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SUSTAINABLE BIOFUELS

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Sierra Club Guidance on Biofuels

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This Sierra Club Guidance on Biofuels was developed by the Sierra Club Sustainable Biofuels Task Force in 2008. It is a guide for activists at all levels of the Sierra Club in implementing the Biofuels policy which is found beginning on page 16 of the Club's Energy Resources Policy:

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<https://www.sierraclub.org/sites/www.sierraclub.org/files/Energy%20Resources.pdf>
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You can find the exact language here: Sierra Club Guidance on Biofuels
<http://www.sierraclub.org/policy/energy/biomass-guidance>

1. What are "biofuels"? Biofuels are liquid fuels made from either food-based or non-food sources, agricultural residues, crops suitable for biodiesel such as soy and palm, and other promising options such as aquatic plants.
2. What is the Sierra Club's position on corn-based ethanol as a biofuel? The Club opposes further deployment of corn-based ethanol based on its extremely dubious net carbon benefits and its unresolved direct and indirect environmental impacts. The Club also opposes proposals to use agricultural waste and residue products (e.g , corn stover) without rigorous evidence that the material being used is surplus to the needs of soil health and fertility

In 2015 biofuels production in the US is still primarily based on corn-based ethanol, an industry that receives enormous federal subsidies and preferences. The corn ethanol industry has not only failed to prove its sustainability, but if anything, concerns about corn ethanol's impacts have grown. Those concerns don't apply equally to all biofuels. An October, 2007 report from the National Research Council (NRC) notes that "biofuels production will be an important component of the nation's energy portfolio for at least the next several decades." The report detailed many adverse impacts from corn ethanol production in particular, including chemical

pollution, nutrient and sediment loading of rivers and streams, and further depletion of already-stressed aquifers and groundwater. Two recent studies warn of another serious risk of corn ethanol production: runoff from nitrogen fertilizers ultimately results in ocean releases of carbon dioxide and of nitrous oxide, a far more potent greenhouse gas. These impacts must be considered as part of climate change scenarios. As the NRC report notes, the current regulatory system is especially ill-equipped to deal with the problem of nutrient loading – the cause of eutrophication and the “Dead Zone” in the Gulf of Mexico – because most nutrient pollution comes from non-point sources. The NRC warns that “If projected future increases in use of corn for ethanol production do occur, the increase in harm to water quality could be considerable. Given the likelihood that cellulosic biofuels often will have less impact on water quality per unit of energy gained, it seems prudent to encourage the transition from corn ethanol to the next generation of biofuels.” With the caution that all biofuels still need more research, the Sierra Club supports the NRC recommendation. It’s time to move beyond corn.

3. What is the Sierra Club position on biodiesel?

Sierra Club supports the manufacture of biodiesel fuels derived from the re-use of cooking oils. Crop-based biodiesel projects must be evaluated based on overall greenhouse gas savings, impacts on local sustainable agriculture, food production needs, and all environmental impacts including GMOs.

4. What is the Sierra Club's basic approach to state and national legislation and rulemaking?

The Sierra Club has one consistent national position. We support increased research, demonstration, deployment, and commercialization of new sustainable advanced biofuels from non-food resources. Supported biofuels must entail lower carbon emissions than gasoline on a full lifecycle basis.

5. How should activists reply to a request for a "quote" on the biofuels issue from the local media?

The Sierra Club believes that responsibly grown feed stocks for biofuels and responsibly designed and -sited biofuels facilities are an available and important part of the solution to the challenge of global warming. As with almost any renewable resource of significant size, biofuels have some unavoidable environmental impact. In choosing biofuel sources or facilities the Sierra Club believes that a specific feed stock or facility to produce biofuels should in general comport with Sierra Club’s values/policies to protect special places, water resources, prevent air pollution, and promote environmental justice.

We must consider all possible ways to reduce the global warming pollution that spews from vehicle’s tailpipes. Biofuels derived from non-food resources can play a role in achieving this goal while also reducing our dependence on oil. Sierra Club supports the development and deployment of non-food, or cellulosic, biofuels that can be proven to be significantly better than existing gasoline on a full life-cycle basis.

6. How should some of our real concerns about biofuels be phrased so as to align with and support the Club's overall solutions-based approach to the climate/energy issue?

The Club has adopted a solutions-based approach to its climate advocacy because our experience tells us that we lose our credibility with the public if we are seen as opposing anything which is not perfect. The public wants to hear solutions to climate change. In line with this approach, it is better for us to speak to the solutions that preferable sources of biofuels offer society, rather than in fierce opposition to food-based or other more flawed biofuels sources. The Club has not supported corn-based ethanol provisions of recent legislation, primarily because of the intensive use of chemicals in corn production and because corn-based ethanol offers little or no reduction in carbon emissions.

While some source of liquid fuels will be required in the future, the Club strongly supports reducing the fuel consumption used in transportation as well as development of responsible biofuels. Transportation contributes approximately one third of US greenhouse gas pollution. Switching to non-food (which includes cellulosic) biofuels can play a role in reducing carbon emissions from motor vehicles and the petroleum dependence associated with them. Biofuels, however, cannot provide most or all of our petroleum substitute needs. In addition to continuing to support increasing fuel economy standards and California's Pavley greenhouse gas standards, we support the development of electric and plug-in hybrid cars that can be fueled with electricity at reduced overall impact. Finally, we need to make shifts in travel practices such as developing more livable communities where people live closer to where they work and play, improvements in mass transit and telecommuting, and much more. The transportation sector is the easiest place to find early efficiency reductions, and the hardest place to identify a complete elimination of fossil fuel needs. We support research in regard to cellulosic ethanol. At present no commercial facilities exist to allow us to evaluate the real processes and impacts. Sierra Club supports the manufacture of biodiesel fuels derived from the re-use of cooking oils or other waste, which is recycling.

We continue to look to the fuels industry to produce clean renewable biofuels that do not present sustainability issues. But most of the technologies proposed today are very limited in potential scale, not commercially viable today, or both. Even cellulosic ethanol from switchgrass or other sources faces technical and commercial challenges. Any potential liquid fuel for motor vehicles must be shown, from field/source to wheel, that it provides a net benefit to the environment over gasoline.

7. How do we balance impacts from biofuels with those from other renewables the Club also supports?

Biofuels alone cannot solve the grave threat of climate change. We need significant changes in consumption patterns and efficiency gains in our buildings, appliances, industries, and transportation.

Renewables are a crucial part of the solution -- and almost all renewable energy sources have

significant environmental impacts. We might not support any of them, were not the impacts of climate change so compelling and in need of urgent action. Biofuels, like wind and solar and geothermal energy sources, are not free of impacts, but through proper choices about sources and plant siting, the Club can reduce them to an acceptable level.

8. How do biofuels fit with trading in carbon credits?

Biofuels should not be candidates for credits in carbon trading programs. In order to cause a net reduction in atmospheric CO₂, carbon reduction programs must affect the release of fossil fuel CO₂. Manufacture of biofuels does not guarantee a reduction in fossil fuel use and therefore may not result in reductions of atmospheric CO₂. Therefore trading programs must issue allowances to fossil carbon sources only. Should the production of biofuel cause a real reduction in fossil fuel use, the fossil fuel source(s) will have unused allowances to sell or trade. Sierra Club will encourage fossil fuel sources to provide financial support to sustainable biofuels producers should a viable carbon trading market emerge, but the direct assignment of credits cannot be done without distorting the ultimate control of overall emissions.

9. How should Sierra Club respond to a proposal to site an ethanol plant?

Biofuels plants are somewhat similar to breweries, but there are often additional chemical inputs, so citizens should ask the same questions they ask regarding other chemical facilities. Nutrient and chemical pollution standards must be part of their permits. Energy and water needs and sources should be identified in the initial plans.

Different types of cellulosic technology may generate different types of pollution, including atmospheric, land and water escape of products, by products and contaminants, and disposal of by-products which can't be economically sold. All of these need to be considered, together with transportation of materials and the disruption of habitat due to the exact site selected and the high water use which will generally be involved. Where biomass is burned for fuel used in the process, the smoke may cause air quality and environmental justice issues. If there are toxic contaminants in the starting materials (leaves from municipal street cleaning may be contaminated from cars or runoff, for example), their fate must be considered. An environmental impact statement is the appropriate way to address these concerns.

The Sierra Club gives preference to encouraging the research and development of cellulosic ethanol, and therefore supports the siting and construction of cellulosic ethanol facilities that meet the criteria described above. At present no commercial-scale facilities exist to allow us to evaluate the real processes and impacts. Research on the impacts of land use associated with growing crops for fuel and potential impacts on world food are revealing that corn-ethanol may be a net negative. See Science magazine report: [Use of U.S. Croplands for Biofuels Increases Greenhouse Gases Through Emissions from Land-Use Change](http://www.sciencemag.org/cgi/content/abstract/319/5867/1238?rss=1).
(<http://www.sciencemag.org/cgi/content/abstract/319/5867/1238?rss=1>)
<http://www.sciencemag.org/content/319/5867/1238.abstract?rss=1>

10. In what situations should our general support for cellulosic shift over to opposing some proposed plant?

Site-specific concerns as well as technological considerations could lead us to oppose a proposal. The source of the feedstock, the location, and the technology for processing the feedstock for cellulosic ethanol pose different considerations. All must be addressed. Processing facility considerations include the energy required for fermentation and distillation, as well as the toxicity or reusability of any wastes or residuals.

The negative issues which the Sierra Club sees with growing resources for biofuels include net energy balance, where for example corn depends on fossil fuel-based fertilizer, pesticides and intensive land management, drying and transport, intensive dependence on water, economic pressures to increase farming on marginal lands (lands which are more subject to erosion, which require more intensive fertilization and mechanical management) and conservation reserve lands, and finally on lands which have natural or habitat value, and direct competition for food production. Many of these problems are associated more with growing corn for conversion to ethanol, but may also apply to growing non-food feedstocks. The proponent must be able to guarantee that it has the funds to carry out the project and comply with all applicable laws. Generating biofuels can place enormous demands on water resources so special attention should be given to this issue. All technologies generate some waste and we should oppose plants which do not adequately contain such wastes and which may harm human health or important habitat.

Though it is likely that growing cellulosic ethanol will use less land, less fossil energy input and produce more ethanol at a lower cost than sugar/starch (corn) ethanol production, it still might stimulate similar abusive agricultural practices and supplementary fossil fuel input if policy and practice are not aligned to promote true sustainability.

11. What is the relationship between biofuels and sustainable agriculture?

Sustainable biofuels projects can be a part of the strategy to promote sustainable agriculture, in addition to reducing transportation energy costs and reducing greenhouse gas emissions. In making decisions about projects we have to be careful to weigh the land use issues, the water issues, and the true costs to the global commons. The use of locally produced biofuels to run agricultural machinery and for other farm energy needs is an important opportunity to cut petroleum inputs in agriculture.

12. What are the differences between alternative cellulosic feedstocks?

Society needs to invest in biofuels research in order to learn a lot more about which are the best feedstocks and processes. A number of very interesting technologies could develop to commercial status, including algae production of biofuels, particularly in association with municipal sewage treatment, better bacterial digestion of starches, sugars and cellulose, and water crops, and the biological production of hydrogen. A number of waste streams, including

vegetable oils, waste animal fats such as lard, landfill gas, segregated yard and tree trimming waste and more, offer potential sources of biofuel feedstock. All of these are potentially sustainable or good for the environment. None of them are immune to bad practices and degradation of some aspect of the commons.

13. When should we be cautious about feedstocks we generally prefer, such as switchgrass?

When peer-reviewed research suggests that there could be negative consequences. Proposals to replace native mixed grass prairies, which have high biodiversity value, with switchgrass should be a carefully made, local decision. "Each biofuel crop shares many characteristics with established invasive weeds. Switchgrass was found to have a high invasive potential in California, unless sterility is introduced" (BioScience, Volume 58, Number 1. "Nonnative Species and Bioenergy: Are We Cultivating the Next Invader?") It's possible that ocean-based systems can use algae to produce biomass without encroaching on land use, but there will still be issues of coastal degradation, water pollution, reef destruction and so forth to consider.

While harvesting native-mixed grass prairies appears to be preferable to farmed crops in that chemical inputs and runoff are reduced, wildlife habitat is preserved, and soils are not disturbed, there may be some real downsides to growing switchgrass for biofuels. According to Fargione, "Landclearing and the Biofuels Carbon Cleaning Debt" (<http://www.sciencemag.org/content/319/5867/1235.abstract> (<http://www.sciencemag.org/content/319/5867/1235.abstract>)) : "There's almost three times as much carbon in plants and soil as there is in the air. So when the soil is disturbed -- when rain forests are cut to plant sugar cane, or prairie is plowed to plant corn, or tropical peatlands are drained to plant palm trees -- it releases carbon from the existing plants and the soil into the air."The critical point in this new research is that there may be an enormous carbon outgassing created by disturbing land for conversion to switchgrass "farming" that may take 100s of years to offset by the lesser greenhouse gas emissions associated with the biofuel.

14. What does Sierra Club say about the use of genetic engineering in producing biofuels?

Genetically engineered crops have been advanced as good candidates for biofuel production. The Club's policy is for a moratorium on outdoor release of genetically engineered organisms and for their use only with strict containment. The Club doesn't oppose the use of genetic technologies where there is no release of genetically engineered organisms into the environment, whether in biomedical and pharmaceutical applications or to produce industrial enzymes. Thus we would oppose the outdoor, uncontained growth of bacteria or algae genetically engineered to produce oils or fuel intermediates rather than carbohydrates. We would not oppose the use of special enzymes produced through genetic technology in confined indoor applications where the organisms aren't released. Such enzymes would assist in digesting plant materials such as cellulose and lignin. We are opposed to genetically engineered trees such as low lignin eucalyptus for biofuels production.

15. How should the Sierra Club respond to questions about biofuels, food prices, and world

hunger?

Grain-based ethanol and biodiesel made from palm oil are leading to bad land use decisions and diverting food from the human diet to fuel, and thus are one factor pushing up food prices. Corn based ethanol also uses almost as much energy (fossil fuel) to produce as it yields during combustion, so it makes almost no dent in our petroleum dependence, and high petroleum prices also cause high food prices.

However, the impacts on food supply from cellulosic biofuels promise to be much smaller. Switchgrass, for example, generally can be grown on non-prime agricultural land, and requires much less intensive agricultural practices.

A new report addresses the biofuels question from the perspective of communities trying to feed themselves: http://www.worldhungeryear.org/fslc/pubs/fueling_disaster.pdf (http://www.worldhungeryear.org/fslc/pubs/fueling_disaster.pdf). "Federal renewable fuels policies in the US have mandated major increases in U.S. agrofuel consumption, causing countries such as Brazil to increase biofuels production to meet our demand. The ecological and social footprint of agrofuel consumption is increasing throughout the world as other countries are joining this trend." Globally, we should contribute to programs that promote the capacity of agriculture to provide for the need for food in a manner that is sustainable."

16. What is the Sierra Club's guidance about international biofuels?

As our fuels policy says: "The Sierra Club supports the import of biofuels only when a certification process is established internationally to eliminate the conversion of endangered rainforests, native grasslands and other endangered ecosystems to biofuel crops." Therefore we should not support international trade in biofuels unless there is an effective worldwide system of controls to assure that they aren't produced in environmentally damaging ways or divert vital food resources from the poorer parts of the world in order to fuel vehicles in the richer nations, that they don't encroach on tribal lands, biological hot spots and protected areas, or threaten fragile or endangered ecosystems.

Sierra Club opposes any proposed international trade agreements which, while setting minimum standards, preempt the ability of nations to individually set higher, more protective standards.

17. Why is a certification process for biofuels important?

Certification programs based on sustainability, environmental protection, transparency and fairness must be established, especially for international trade in biofuels. We are not certain how this can be done, but it is essential for fairness and sustainability. Additionally, the biofuels industry needs to develop internal processes to promote sustainability. International trade in biofuels already shows signs of being exploitive, with powerful corporate or state interests pushing people off traditional lands which are converted to biofuel production with crops which degrade soil quality. Sustainability must be based on the health of the soil and the diets and

prosperity of all people. We oppose any proposed international trade agreements which, while setting minimum standards, preempt the ability of nations to individually set higher, more protective standards.

18. How should Sierra Club respond to subsidies?

Subsidies for renewable fuels are appropriate, and perhaps even necessary to balance subsidies and tax credits available for fossil fuels. However, a deeply flawed process of incentives emerged for corn ethanol where subsidies were developed to favor a single crop without reference to the many alternative crops which have practical advantages, and for production of a single type of biofuel without reference to the several alternative biofuels which have practical advantages. Corn is the most fossil-fuel dependent crop grown in the U.S. When a gallon of grain-based ethanol is used as fuel, at least seven-tenths of a gallon of petroleum was also consumed to make that ethanol. Sierra Club observes an overlapping and excessive subsidy situation which includes the effects of Federal crop subsidies, Federal renewable fuels tax credits, Federal and State tax incentives for construction of ethanol production facilities, and some State mandates for ethanol fuel content in gasoline. Together this complex web of incentives does very little to reduce greenhouse gases or curb oil imports. We advocate shifting policies to reward a generic outcome, for example, liquid biofuel energy delivered to market, while monitoring the true cost and effect of incentives and subsidies to ensure that they serve the public interest.

Subsidies should not pick winners, but should reward the desired outcome. They should also be appropriate in scale, and at present the overlapping subsidies for ethanol are enormous relative to the market price of the fuel. Economic subsidies for first generation biofuels appear at present to drive up food prices while encouraging non-sustainable agricultural practices, for instance, and we shouldn't advocate for subsidies which represent a wealth transfer from household food budgets to fuel producers. Subsidies may be appropriate when they strongly favor a desired end result and their costs are distributed fairly.