuels are significant, and must be included in LCFS fuel carbon intensities. To exclude them would allow fuels with carbon intensities that are similar to gasoline and diesel fuel to function as low-carbon fuels under the LCFS. This would delay the development of truly low-carbon fuels, and jeopardize the achievement of a 10 percent reduction in fuel carbon intensity by 2020."[115] Similarly, proposing incomplete land use change values risks underestimating a fuel's true GWI, and entrenching the new infrastructure for that fuel for years and even decades to come delaying the development of truly low-carbon fuels. The only reasonable alternative is for ARB staff to delay implementation of the LCFS and complete all of its analyses.
- "Staff is also continuing to analyze and refine the corn ethanol land use change results. Work is underway in the following areas: The possible inclusion of Conservation Reserve Program Land in the analysis; The use of improved emission factors, as they become available; The evaluation and possible use of data and analyses provided by stakeholders; and Characterizing in greater detail of the land use types that are subject to conversion by the GTAP model (forest, grassland, idle and fallow croplands, etc.). The results of these analyses will be published when they are completed."[116]
- "Inclusion of Conservation Reserve Program land. The GTAP model does not include Conservation Reserve Program land in the pool of available land in the U.S. for agricultural expansion. ARB staff and GTAP modelers are updating GTAP to include Conservation Reserve Program land, as appropriate. We will then analyze the effect that this change has on the estimate for amount and location of land converted within the U.S."[117]

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[113] ISOR, VIII-39.
[114] ISOR, VIII-39.
[115] ISOR, ES-28.
[116] ISOR, IV-44.
[117] IV-46.

- "However, for advanced technology or emerging vehicles such as battery electric vehicles (BEV), plug-in hybrid electric vehicles (PHEV), fuel cell vehicles (FEV), and heavy-duty compressed natural gas (CNG) or liquefied natural gas (LNG) vehicles, the [EER] data are relatively limited. Therefore, the staff has provided EER values that are to be used until such time that there is more robust data available to better establish the EER… Staff is committed to review and update these and other EERs as more robust data become available, as well as develop EERs for other vehicles such as internal combustion engines using hydrogen."[118]
- "For E-85, the Division of Measurement Standards (DMS) adopted a specification for E-85 in 4 CCR §4145 (effective May 22, 2004). More recently, ASTM updated its specification for E-85 in D5798-07, 'Standard Specification for Fuel Ethanol (Ed75-Ed85) for Automotive Spark-Ignition Engines.' [] Because the newer ASTM specification better reflects current technologies, ARB plans to update its E-85 specifications in a rulemaking tentatively scheduled for Board consideration in late 2009… Biodiesel is considered to be an alternative fuel, but there are currently no ARB standards for biodiesel… the 2008 ASTM specifications for biodiesel and biodiesel blends… are the standards that currently apply to such fuels sold in the State. However, staff plans to consider a rulemaking for adopting new biodiesel specifications for motor vehicle fuel, which is currently calendared for late 2009. In support of that effort, staff is currently conducting a multimedia evaluation of biodiesel and renewable diesel pursuant to H&S §43830.8. Also, if necessary, an emissions test program is being conducted to evaluate potential alternative specifications that would result in biodiesel having the same emission characteristics as diesel complying with 13 CCR sections 2281-2285 and 2299."[119]
- "The non-trivial impact of N2O emissions on the direct carbon intensity calculated by GREET and the large uncertainty in actual measurements of N2O emissions suggests we need more research in this area. ARB staff will continue to analyze relevant scientific studies and make adjustments to the CA-GREET model if necessary."[120]
- The ISOR states that at "least two other vehicle studies are in the works, the Coordinating Research Council E-80 project, and the US EPA Comprehensive Gasoline Light Duty Exhaust Fuel Effects Test Program to Cover Multiple Fuel Properties and Two Ambient Test Temperatures. Criteria pollutant and toxic emissions from motor vehicles using all fuels were estimated with the CA Modified GREET version 1.8b(47)." ARB staff cannot guarantee that there will be no increases in toxic and criteria pollutants as legally required without the results of these and other tests for all fuel types. Initial study on E85 suggests that E85 fuel "will increase atmospheric levels of ozone and PAN, leading indicators of photochemical smog, in the Los Angeles basin, the most polluted airshed in the U.S.," and that "E85 will increase two major carcinogens, acetaldehyde and formaldehyde."[121] The author concluded that "E85 is an equal or greater risk to public health than gasoline. As such, both are expected to continue to contribute to the thousands of cases of premature mortality and millions of cases of asthma and respiratory diseases in the U.S."[122] In a separate paper the author further elaborated: "E85 generally increased nonmethane organic gases (NMOG), methane, formaldehyde, and acetaldehyde and reduced 1,3-butadiene, benzene, and nitrogen oxides. Carbon monoxide increased in half the studies. E85 increased acetaldehyde (1250%-4340%) and formaldehyde (7%-240%), two important ozone precursors."[123] "In Los Angeles, E85 increased 24-hour and afternoon ozone by up to 3 and 4 ppbv, respectively... In other words, E85 may increase 24-hour ozone exposure to all 21.2 million residents in the Los Angeles domain in 2020 by 1.4 ppbv. E85 increased the U.S. population weighted 24-hour August ozone above 0 ppbv by 0.27 ppbv."[124] "In [a] 2020 Case-1 scenario, E85 was calculated to increase ozone-related mortality by 120 deaths/yr (with a range of 47-140/yr) in Los Angeles and 185

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[118] ISOR, ES-18-19.
[119] ISOR, II-11.
[120] IV-48.
[121] Jacobson, Mark, "Addressing Global Warming, Air Pollution Health Damage, and Long-Term Energy Needs Simultaneously," p. 1.
[122] Jacobson, Mark, "Addressing Global Warming, Air Pollution Health Damage, and Long-Term Energy Needs Simultaneously," p. 5.
[123] Jacobson, Mark, "Effects of Ethanol (E85) Versus Gasoline Vehicles on Cancer and Mortality in the United States," p. 4. "The U.S. Environmental Protection Agency (USEPA) and the California Office of Environmental Health Hazard Assessment (OEHHA) have assigned cancer unit risk estimates (CUREs) to these chemicals… It shows that E85 increased population-weighted formaldehyde and acetaldehyde mixing ratios (with population) but decreased those of benzene and butadiene in Los Angeles and the U.S. … Since most remaining ethanol eventually converts as well, future unburned ethanol may enhance global-scale acetaldehyde and ozone… E85 increased the USEPA- but decreased the OEHHA-CURE- and population-weighted number of cancer cases relative to gasoline. For both CURES, the changes were small (+0.3, -3.5 cancers/yr in Los Angeles; +3, –29 cancers/yr in the U.S.), suggesting that E85 may result in cancer rates similar to those of gasoline (~40/yr in Los Angeles and ~430/yr in the U.S.: Table 5)."
[124] Jacobson, "Effects of Ethanol (E85) Versus Gasoline Vehicles on Cancer and Mortality in the United States," p. 6-7.

deaths/yr (72-216/yr) in the U.S. These death rates represent an increase of about 9% in Los Angeles and 4% in the U.S. over the projected death rates with gasoline vehicles. E85 also increased hospitalization by about 650 and 990 in Los Angeles and the U.S., respectively, and asthma-related emergency-room visits by about 770 and 1200 in Los Angeles and the U.S., respectively. Some increases in health risk in Los Angeles and the northeast were offset by decreases in the southeast, but the overall health risk was greater for E85 than gasoline. E85 health effects due to ozone significantly exceeded those due to cancer."[125] "In all tests..., E85 increased ozone and PAN relative to gasoline."[126] According to the EPA, "the most widespread and persistent urban pollution problem is ozone."[127] "With respect to air pollution, several studies have examined emission differences between gasoline- and ethanol-fueled vehicles. However, no study has examined the spatially-varying effect on cancer or ozone-related illness throughout the U.S. that might result from a conversion to ethanol. Such a study is important because previous introductions of chemicals (e.g., tetraethyl lead, chlorofluorocarbons, DDT, dioxins) without an analysis led to damaging consequences. Air pollution (indoor plus outdoor) is also the seventh leading cause of death worldwide, so any change in fuel that could affect mortality should be examined prior to its implementation."[128]

- "Staff is also considering language that would enumerate specific acts prohibited under the LCFS."[129]
- "Currently, there is not enough information available to develop relevant and detailed sustainability strategy or standards."[130] ARB staff says that they will develop sustainability metrics by 2011.

We submit the following list of factors identified by UN Energy in need of further analysis by ARB:

- Key areas of knowledge include: current production of agricultural products with bioenergy potential, as well as assessment of possible energy use and expansion of production; current land uses, obtained with the help of surveys, mapping , and GIS; production potential in rehabilitated marginal and degraded lands; alternative uses of feedstock as well as current demand and uses of agricultural and forestry residues and by-products; and availability of water and other resources; availability and accessibility of modern technologies for bioenergy conversion and use; life-cycle analysis methodology and tools to assess bioenergy systems, including their economics, energy balance, carbon flows, and leakage effects; costs across the supply chain: raw material production or gathering, processing, transport and infrastructure modifications (if any); value of by-products; local costs of alternative energy sources; opportunity costs of land, labour, and water used; monetizing environmental externalities; risks to food security of various bioenergy scenarios and possible ways to avert them; positive impacts of expanded bioenergy due to diversification, new rural infrastructure, and jobs; potential benefits or harm to affected populations; present and future prices, markets, and subsidies; potential export markets for possible surpluses; impacts of second-generation systems on the structure of agriculture; bioenergy's viability as an energy option and its present role in the national energy balance; costs and prices of biomass-based energy carriers; current taxation and subsidy situation in light of future bioenergy scenarios; economic and social costs and benefits of different types of support: subsidies, import tariffs and other import restrictions, and consumption mandates; net loss in government revenue and what other government programmes will be cut as a result, and alternative uses of government subsidies; impact of a consumption mandate on domestic fuel prices in times of supply shortage due to weather-or-pest-related crop failures; welfare impact if energy prices rise as a result; integration of bioenergy development into existing rural development policies and programmes; number of jobs to be created; quality, safety, and health characteristics of these new jobs; impact on rural development; monitoring and assessment of new investments due to bioenergy expansion; protecting small-scale farmers from loss of land due to pressures from large-scale producers; respect for and protection of land tenure rights; use of "informed decision-making" and full participation of stakeholders when determining land-use changes; assessing existing land-use policies in light of potential expanded bioenergy use; impact assessments; emissions monitoring and reduction; biodiversity protection; water use management; soil health maintenance; examine agro-industry which will gain in importance as it transitions to providing energy in addition to food and feed; forestry industry which will gain new markets, new value-creation opportunities for its wastes and low-value timber, and enhanced scrutiny as forests are more intensively managed; identifying where the R&D community in the country has comparative advantage; etc.[131]

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[125] Jacobson, "Effects of Ethanol (E85) Versus Gasoline Vehicles on Cancer and Mortality in the United States," p. 7-8.
[126] Jacobson, "Effects of Ethanol (E85) Versus Gasoline Vehicles on Cancer and Mortality in the United States," p. 8.
[127] "The Clean Air Act Amendments of 1990," http://www.epa.gov/air/caa/overview.txt
[128] Jacobson, "Effects of Ethanol (E85) Versus Gasoline Vehicles on Cancer and Mortality in the United States," p. 2.
[129] ISOR, ES-22.
[130] ISOR, VII-32.
[131] UN Energy, p. 53-58.

In response to comments made at the March 27, 2009 LCFS workshop that the main uncertainties are EER, soil carbon payback, co-product accounting, LUC, and crude oil, ARB staff replied that "this is the start of these analyses … will continue evaluations indefinitely." However, compliance is proposed to begin in 2011, the same year that ARB staff stated that they expect their reports and studies to be finished. Fuel providers will need to make investment decisions now, but cannot do so wisely when the default values could change significantly based upon a variety of factors listed above. In the absence of scientific certainty, we recommend excluding a particular fuel from receiving credits under the LCFS, versus underestimating its true Global Warming Intensity, and having the opposite effect of accelerating climate change.

ARB Is Legally Required to Conduct A Multimedia Evaluation

Given the considerable economic[132] and public health risks of switching and mixing fuel blends, with often unknown or controversial results in localized communities,[133] and the need for "compatibility" of engine, vehicle, and infrastructure needs, a full multimedia analysis is and should be required to assess potential environmental and public health harms and help guide regulated entities when making investment decisions. Reducing carbon-intensity by 10% is a "specification" for the fuel, where the intent of SB529 was passed in direct response to MBTE contamination concerns,[134] and such concerns about potential damage from fuel composition are controlling pursuant to Health and Safety Code (H&S) § 43830.8.

ARB staff's self-identified "difficulty"[135] in conducting a multimedia analysis before approval of the LCFS regulation indicates a problem with ARB's program design where the "LCFS is a performance-based standard: it neither mandates nor prohibits the use of specific fuels. Regulated fuel providers are free to make available any mix of fuels, so long as that mix complies with current carbon intensity limits."[136] Indeed, the *LA Times* published a story today illustrating how the LCFS is already encouraging a global race to the bottom to find things to burn.

> "BlueFire Ethanol Fuels, plans to build a $100-million plant to convert raw trash into an alcohol-based fuel that will help power the cars and trucks of the future. It's just the sort of improbable concoction that California is now demanding... Financing for his Lancaster plant, which recently obtained its final permits, has been delayed by the credit crunch. But if it comes through, the facility will process 170 tons of garbage a day to produce 3.7 million gallons of ethanol a year. Estimated cost per gallon: about $2, Klann says. He already has plans for 20 more facilities across the country. Next on the block: a plant outside Palm Springs, partly funded by the U.S. Department of Energy, that would produce 19 million gallons annually. Across California, scores of advanced fuel companies are feverish with activity. Down the road from Klann's Irvine-based company, Prometheus Energy is capturing

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[132] "Boater sues over ethanol-laced gasoline's effect on fiberglass fuel tank," *LA Times*, Apr. 14, 2008, http://articles.latimes.com/2008/apr/15/business/fi-boat15

[133] *See, e.g.*, MTBE ban after found contaminated drinking water. "Very much like the original backers of MTBE, both from industry and major environmental groups, who adamantly ignored the warnings regarding MTBE's ability to contaminate drinking water, many of these same people are avoiding the unintended consequences of diverting millions of gallons of water into ethanol plants. They fought to preserve the oxygenate mandate so that ethanol could replace MTBE, which delayed MTBE's removal from California's gasoline by several years. Only after many wells in California were contaminated, did they support its removal." Anthony, 2007; *see also,* Kelly, 2007.

[134] "The Legislature enacted SB 529 after MTBE was subsequently shown to leak out of underground storage tanks unexpectedly into aquifers." ISOR, V-25.

[135] ISOR, V-32.

[136] ISOR, V-37.

Naomi kim

> methane gas from rotting garbage in the Frank R. Bowerman Landfill, converting it to liquid natural gas and selling it to fleets of Orange County trucks."[137]

Burning trash as fuel threatens multiple environmental and environmental justice harms, including increasing toxic and criteria pollutants and disproportionately impacting low-income communities located near the facilities. The ARB could save at least $100 million in wasted investments, as evidenced in the *LA Times* article, if staff conducted a multimedia analysis from the outset, versus waiting an indefinite amount of time until after the build-up of infrastructure and capital to determine that burning trash violates several environmental laws. SB529 and the multimedia analysis requirement exist to prevent everyone from just going out to find things to burn as fuel without first knowing the full consequences. "Key components of the evaluation process are the identification and evaluation of significant adverse impacts on public health or the environment and the use of best available scientific data. 'Multimedia evaluation' means the identification and evaluation of any significant adverse impact on public health or the environment, including air, water, or soil, that may result from the production, use, or disposal of the motor vehicle fuel that may be used to meet the state board's motor vehicle fuel specifications. H&S §43830.8(b)."[138]

ARB staff invites fuel providers to experiment with burning trash, landfill gas, animal fats, and other random sources.[139] Given that there are great risks in burning trash and other feedstock sources, the overriding considerations of public health and safety that was the legislature's intent in passing SB529, trumps ARB staff's attempt to defer their way out of the requirement by arguing semantics. The authority that ARB staff gives to justify its narrowed interpretation of "specification" cites one of many possible dictionary definitions[140] and a statute last amended nine years before SB 529 took effect. ARB staff's narrowed definition based upon an implied "subset" interpretation of an outdated statute leads to a contrary conclusion than ARB staff asserts. The ISOR reasons that in the H&S §43018 "context, the Legislature *seems to* use the term 'specification' as a subset of motor vehicle 'standards,' 'regulations,' and 'measures.' Thus, one can reasonably presume that, in the context of motor vehicle fuels, the Legislature intended the term 'specification' to be an ARB mandate on a vehicular fuel's permissible composition, rather than on the production process for the fuel."[141] However, the LCFS is a mandate on a vehicular fuel's permissible composition of carbon-intensity, a tangible substance that gets burned along with other co-pollutants and emitted into the atmosphere, specified to be reduced 10% by 2020. Whereas the LCFS does not propose to require any specified "production *process* for the fuel" such as requiring wet versus drymill facilities in the production of corn-ethanol.

Rather, the language in §43830.8(b) itself better informs legislative intent on if the multimedia analysis requirement is triggered. The multimedia evaluation "means" to identify and evaluate adverse impacts from the "production, use, or disposal of the motor vehicle fuel that may be used to meet the state

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[137] Roosevelt, Margot, "A $100-million bet on making fuel from trash," *Los Angeles Times*, Apr. 22, 2009, http://www.latimes.com/news/local/la-me-biofuels22-2009apr22,0,3486052.story

[138] ISOR, V-26.

[139] *See,* "There are feedstocks available to produce sufficient quantities of cellulosic ethanol, advanced renewable ethanol, sugarcane ethanol, biodiesel, renewable diesel, and other renewable fuels, as necessary. These feedstocks include, but are not limited to cellulosic waste materials from agricultural, sugarcane, forestry wastes, municipal wastes, waste oils, and animal fats." ISOR, VI-5.

[140] *See e.g., Webster's New World College Dictionary* (3rd Ed.), Macmillan, 1996, p. 1288 (Definition 3 for "specification" as "something specified; specified item, particular, etc.")

[141] ISOR, V-28 (emphasis added).

board's motor vehicle fuel specifications."[142] Here the statute clarifies a "fuel that *may* be used to *meet*" the state board's motor vehicle specifications, inferring that multiple fuels could be used to meet or fulfill a given motor vehicle specification. This is the case under the LCFS where multiple fuels could be used to meet the 10% carbon-intensity reduction specification. Whereas, if the legislature intended ARB staff's interpretation of "fuel specifications" as being specific to a particular fuel type, the stated meaning of 'multimedia evaluation' would have read the opposite direction, such that fuel specifications are contained or limited by the fuel type. Or if the legislature intended a "prescriptive" or "performance" standard it would have used those terms instead.[143] The ISOR's comparisons to other "prescriptive" fuel specifications in existence at the time of SB529, ignores that the LCFS is an entirely new and untested program design where "the state is expected to adopt the world's first regulation to reduce the carbon footprint of fuel."[144]

Furthermore, ARB staff's suggested approach to conduct multimedia evaluations on an ad hoc and per fuel type basis will ignore the cumulative effects of the overall LCFS program, and could potentially allow a fuel type to avoid a multimedia evaluation entirely when ARB staff claim they are exempt from the "pre-sale prohibition."[145] The suggested "grandfathering" of fuel types that have not had their "specifications" amended since SB 529 was enacted pursuant to subsection §43830.8(h) confuses the statute's call in subsection (a) for the California Environmental Policy Council to review the proposed LCFS "*regulation* that establishes a specification for motor vehicle fuel." When prior fuel specifications were approved before July 1, 2000 they were under different regulations. Whereas the LCFS regulation carries along with it numerous new legal requirements under AB32, new scientific methodologies and uncertainties as described elsewhere in these comments, and a wide range of environmental impacts never considered a decade ago. Thus, ARB staff cannot "grandfather" fuels to be included in the LCFS based upon prior evaluations of other regulations. Meanwhile, there is no basis to exempt "[t]hose fuels for which there are no existing ARB specifications but are permitted for sale in California pursuant to regulations promulgated by the Division of Measurement Standards -- this includes biodiesel and renewable diesel."[146]

The ISOR states that "conducting such [a multimedia] evaluation for the overall rule would make it practically very difficult, if not impossible, to conduct such an evaluation..."[147] Using ARB's rationale, just because an individual may find it difficult to meet a legal requirement, e.g. requiring passing a driver's test, does that give the person the right to just ignore the law? Or is the difficulty in meeting the

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[142] ISOR, V-26.

[143] "'Prescriptive standard' means a regulation that specifies the sole means of compliance with a performance standard by specific actions, measurements, or other quantifiable means. (Gov. Code §11342.590.)" ISOR, V-31 n.43. "'Performance standard' means a regulation that describes an objective with the criteria stated for achieving the objective. (Gov. Code §11342.570.)" *Id.* at n.44.

[144] Roosevelt, Apr. 22, 2009.

[145] "Fuels that would not be subject to this pre-sale prohibition include the following (until such time as ARB adopts a new specification or modifies the existing specification for these fuels):
• Those fuels that were "grandfathered" in before July 1, 2000, pursuant to H&S §43830.8(h), or have not had their specifications amended since SB 529 was enacted – these include CaRFG, diesel, E85, E10, CNG, LNG;
• Those fuels for which there are no existing ARB specifications but are permitted for sale in California pursuant to regulations promulgated by the Division of Measurement Standards -- this includes biodiesel and renewable diesel; and
• Those fuels for which the California Environmental Policy Council has determined no significant adverse impacts would result from the Board's adoption of a fuel specification (under H&S §43830.8(i))." ISOR, V-33.

[146] ISOR, V-33.

[147] ISOR, V-32.

requirement an indicator that perhaps the law is meant to protect against the very activity that the person wishes to engage in? The multimedia evaluation requirement is meant to protect against future harms from burning random substances as fuel, the very situation that the LCFS will create. ARB staff asserts that given the difficulty of conducting a multimedia analysis "the best that ARB staff can provide at this time is the 'functional equivalent' of a multimedia evaluation."[148] However, §43830.8 does not allow for a 'functional equivalent' to implement the "spirit" of the statute "to the extent feasible" that staff currently proposes.[149] H&S §43830.8(i) unequivocally states "the state board may adopt a regulation that establishes a specification for motor vehicle fuel without the proposed regulation being subject to a multimedia evaluation if the [California Environmental Policy Council], following an initial evaluation of the proposed regulation, conclusively determines that the regulation will not have any significant adverse impact on public health or the environment." The Council has not made such a determination as required by the statute, and therefore, the ARB Board should not adopt the LCFS at this time.[150]

The Proposed LCFS Does Not Comply With Requirements Under the California Environmental Quality Act (CEQA)

"Chapter VII provides an analysis of the environmental impacts of the LCFS. This analysis is designed to comply with the California Environmental Quality Act (CEQA)."[151] However, the Environmental Impacts section VII of the LCFS and its corresponding appendix F inadequately address the potential environmental and environmental justice impacts of this regulation and in many instances postpone analysis until specific projects are proposed. The Environmental Impacts analysis fails to inform decision-makers and the public about the significant and cumulative impacts – especially on environmental justice communities,[152] and it fails to provide legally enforceable mitigation measures. The evaluation of alternative approaches to the proposed program is also inadequate because it fails to evaluate any approach other than whether to implement a credit trading program now or not. "The staff analyzed four different approaches to the regulation… Only implement the federal renewable fuels program; Implement a gasoline standard only; Delay LCFS Pending Possible National Regulation; and Delay LCFS Pending Development of Regional GHG Programs."[153] ARB could have evaluated actual program alternatives other than no or partial implementation of the proposal, such as an entity-specific standard that requires each regulated entity to measure and reduce the carbon-intensity of its fuels without the tradeoffs of pollution trading.

The Metrics on Sustainability Should Be Developed and Incorporated Into the Design of the LCFS Before Board Adoption

To wait until after the implementation of the program to investigate sustainability issues on the local, national, and global scale would be too late to prevent some of the global effects predicted to result from the incentivization of biofuels. The ISOR states that the "LCFS standards established in this rulemaking

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[148] ISOR, V-32.

[149] ISOR, V-33.

[150] §43830.8(c) "At a minimum, the evaluation shall address impacts associated with all the following:
(1) Emissions of air pollutants, including ozone forming compounds, particulate matter, toxic air contaminants, and greenhouse gases.
(2) Contamination of surface water, groundwater, and soil.
(3) Disposal or use of the byproducts and waste materials from the production of the fuel."

[151] ISOR, ES-39.

[152] *See e.g.*, "Pollution Is Called a Byproduct of a 'Clean' Fuel" *New York Times*, Mar. 11, 2008, http://www.nytimes.com/2008/03/11/us/11biofuel.html?_r=2&oref=slogin

[153] ISOR, X-1.

will be periodically reviewed. The first formal review will occur by January 1, 2012. … The 2012 review will … provide recommendations on metrics to address the sustainable production of low carbon fuels."[154] In order to give "sustainability" any meaning, i.e. "development that meets the needs of the present without compromising the ability of future generations to meet their own needs,"[155] any metrics developed would need to be enforceable, including the possible exclusion of a fuel that was found to be unsustainable. To not have enforceable criteria would be a useless exercise in self-reporting for the regulated entities. When there are no enforceable criteria, it is worthy to note that these calls for sustainability criteria have been criticized as "a mechanism to provide the appearance of 'clean' fuels" and gain public support when "None of the proposals for standards or certification ha[ve] been developed with the support of the local communities whose livelihoods are being directly affected by agrofuel production and who are not being consulted as to whether they wish to see their land turned into monoculture plantations for agroenergy."[156] Because ARB has not indicated what possible metrics or prohibitions would apply, the proposed regulation either jeopardizes significant stranded investments or the entrenchment of unsustainable fuels.

In making the argument to advance biofuels, several studies contend that it is merely an interim measure until zero-carbon technologies, like hydrogen and plug-ins are developed. However, the inclusion of at least corn-based ethanol would be inapposite to these purposes. For example, E85 can only be burned in specially designed engines,[157] while our cars last for more than 15 years.[158] AB118 is "intended to include incentive payments to help install a network of ethanol pumps around the state," totaling $130 million a year.[159] The ARB is providing $5.4 million to fund 51 E-85 pumps around the state and giving $6 million to developers of 10 biofuel plants.[160] "Corn is already the most subsidized crop in America, raking in a total of $51 billion in federal handouts between 1995 and 2005—twice as much as wheat subsidies and four times as much as soybeans. Ethanol itself is propped up by hefty subsidies, including a fifty-one-cent-per-gallon tax allowance for refiners. And a study by the International Institute for Sustainable Development found that ethanol subsidies amount to as much as $1.38 per gallon—about half of ethanol's wholesale market price."[161] All of these infrastructure factors and government subsidies serve to entrench ethanol creating an unfair advantage where new zero-carbon technologies cannot compete.

The result is that promising new lower carbon technologies struggle economically, like algae farms that can churn out more than 5,000 gallons of biofuel from a single acre, compared with corn-ethanol's meager 300 gallons and can grow from little more than wastewater, sunlight, and CO2 to flourish.[162] We have the technology for clean-burning electric and hybrids run on clean solar and wind power, and cellulosic second-generation ethanol, except that the biggest challenge for the companies is that they

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[154] ISOR, ES-3.
[155] UN Energy, p. 4.
[156] Boswell, p. 6.
[157] Bourne, Joel K., Jr., "Green Dreams," *National Geographic*, Oct. 2007, http://magma.nationalgeographic.com/ngm/2007-10/biofuels/biofuels.html
[158] University of California, "UC experts detail new standard for cleaner transportation fuels," Aug. 2, 2007, http://www.energy.ca.gov/low_carbon_fuel_standard/index.html
[159] Kelly, 2007.
[160] Kelly, 2007.
[161] Goodell, 2007.
[162] Bourne, Jr., 2007.

cannot compete with the highly subsidized price of petroleum and now, ethanol industries.[163] Given the artificially-low price that corn-based ethanol enjoys, it is of little surprise that biofuel production has focused on food crops in the "first generation" of agrofuels.[164] Thus, if technological innovation leading to zero-carbon fuels is an unequivocal objective, the ARB should take corn-based ethanol, or at the very least all of its subsidies, off of the table. To do otherwise would award "likely valuable" credits to a fuel industry that exacerbates global warming, achieves no emissions reductions contrary to the LCFS directive, violates AB32 statutory provisions protecting low-income communities, and effectuates large-scale global famine, deforestation, food riots and war.

Second-Generation Biofuels Still Raise Significant Problems

Although moving immediately to "second generation" technologies in biofuels production such as agricultural wastes and crop residues would reduce the competition between food and fuel, and is highly preferable on that basis alone,[165] even these fuel sources have not been proven to reduce GHG emissions. Cellulosic ethanol and other second-generation crops have problems in need of consideration as well. For example, "Even the planting and harvesting of 'sustainable' energy crops can have a negative impact if these replace primary forests, resulting in large releases of carbon from the soil and forest biomass that negate any benefits of biofuels for decades."[166] Meanwhile, the total water requirements for ethanol from cellulose are thought to be large—about 9.5 gal/gal, but this likely will decline as efficiency increases.[167] There are two additional steps required in converting lignin and cellulose into starch, and these operations could produce wastewater streams that are high BOD and would require on-site treatment or treatment at publicly-owned treatment works.[168] Although cellulosic crops hold soil better than corn in general, they can also pose problems of nutrient leaching and erosion, raising substantial concerns.[169] Finally, while several studies have suggested that cellulosic ethanol will provide a significant carbon benefit over corn ethanol, research has been ongoing for greater than 15 years to produce cellulosic ethanol, yet such technology has not been developed to date at the industrial scale.[170] Thus, "all calculations of carbon cycling during production and consumption of cellulosic ethanol are hypothetical and premature."[171] With lignocellulosic feedstock a risk could follow that they might increase the likelihood of a greater push to plow up "waste lands," including rangelands and savannas, to plant switchgrass and other hardy biofuels, in addition to the potential of displacing cereals and subsistence crops.[172] "It seems unlikely that significant quantities of biofuel feedstock can be produced on marginal lands; some of this land is already used for livestock grazing, competing with food production."[173] In a compilation by an organization in the U.K., the authors cite studies by scientists showing that current production methods of agrofuels will release between 2-9 times more

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[163] Bourne, Jr., 2007; *see also*, "San Diego firm turns green slime into black gold," *LA Times,* May 28, 2008, http://latimesblogs.latimes.com/lanow/2008/05/san-diego-firm.html; Thank Carbon for Air Cars" *Truthout.org,* Feb. 16, 2008, http://www.truthout.org/article/thank-carbon-air-cars

[164] Ziegler, p. 10-11.

[165] *See*, Ziegler, p. 13.

[166] UN Energy, p. 50.

[167] *Water Implications of Biofuels Production in the United States*, p. 36.

[168] *Water Implications of Biofuels Production in the United States*, p. 40.

[169] *Water Implications of Biofuels Production in the United States*, p. 47.

[170] Jacobson, Mark, "Addressing Global Warming, Air Pollution Health Damage, and Long-Term Energy Needs Simultaneously," p. 5-6.

[171] Jacobson, Mark, "Addressing Global Warming, Air Pollution Health Damage, and Long-Term Energy Needs Simultaneously," p. 5-6.

[172] UN Energy, p. 35.

[173] UN Energy, p. 37 n.4.

carbon gases over the next 30 years than if land was forested.[174] Even the international body, U.N. Energy warned that:

> With second-generation technologies that rely on agricultural and forestry residues, it is important to recognize that such residues are necessary for maintaining soil and ecosystem health, and that a certain amount must remain on the ground. Logging residues are an important source of forest nutrients and help protect the soil from rain, sun, and wind, lowering the risk of erosion; agricultural residues play a similar role in farm fields… The potential for carbon sequestration in large areas would be reduced… if most of this organic matter were converted into bioenergy, resulting in the re-release of the carbon into the atmosphere. Especially for second-generation fuels where the entire feedstock product (including crop residues) can be utilized, it might be difficult to convince farmers to leave a certain percentage of the harvest on the field… even more-sustainable energy crops cannot substitute for natural forests or prairies.[175]

Thus, even second-generation biofuels run the risk of achieving little to no carbon reductions when retaining plant cover, virgin forests, and pristine savannas are the best fool-proof safeguards against global warming.

Sustainability Issues For Consideration

The ISOR states that "[c]urrently, there is not enough information available to develop relevant and detailed sustainability strategy or standards,"[176] despite also identifying several potential sustainability criteria adopted in other jurisdictions. Meanwhile, relying upon "the use of a global warming intensity metric in the LCFS [as] an effective surrogate for several of the sustainability concerns"[177], as the UC Berkeley Policy Report suggests, is clearly deficient when no lifecycle analysis metric to date has incorporated water impacts, shortage or any social impacts. Even if complete lifecycle analysis models were developed per fuel, this would be at the micro-level focusing on a single fuel's pathway in emitting GHG's alone, and would ignore the macro-environmental and social effects of pursuing and developing biofuel production.

The UC Berkeley report correctly asserts that "social issues associated with sustainability are not so well captured by the LCFS."[178] However, because many are looking to California as a leader in developing its LCFS, California will have a direct influence on several sustainability issues, and must not deflect this responsibility onto the international community while simultaneously touting its leadership role.[179]

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[174] Boswell, Dr. Andrew; Ernsting, Almuth; Rughani, Deepak, "Agrofuels threaten to accelerate global warming," Biofuelwatch, Updated Dec. 2007, *UNFCCC, Bali version*, p. 4. http://www.biofuelwatch.org.uk/docs/biofuels-accelerate-climate-change.pdf

[175] UN Energy, p. 46.

[176] ISOR, VII-32. We note that the ISOR identified that the "U.S. and several other governments (United Kingdom, Germany and Netherlands) have either passed laws, proposed policies, or implemented policies for the sustainable production of biofuels. The proposed policies by the United States, United Kingdom, Germany, and Netherlands have key similarities: they address common environmental and social principles, they use existing standards to certify sustainability, and they intend to tighten sustainability policy over time." *Id.*

[177] UC Berkeley Policy Report, p. 74.

[178] UC Berkeley Policy Report, p. 74.

[179] *See*, Collier, Robert, "Governor to detail plans to curb fuel emissions," *San Francisco Chronicle*, May 18, 2007, http://sfgate.com/cgi-bin/article.cgi?file=/c/a/2007/05/18/MNGR2PTFOD1.DTL&type=printable; University of California, "UC experts detail new standard for cleaner transportation fuels," Aug. 2, 2007, http://www.energy.ca.gov/low_carbon_fuel_standard/index.html

Indeed, the ISOR states "a single successful national program based on California's efforts can stimulate the development of related programs in other nations. In this respect, California seeks to implement an LCFS that will accelerate the adoption of similar measures nationally, and, possibly, internationally."[180] The media recognizes the significance of what is at stake, quoting people as saying that "This is the most dramatic change in gas formulation that anyone has ever attempted, and the state can't afford to get it wrong," and "I know the word 'sustainable' is seen as mushy…, but we need to follow this with something like 'fair trade' coffee, a sustainability fuel standard. There are huge issues at stake for developing nations."[181] As a sampling of "key sustainability" issues under categories identified by U.N. Energy,[182] we include the following non-exhaustive list of considerations:

- Implications for agro-industrial development and job creation:
  - AB32 § 38565 requires that "The state board shall ensure that the greenhouse gas emission reduction rules, regulations, programs, mechanisms, and incentives under its jurisdiction, where applicable and to the extent feasible, direct public and private investment toward the most disadvantaged communities in California and provide an opportunity for small businesses, schools, affordable housing associations, and other community institutions to participate in and benefit from statewide efforts to reduce greenhouse gas emissions."
  - "Ensuring that biofuel production is based on family agriculture, rather than industrial models of agriculture, in order to ensure more employment and rural development that provides opportunities, rather than competition, to poor peasant farmers. Organizing cooperatives of small farmers to grow crops for larger processing firms would provide much more employment than the concentration of land into heavily mechanized expanses and plantations."[183]
  - "In many countries, the current structure of agricultural markets means that the bulk of the profits go to a small portion of the population. Unless ownership is shared more equitably, this divide could become as true for energy commodities as it is for food commodities today. For instance, two companies, Cargill and Archer Daniels Midland, control more than half of the world's grain trade."[184] In the two largest ethanol-producing countries, Brazil and the United States, the industry is dominated by large corporations…"[185]
  - [N]ot as many jobs have materialized in Iowa as hoped (only about 35 direct jobs, or 133 direct and associated jobs, per 50 million gallon plant)… even if all of the planned ethanol refineries in the state come online, the future and current jobs associated with ethanol will still represent less than 1 percent of the current workforce. The actual number of new jobs has been disappointing to some small towns that gave tax breaks to ethanol plants, betting they would bring closer to 1,000 jobs… For every dollar spent on food in the United States… a farmer receives only about 7 cents… [186]
  - The second generation of liquid biofuel production facilities… will [] require the development of more capital-intensive, complex production facilities, giving a further edge to large companies. Already, large investments are signaling the emergence of a new "bio-economy" in the coming decades. They also point to the possibility that still-larger companies may enter the rural economy, putting the squeeze on farmers by controlling the price paid to feedstock producers in a given area and owning the rest of the value chain.[187]
  - The Brazilian Landless Workers' Movement points out that "the current model of production for bio-energy is sustained by the same elements that have always been the cause of the oppression of our

[180] ISOR, X-3.
[181] Collier, 2007.
[182] UN Energy, p. 49.
[183] Ziegler, p. 15.
[184] UN Energy, p. 6.
[185] UN Energy, p. 31.
[186] Widenoja, p. 13-14.
[187] UN Energy, p. 26.

peoples" — the appropriation of land, concentration of ownership and the exploitation of the labour force.[188]

- In some cases, large-scale, mechanized farming may displace workers and poor labor conditions are associated with some large-scale agricultural plantations.[189] In the sugar plantations of Brazil, one labor activist warned that "the social cost of [biofuels] policy is the overexploitation of labour with an army of seasonal workers who cut one ton of sugar cane for 2.50 reals (1.28 dollars) in precarious conditions which have already caused the deaths of hundreds of workers." An expert in agrarian development in Rio de Janeiro warned that the growth of the ethanol industry is breathing life into "a modern-day version of the sugar plantation slave-labour past".[190]
- There are several accounts of persistent violations of farmworkers' rights by agribusiness in the U.S. that require consideration.
- There are "examples of investment and policy support to small-scale, labour-intensive biofuel production systems aimed at providing employment and income for smallholders. For instance, Brazil introduced a 'social biodiesel' programme focused on small rural cooperatives, which is targeted specifically at poverty reduction."[191]

- Health and gender implications
  - "Health risks associated with the production of biomass feedstocks… are similar to those of modern agriculture, including exposure to pesticides and the operation of hazardous machinery. With regard to decentralized liquid or gaseous biofuel conversion, small-scale plants need special concern for labour safety, as hazardous or explosive materials such as methanol or methane are processed."[192]
- Implications for the structure of agriculture
  - The UC Berkeley report identified that "an increase in biofuel production can lead to a consolidation of land holdings which could affect small land owners with little political power."[193]
  - "The transition to liquid biofuels can be especially harmful to farmers who do not own their own land, and to the rural and urban poor who are net buyers of food, as they could suffer from even greater pressure on already-limited financial resources. This is one of the most significant threats associated with liquid biofuel development and calls for careful consideration by decision-makers… at their worst, biofuel programmes can result in concentration of ownership that could drive the world's poorest farmers off their land and into deeper poverty."[194]
  - "The poorest members of a society typically do not have official title to their land, and in some cases rely on alternative land tenure arrangements … While global market forces unleashed by the merging of the agriculture and energy industries could lead to new and stable income streams, they could also increase marginalization of the poor and indigenous peoples and affect traditional ways of living if they end up driving small farmers without clear land titles from their land and destroying their livelihoods."[195]
  - Land grabs for agrofuels are happening across Asia, Latin America and Africa, and often involve violence. Some 150,000 families in Argentina and 90,000 families in Paraguay have already been displaced by soya. The accelerating rate of soya expansion due to the agrofuel boom is associated with increasing frequency of evictions. In Tanzania, the UK-based Sun Biofuel Plc are having over 11,000 villagers evicted for jatrtopha biodiesel. In Indonesia, the Chair of the UN Permanent Forum on Indigenous Issues has warned that millions of indigenous peoples will soon become biofuel refugees.[196]
  - "Lessons must be learned from the more recent expansion of soya production across Latin America, which has contributed to the deforestation of vast swathes of the Amazonian basin and has resulted in the forcible eviction of many peasants and indigenous peoples from their lands. The non-governmental

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[188] Ziegler, p. 11-12.
[189] UN Energy, p. 17.
[190] Ziegler, p. 14.
[191] UN Energy, p. 37.
[192] UN Energy, p. 23.
[193] UC Berkeley Policy Report, p. 74.
[194] UN Energy, p. 26.
[195] UN Energy, p. 29.
[196] Biofuelwatch homepage, http://www.biofuelwatch.org.uk/

organization FIAN International has documented the complicity of agroindustrial corporations, large landowners and security forces in forced evictions in Brazil, Colombia, Argentina, Paraguay and Indonesia… In Paraguay, where the area planted with soya has more than doubled since the 1990's… many indigenous communities do not possess land titles and have been forcibly evicted. Houses, crops and animals were burned in the community of the Tetaguá Guarani, in the Primero de Marzo peasant camp and in the community of María Antonia. It is estimated that 350 similar cases occurred in Paraguay between 1990 and 2004. In Argentina… [v]illagers in the province of Santiago del Estero have been systematically threatened by soya agribusiness, by the paramilitaries paid to protect it, and by the state police. In the Colombian region of Chocó, communities of indigenous people and people of African descent have been evicted from their land after oil palm growing companies occupied the land. Similar cases have been recorded in Indonesia and Cameroon.[197]

- "A rapid increase in the prices of food crops will intensify competition over land and other natural resources, including forest reserves. This will pit peasant farmers and indigenous communities of forest dwellers against massive agribusiness corporations and large investors who are already buying up large swathes of land or forcing peasants off their land. The Belgian human rights organization Human Rights Everywhere (HREV) has already documented forced evictions, the appropriation of land and other violations of human rights in the palm oil plantations in Colombia, documenting responsibilities of all the actors along the production chain."[198]

- Implications for food security
  - Food prices will increase generating more hunger and starvation worldwide.[199]

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[197] Ziegler, p. 13.

[198] Ziegler, p. 13.

[199] *See*, Attachment 1 (below): Bryce, Robert, "14 Studies Have Exposed the High Cost of Ethanol and Biofuels: The Unraveling of the Ethanol Scam," Feb. 5, 2009, http://www.counterpunch.org/bryce02052009.html; *see also*, "Kraft calls for biofuels policy overhaul," *Food Navigator USA*, Sept. 5, 2008, http://www.foodnavigator-usa.com/Financial-Industry/Kraft-calls-for-biofuels-policy-overhaul/?c=mAVvOgHCeIC27yqX3WzWxA%3D%3D; "Secret report: biofuel caused food crisis - Internal World Bank study delivers blow to plant energy drive," *The Guardian* , Jul. 4, 2008, http://www.guardian.co.uk/environment/2008/jul/03/biofuels.renewableenergy; "U.S. survey ties biofuels to high food costs, hunger," *Environmental News Network*, Oct. 29, 2007, http://www.enn.com/top_stories/article/24142; "The End of Cheap Food," *The Economist*, Dec. 6, 2007, http://www.economist.com/opinion/displaystory.cfm?story_id=10252015; World food stocks dwindling rapidly, UN warns," *International Herald Tribune*, Dec. 18, 2007, http://www.nytimes.com/2007/12/18/business/worldbusiness/18supply.html?scp=3&sq=world%20food%20stocks%20dwindling%20rapidly&st=cse; "The incredible expanding popcorn price," *LA Times*, Mar. 15, 2008, http://articles.latimes.com/p/2008/mar/15/entertainment/et-popcorn15; "Ethanol Demand in U.S. Adds to Food, Fertilizer Costs," *Bloomberg.com*, Feb. 21, 2008, http://www.bloomberg.com/apps/news?pid=newsarchive&sid=aUIPybKj4IGs; "Corn Is King - and Therefore a Growing Problem" *Los Angeles Times*_, Mar. 2, 2008, http://articles.latimes.com/2008/mar/02/business/fi-corn2; "Reduced corn crop forecast plants fears" *Los Angeles Times* , Apr. 1, 2008, http://articles.latimes.com/2008/apr/01/business/fi-corn1; "Can't eat ethanol," *The Boston Globe*, Apr. 13, 2007, http://www.boston.com/bostonglobe/editorial_opinion/editorials/articles/2008/04/13/cant_eat_ethanol/; "Africa becoming a biofuel battleground: a new colonialism?," *African Agriculture* , Sept. 7, 2008, http://africanagriculture.blogspot.com/2008/09/africa-becoming-biofuel-battleground.html; "Hunger. Strikes. Riots. The food crisis bites," *U.K. Guardian* , Apr. 13, 2008, http://www.guardian.co.uk/environment/2008/apr/13/food.climatechange; "UN: Biofuel Production 'Criminal Path' to Global Food Crisis," *Environmental News Network* , May 1, 2008, http://www.enn.com/energy/article/35648#; "EU set to scrap biofuels target amid fears of food crisis," *The Guardian*, Apr. 19, 2008, http://www.guardian.co.uk/environment/2008/apr/19/biofuels.food?gusrc=rss&feed=networkfront; "U.N. food aid costlier as need soars," *LA Times*, Apr. 1, 2008, http://www.latimes.com/news/nationworld/world/la-fg-food1apr01,0,5185698.story; "Making a killing from hunger," *GRAIN* , Apr. 2008, http://www.grain.org/articles/?id=39; "Food or fuel?: As global starvation worsens, the U.S. plans to devote vast amounts of grain to producing ethanol," *LA Times*, Feb. 26, 2008, http://www.latimes.com/news/printedition/asection/la-ed-food26feb26,1,5542093.story; Call for 5 year moratorium on biofuels by UN Special Rapporteur on the Right to Food, *Report to UN General Assembly*, 2007, p. 8-14, http://www.righttofood.org/new/PDF/A62289.pdf; "Food lobby pressures New Jersey governor to request ethanol mandate waiver" *Biofuels Digest* , Jun. 27, 2008, http://biofuelsdigest.com/blog2/2008/06/27/food-lobby-pressures-new-jersey-governor-to-request-ethanol-mandate-waiver/

- Biofuels have forced global food prices up by 75% - far more than previously estimated - according to a confidential World Bank report obtained by the Guardian.[200]
- The threat of biofuels on food security will also impact subsistence farmers along with Indigenous communities in particular, such as Guatamala's Maya – the People of the Corn, who have already felt the impacts on their cultural and food staple.[201]
- The planned expansion of biofuels worldwide must be tallied and cumulatively assessed. For example, "Ethanol produced from corn kernels total 4.5 billion gallons in 2006. Production is growing rapidly in the United States..."[202] China also consumes 3 to 5 million tons of ethanol a year and has [in 2007] set-up 4 new processing plants.[203]

- Implications for government budget
  - A key European Union trade panel approved [in March 2009] temporary anti-dumping and anti-subsidy duties on imports of biodiesel from the United States.[204]
  - "Experience in Brazil, France, Germany, Mauritius, and the United States has shown that biofuel production facilities that are small and locally owned tend to bring about higher local revenues and lower social spending. Qualitatively, governments tend to get higher returns on investments by fostering small-scale production due to the lowered demand for social-welfare spending and the greater economic multiplier effects incurred where money is earned and spent by community members who obtain new or higher-paying jobs or businesses. Relative to large-scale producers, small-scale farmers or labourers generally buy more of their basic necessities and luxuries, and pay more of their sales and other taxes, near where they live and where they might have originally obtained their credit, price supports, etc."[205]
  - "A detailed study of subsidies for ethanol in the US calculated that [bioethanol] subsidies totaled US$5 billion in 2006, about half of this in the form of fuel tax credits and reductions. The subsidy amounted to more than 40% of the market price."[206]
  - State indemnity and liability issues for fuels later determined to damage private property.
- Implications for trade, foreign exchange balances, and energy security
  - "Agricultural commodities dominate the export earnings of many poor countries, but these earnings are limited by the fact that agricultural subsidies and other protectionist policies in industrialized countries have reduced international agricultural prices and limited access to the world's wealthiest markets. In the US, the government provides 16% of total farmer income, in Europe, 32%, and in Japan, 56%. Unlike with energy, most agricultural commodity prices today are well below the real price of 20 years ago. Trade agreements such as NAFTA have... flooded poor countries with cheap grain, while efforts to reduce industrial-country price supports and other subsidies have largely failed."[207]
- Impacts on biodiversity and natural resource management:
  - "Rapid growth in liquid biofuel production will make substantial demands on the world's land and water resources at a time when demand for both food and forest products is also rising rapidly."[208]
  - "One of the greatest risks... is the potential impact on land used for feedstock production and harvesting (particularly virgin land or land with high conservation value), and the associated effects on habitat, biodiversity, and water, air, and soil quality. Additionally, changes in the carbon content of soils, or in carbon stocks in forests and peat lands related to bioenergy production, might offset some or all of the GHG benefits."[209]

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[200] "Secret report: biofuel caused food crisis - Internal World Bank study delivers blow to plant energy drive," *The Guardian,* Jul. 4, 2008, http://www.guardian.co.uk/environment/2008/jul/03/biofuels.renewableenergy

[201] "The Genocidal Biofuel Agenda," Nov. 18, 2007, http://intercontine ntalcry.org/ the-genocidal- biofuel-agenda/

[202] *Water Implications of Biofuels Production in the United States*, p. 34-35.

[203] "The Genocidal Biofuel Agenda," 2007.

[204] "Green Trade War: EU Slaps Duties on U.S. Biodiesel," *Reuters*, Mar. 3, 2009, http://www.reuters.com/article/GCA-BusinessofGreen/idUSTRE51Q46F20090303

[205] UN Energy, p. 30.

[206] UN Energy, p. 39.

[207] UN Energy, p. 42.

[208] UN Energy, p. 7.

[209] UN Energy, p. 45.

- "Other potential impacts include the eutrophication of water bodies, acidification of soils and surface waters, and ozone depletion (all of which are associated with nitrogen releases from agriculture), as well as the loss of biodiversity and its associated functions. Finally, the loss of pastoral lifestyles associated with shrinking grasslands, and the loss of feed production for domesticated and wild herbivores that depend on these lands, could have significant negative economic and social impacts."[210]

- Implications for climate change
  - "Environmental degradation, desertification and global climate change are exacerbating destitution and desperation, especially in the highly arid countries of Sahelian Africa (see A/61/306). The International Panel on Climate Change has estimated that by 2050, there may be as many as 150 million 'environmental refugees' — people forced to leave their homes and lands for environmental reasons linked to global climate change, including desertification and land degradation."[211]
  - "Lessons must be learned from the more recent expansion of soya production across Latin America, which has contributed to the deforestation of vast swathes of the Amazonian."[212] Loss of irreplaceable virgin forests to agriculture accounts for 25% of global warming.
  - If electricity generation from natural gas power plants is further entrenched, as will likely occur with the development of 21 new natural gas power plants proposed across CA, an increase in demand for fuel electricity will result in increased emissions from power plants wiping out any reduction gains from the LCFS. For hybrids and electric vehicles that will increase the demand for electricity, we encourage the ARB to incentivize the use of renewable energy sources.

Unrestricted Banking of Credits Can Lead to Hoarding and Unquantifiable Emissions Reductions

AB32 § 38562(d)(1) requires that the ARB achieve reductions that are "quantifiable." However, the unlimited ability to "bank" credits will lead to future uncertainty in the system. Banking delays the achievement of the emission target if banked allowances are used."[213] A credit trading program that allows unrestricted banking means that California would not reach the LCFS intensity reduction target with any certainty in a given year, considering that banked credits could be used at any time. As an illustration of this, under the U.S. EPA Acid Rain Program, utilities banked about 31% of total allowances between 1995-1998, meaning that emissions could have risen if they decided to use their banked allowances to exceed the cap in a given year.[214] Also, allowing unrestricted banking will further inhibit technological innovation when regulated entities can purchase, speculate and stockpile credits for use for an indefinite amount of time. This in effect discourages entities from making substantial investments.

Banking of credits should not be allowed where severe air quality problems persist. For example, even RECLAIM did not allow banking into the future, outside of allowing the limited exchange between the two compliance periods.[215] A "reason that program designers chose to limit banking was that the locality faced a severe air quality problem and policymakers were concerned that banking would cause potential emission spikes."[216] Comparable to the situation under RECLAIM, where the LCFS and AB32 will apply across both Los Angeles and the Central Valley, areas that compete as having the worst air

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[210] UN Energy, p. 46-47.
[211] Ziegler, p. 16.
[212] Ziegler, p. 13.
[213] EPA, "Tools of the Trade: A Guide to Designing and Operating a Cap and Trade Program for Pollution Control," Jun. 2003, p. 39, http://www.epa.gov/airmarkets/resource/docs/tools.pdf
[214] Bearden, David M., "98-563: Air Quality and Emissions Trading: An Overview of Current Issues," CRS Report for Congress, Aug. 16, 1999, http://digital.library.unt.edu/govdocs/crs//data/1999/upl-meta-crs-844/98-563_1999Aug16.html
[215] EPA, "Tools of the Trade: A Guide to Designing and Operating a Cap and Trade Program for Pollution Control," p. 40.
[216] EPA, "Tools of the Trade: A Guide to Designing and Operating a Cap and Trade Program for Pollution Control," p. 40.

quality in the entire U.S., the LCFS should not allow banking of credits if a credit trading program is established.

Allowing unrestricted banking is contrary to other pollution trading regimes. Where banking was permitted in the OTC Regional NOx Trading Program in the Northeastern States', automatic limits were imposed to "guard against the excessive use of banked allowances in any single compliance period," and resulting in a "stratified price structure which values banked allowances significantly less than present year allowances."[217] Under the Bay Area Air Quality Management Districts' Emissions Banking program "There are a number of restrictions on what emission reductions will qualify for a banking certificate", including that the new controls must be "real, permanent, quantifiable, and enforceable" and must exceed reductions required by measures in the Districts' Plan, rules and regulations, and state and federal law.[218] Similarly, if a banking provision is adopted under the LCFS, several requirements should be imposed so that the standard meets AB32's requirements for real, permanent, quantifiable, verifiable, and enforceable GHG emissions reductions as well. As a non-exhaustive list, the ARB should: impose a short time limit of 2-3 years after which banked credits would expire helping quantify emissions and lessening speculation; discount banked allowances significantly less than present allowances encouraging present day reductions; impose an automatic limit on the use of banked allowances whenever the bank reaches a certain level so as not to risk over-allocation; forbid use of banked credits in communities historically overburdened by pollution; explicitly require banked reductions to not interfere with state and federal air pollution laws, increase toxic nor criteria pollutants, nor disproportionately impact low-income communities; and to the greatest extent possible, be designed to encourage actual present-day GHG emissions reductions to the maximum extent feasible to achieve the greater goal of 50% emissions reductions by 2050.

Recommendations Against Credit Trading & Suggested Alternatives

We recommend against designing the LCFS as a credit trading program because it is not the most effective or efficient approach to reduce carbon emissions,[219] creates opportunities for emissions falsification and fraud for entities to gain monetary profit, leads to unpredictable fluctuations in energy prices that may impact low-income Californians severely,[220] inhibits technological innovation needed to realize the long-term 50% reductions goal, will not avoid interference with air toxic or criteria pollutants, does not provide opportunities for public participation, nor achieve reductions that are "real, permanent, quantifiable, verifiable, and enforceable" as required under §§ 38562(d)(1); 38570(b)(2); 38562(b)(4); 38570(b)(1); 38562(b)(2); 38565. Rather, we advocate the following program designs:

1. Direct regulation of each fuel-provider in the state to reduce their respective carbon intensities', as required under Exec. Order 01-07, as the best means for the government to achieve actual GHG emissions reductions.
2. Support and incentivize fuels that use currently existing and proven technologies which if deployed rapidly, could (A) reduce our reliance on fossil fuels, (B) result in cleaner air which would greatly

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[217] EPA, "Tools of the Trade: A Guide to Designing and Operating a Cap and Trade Program for Pollution Control," p. 40, *quoting*, Farrell, et at., "The NOx budget: Market-based control of tropospheric ozone in the northeastern United States," *Resource and Energy Economics*, 21 (2), 1999, p. 103-124.

[218] Bay Area Air Quality Management District (BAAQMD) Emission Bank Status, CARB ERC Offsets Page, http://www.baaqmd.gov/pmt/emissions_banking/index.htm

[219] *See e.g.*, http://www.ejmatters.org/docs/Cap_Trade_Trail_of_Failures_1pg.pdf

[220] *See e.g.*, "Time to tax carbon," *Los Angeles Times*, May 28, 2007, http://www.latimes.com/news/opinion/la-ed-carbontax28may28,0,2888366.story?coll=la-opinion-leftrail

benefit the health of our communities, (C) create new green job bases for our communities, and (D) reduce greenhouse gas emissions significantly. Whereas, carbon trading in itself does nothing to help those beneficial technologies such as solar and wind power become a majority source of our power needs.

3. Reform State Agency subsidy programs to eliminate huge government investments in fossil and biofuels and other polluting technologies, and redirect investments toward zero/ little carbon technology, such as solar and clean electric power. Dare to pick fuel "winners" that produce the least or ideally, zero carbon which could actually achieve the long-term goal of 50% reductions by 2050, and avert the "climate catastrophe" that we may only have 10 years to avert.
4. "As demonstrated in Los Angeles, the more unrestricted an emissions trading program, the more likely that unjust hot-spot impacts, over allocations, and fraudulent transactions will result… Serious restrictions are needed on the proposed global pollution trading system to prevent the worst abuses of an inherently flawed environmental policy tool. However, protecting public health, civil rights, and economic security would be better realized by halting further reliance on pollution trading. Instead, an effective floor of clean technology-forcing regulations, enhanced by other market-based strategies such as subsidy reform and progressive pollution [fees], provide the best means of ensuring a just, participatory, and environmentally sustainable future."[221]

We thank you for the opportunity to submit these comments.

Sincerely,

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[221] Drury, p. 289.

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- **Appendix E** (on CD): Marquez, Jesse N., "Hydrogen Power Plants & Carbon Capture Sequestration: Risks, Liabilities, Hazards," Nov. 8, 2007, RACE Conference Presentation
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- **Appendix H** (on CD): "The Geopolitics of Agrofuels: Position Paper of the Global South on Food Sovereignty, Energy Sovereignty and the transition towards a post-oil society"
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February 5, 2009

14 Studies Have Exposed the High Cost of Ethanol and Biofuels

The Unraveling of the Ethanol Scam

By ROBERT BRYCE

On its website, Wisconsin-based Renew Energy says it is the "biofuels industry leader for innovation and efficiency." It goes on, saying that its new 130 million gallon per year ethanol plant in Jefferson, Wisconsin is "the largest dry mill corn fractionation facility in the world" which uses 35 percent less energy and 33 percent less water than similar ethanol plants.

That would be impressive but for one fact: Renew Energy just filed for bankruptcy.

The failure of Renew is the latest bankruptcy in the corn ethanol industry, a sector that despite billions of dollars in federal subsidies, hasn't been able to prove its long-term economic viability. About 9 percent of all the ethanol plants in the US have now filed for bankruptcy and some analysts believe the numbers could go as high as 20 percent.

Even if the 20 percent figure is never reached, it's readily apparent that billions of investment dollars will be lost on the corn ethanol scam, a darling of farm state legislators. Today, about four years after Congress increased the mandates on the use of corn ethanol in gasoline, the US is nowhere close to the much-promised goal of "energy independence." Instead, the increasing use of corn to make motor fuel has caused a myriad of problems. Chief among them: increased food prices.

While it's true that other factors have helped inflate food prices, including rising energy prices and increased grain demand in other countries, it's also abundantly obvious that the corn ethanol industry has had a major effect on food prices. The reason is obvious: in 2008, some 4.1 billion bushels of corn – fully one-third of the US crop – was used to make motor fuel. And the results are being seen in the supermarket.

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In mid-January, the Bureau of Labor Statistics reported that in 2008, food prices jumped by nearly 6 percent. That comes on the heels of food price increases of 4.8 percent in 2007. Some agricultural economists are now predicting that food prices could increase by as much as 10 percent in 2009. Worse still, those increases are coming at the same time that the global economy is foundering and U.S. unemployment rates are soaring.

Some of that unemployment is happening within the ethanol sector itself. Renew, which had $184.2 million in revenue in 2008, filed Chapter 11 papers on January 30, just nine days after it posted an article on its website from Ethanol Producer Magazine which touted their new ethanol production process as one that "adds up to higher profitability and sustainability."

The failure of Renew occurred just two days after Oregon-based Cascade Grain Products filed for Chapter 11. Cascade began operating its 108 million gallon per year distillery in Clatskanie, Oregon last June. Another distiller, New York-based Northeast Biofuels, filed for bankruptcy on January 14. That company's plant, a $200 million facility with 100 million gallons per year of capacity, began operating last August. In October, VeraSun Energy, the second-largest ethanol producer in the country, declared bankruptcy. Other recent failures in the sector include Greater Ohio Ethanol and Gateway Ethanol.

It may be unkind to kick the ethanol industry while it is circling the drain, but little of this financial news is overly surprising. The corn ethanol industry has always depended on federal handouts for its existence. And given this string of bankruptcies, it's worth reviewing the many studies produced over the past two years that have shown the high costs of ethanol and biofuels. Thus far, I've found 14 of them. If readers find more, please send them along.

1. In May 2007, the Center for Agricultural and Rural Development at Iowa State University released a report saying the ethanol mandates have increased the food bill for every American by about $47 per year due to grain price increases for corn, soybeans, wheat, and others. The Iowa State researchers concluded that American consumers face a "total cost of ethanol of about $14 billion." And that figure does not include the cost of federal subsidies to corn growers or the $0.51 per gallon tax credit to ethanol producers.

2. In September 2007, Corinne Alexander and Chris Hurt, agricultural economists at Purdue University, found that "about two-thirds of the increase" in food price increases from 2005 to 2007 was "related to biofuels." The report also says, "Based on expected 2007 farm level crop prices, that additional food cost is estimated to be $22 billion for U.S. consumers compared to farm prices for the

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crops produced in 2005. A rough estimate is that about $15 billion of this increase is related to the recent surge in demand to use crops for fuel."

3. October 2007, the International Monetary Fund said, "Higher biofuel demand in the United States and the European Union (EU) has not only led to higher corn and soybean prices, it has also resulted in price increases on substitution crops and increased the cost of livestock feed by providing incentives to switch away from other crops."

3. In March 2008, a report commissioned by the Coalition for Balanced Food and Fuel Policy (a coalition based in Washington, D.C. of eight meat, dairy, and egg producers' associations), estimated that the biofuels mandates passed by Congress will cost the U.S. economy more than $100 billion from 2006 to 2009. The report declared that "The policy favoring ethanol and other biofuels over food uses of grains and other crops acts as a regressive tax on the poor." It went on to estimate that the total cost of the U.S. biofuels mandates will total some $32.8 billion this year, or about $108 for every American citizen.

4. An April 8 internal report by the World Bank found that grain prices increased by 140 percent between January 2002 and February 2008.
"This increase was caused by a confluence of factors but the most important was the large increase in biofuels production in the U.S. and E.U. Without the increase in biofuels, global wheat and maize [corn] stocks would not have declined appreciably and price increases due to other factors would have been moderate." Robert Zoellick, president of the Bank, acknowledged those facts, saying that biofuels are "no doubt a significant contributor" to high food costs. And he said that "it is clearly the case that programs in Europe and the United States that have increased biofuel production have contributed to the added demand for food."

5. In May, the Congressional Research Service blamed recent increases in global food prices on two factors: increased grain demand for meat production, and the biofuels mandates. The agency said that the recent "rapid, 'permanent' increase in corn demand has directly sparked substantially higher corn prices to bid available supplies away from other uses – primarily livestock feed. Higher corn prices, in turn, have
forced soybean, wheat, and other grain prices higher in a bidding war for available crop land."

6. Also in May, Mark W. Rosegrant of the International Food Policy Research Institute, testified before the U.S. Senate on biofuels and grain prices. Rosegrant said that the ethanol scam has caused the price of corn to increase by 29 percent, rice to increase by 21 percent and wheat by 22 percent. Rosegrant estimated that

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if the global biofuels mandates were eliminated altogether, corn prices would drop by 20 percent, while sugar and wheat prices would drop by 11 percent and 8 percent, respectively, by 2010. Rosegrant said that "If the current biofuel expansion continues, calorie availability in developing countries is expected to grow more slowly; and the number of malnourished children is projected to increase." He continued, saying "It is therefore important to find ways to keep biofuels from worsening the food-price crisis. In the short run, removal of ethanol blending mandates and subsidies and ethanol import tariffs, and in the United States—together with removal of policies in Europe promoting biofuels—would contribute to lower food prices."

7. In mid-June, Kraft Foods Global sponsored a report by Keith Collins, the former chief economist for the U.S. Department of Agriculture economist. In his 34-page analysis of grain prices, Collins concluded the ethanol scam "may account for up to 60 percent of the increase in corn prices between 2006/07 and 2008/09.

8. In late June, Oxfam, the non-profit group that fights global hunger, released a report declaring that biofuels are responsible for about 30 percent of the recent increases in global food prices, and are pushing 30 million people into poverty. Rob Bailey, Oxfam's biofuel policy adviser, summarized the report: "Rich countries' demands for more biofuels in their transport fuels are causing spiraling production and food inflation."

9. In early July, Britain's Renewable Fuels Agency concluded, "Biofuels contribute to rising food prices that adversely affect the poorest." The report, known as the Gallagher Review, also said that demand for "[biofuels] production must avoid agricultural land that would otherwise be used for food production. This is because the displacement of existing agricultural production, due to biofuel demand, is accelerating land-use change and, if left unchecked, will reduce biodiversity and may even cause greenhouse gas emissions rather than savings. The introduction of biofuels should be significantly slowed."

10. On July 16, the Organization for Economic Cooperation and Development (O.E.C.D.) issued its report on biofuels that concluded: "Further development and expansion of the biofuels sector will contribute to higher food prices over the medium term and to food insecurity for the most vulnerable population groups in developing countries."

11. Also in July, the U.S.D.A., the federal agency that has long been one of the corn ethanol sector's biggest boosters, admitted that corn ethanol is driving up food prices. That's somewhat remarkable given that the agency's leaders have consistently downplayed the link. Nevertheless, in July 2008, the department

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released a report called "Food Security Assessment, 2007," which states very clearly that the biofuels mandates are pushing up food prices. The first page of the report says:

...the persistence of higher oil prices deepens global energy security concerns and heightens the incentives to expand production of other sources of energy including biofuels. The use of food crops for producing biofuels, growing demand for food in emerging Asian and Latin American countries, and unfavorable weather in some of the largest food-exporting countries in 2006-07 all contributed to growth in food prices in recent years."

While that admission is noteworthy, the July 2008 report's importance lies with its projections about the growing numbers of people around the world who are facing food insecurity. And while the U.S.D.A. report does not correlate this increasing food insecurity with soaring ethanol production, the connections are abundantly clear: As the U.S. uses more corn to make motor fuel, there is less grain available on the market. That means higher prices. And that's a key factor for residents of poor countries who generally spend a higher percentage of their income on food than their counterparts in the developed world.

For instance, in the U.S. only about 6.5 percent of disposable income is spent on food. By contrast, in India, about 40 percent of personal disposable income is spent on food. In the Philippines, it's about 47.5 percent. In some sub-Saharan Africa, consumers spend about 50 percent of the household budget on food. And according to the U.S.D.A., "In some
of the poorest countries in the region such as Madagascar, Tanzania, Sierra Leone, and Zambia, this ratio is more than 60 percent."

The July 2008 U.S.D.A. report goes on saying that the number of people facing food insecurity jumped from 849 million in 2006 to 982 million in 2007. And those numbers are expected to continue rising. By 2017, the number of food-insecure people is expected to hit 1.2 billion. And, says the U.S.D.A., "short-term shocks, natural as well as economic" could make the problem even worse.

12. In September 2008, the International Monetary Fund estimated that 70 percent of the recent increase in corn prices was due to the ethanol scam. In a report to the United Nations, Olivier de Schutter, a Belgian academic, said "Policies aimed at promoting the use of agrofuels from feedstock, having an inflationary impact on staple foods, could only be justified under international law if very strong arguments are offered."

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13. On October 7, 2008 the United Nations Food and Agriculture Organization weighed into the debate with a 138-page report called "Biofuels: prospects, risks and opportunities." In the section on food, the report concludes that "Rapidly growing demand for biofuel feedstocks has contributed to higher food prices, which pose an immediate threat to the food security of poor net food buyers (in value terms) in both urban and rural areas."

14. On January 30, the University of Minnesota announced the results of a new study which compared the overall cost of corn ethanol with that of gasoline. "Total environmental and health costs of gasoline are about 71 cents per gallon, while an equivalent amount of corn-ethanol fuel costs from 72 cents to about $1.45, depending on the technology used to produce it," said the university. Stephen Polasky, a professor in the university's applied economics department, said that "These costs are not paid for by those who produce, sell and buy gasoline or ethanol. The public pays these costs."

http://www.counterpunch.org/bryce02062009.html

Weekend Edition
February 6-8, 2009

Another Study Exposes Bio-Fuel Scam

Corn Dog Update

By ROBERT BRYCE

A couple days ago, I published a piece listing 14 studies that have exposed the high costs of the ethanol scam. But I overlooked two points: A new study by Cornell University's David Pimentel, and the latest numbers showing the amount of corn ethanol distilling capacity that has been idled due to negative margins.

On January 29, Pimentel, a professor of ecology at Cornell University who has been researching the corn ethanol issue for more than two decades, published another report on the costs of producing motor fuel from grain. His article, which has seven co-authors, appeared in the journal *Human Ecology*. In the article, "Food Versus Biofuels: Environmental and Economic Costs," Pimentel and his fellow researchers found that "using food and feed crops for ethanol production has brought increases in the prices of US beef, chicken, pork, eggs, breads,

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cereals, and milk of 10 percent to 20 percent." It concludes "Using food crops to produce ethanol raises major nutritional and ethical concerns. Nearly 60 percent of humans in the world are currently malnourished, so the need for grains and other basic foods is critical....Growing crops for biofuel not only ignores the need to reduce natural resource consumption, but exacerbates the problem of malnourishment worldwide by turning food grain into biofuel."

Pimentel's report provides yet more ammunition for ethanol critics. And while that report is important, Tom Elam, an Indiana-based agricultural economist and a long-time critic of the ethanol industry, reminded me that data is easily obtainable that shows the level of distress in the industry. Ethanol Producer Magazine tracks the number of ethanol plants that have quit producing fuel. Its latest numbers show that 32 ethanol distilleries are now idled. (For those of you scoring at home, see: www.ethanolproducer.com/plant-list.jsp?country=USA&view=idle)

The capacity of the idled plants is 2 billion gallons per year. According to the Renewable Fuels Association, the US now has 12.3 billion gallons of ethanol production capacity. Thus, about 16.1 percent of all the ethanol capacity in the US has been idled due to high corn costs – which are, in part, a result of the ethanol industry's own demand for grain – and relatively low gasoline prices.

During a brief telephone interview on Thursday, Pimentel told me that he continues to be amazed that Congress still supports the idea of corn ethanol. He is equally dismissive of the concept of cellulosic ethanol, a substance which, in theory, can profitably produce motor fuel from switchgrass, corn stubble, or other biomass. Although promoters have been pushing cellulosic ethanol for decades – and it is now being pushed hard by the Democrats on Capitol Hill -- Pimentel's latest report estimates that the energy return on energy invested in cellulosic ethanol is minus 68 percent. (Pimentel puts the EROEI on corn ethanol at a negative 46 percent. Some of the most-widely cited reports on corn ethanol, particularly those done by the US Department of Agriculture show that corn ethanol has a slightly positive EROEI.) "It's absolutely ridiculous," says Pimentel. Congress and others who are promoting the idea "haven't even done the most basic calculations about what it would mean to make cellulosic ethanol."

When it comes to making fuel from biomass, he told me, "I wish that it did work. But I'm a scientist first and an agriculturalist second."