Reviews of *Alcohol Can Be a Gas!*

Quotes Praising the Book

Larry Mitchell, Chief Executive Officer of the American Corn Growers Association

David Blume's **Alcohol Can Be a Gas!** is the most comprehensive and understandable book on renewable fuels ever compiled. Over a quarter century in the making, the book explains the history, technology, and even the sociology of renewable fuels in a fashion that can be appreciated by the most accomplished in the ethanol and biodiesel fields, as well as the novice and young students of the issues. You will laugh out loud at his sharp wit and the dozens of cartoons. When you finish reading Dave's book, you will have a much better understanding of how our nation's energy policy evolved, why it is what it is today, and what needs to be done for the future. I have worked in the renewable energy sector in one form or another for close to four decades, and I can recommend *Alcohol Can Be a Gas!* as the best book I have ever read on the subject.

Larry Korn, Soil Scientist, Translator, and Editor of *The One-Straw Revolution: An Introduction to Natural Farming*

Humanity has used up roughly half of the world's oil and topsoil. Just in time, David Blume has given us Alcohol Can Be A Gas! It's a practical road map for supplying all of our energy needs

without drilling, strip-mining, and/or depleting the soil. In fact, following Blume's model, soil fertility would actually increase worldwide; energy production would be not only sustainable, but democratic and highly profitable on the small scale. This is a brilliant visionary work. And, with Mr. Blume's witty personality, reading it is certainly a gas.

Albert Bates, Author of *The Post-Petroleum Survival Guide and Cookbook: Recipes for Changing Times*

As intersections of the food-energy-climate matrix form in Iowa cornfields, Amazonian rain forests, and Canadian gene-splicing labs, and as end-game battles for their control pit theocratic flat-worlders against biologists, climatologists, and tree-huggers over the very survival of life on Earth, David Blume emerges like a wizard on a misty pinnacle, backlit by the full moon, revealing a gemstone in his extended palm.

Ernest Callenbach, Author of *Ecotopia, Ecotopia Emerging,* and *Ecology: A Pocket Guide*

The overarching importance of this delightful book is that it demonstrates how beside the point is the current pseudo-debate about the net energy from corn ethanol. As Blume demonstrates, fuel alcohol must be an important component of our solar-based future. It can be made from a huge variety of feedstocks, including sugar beets and cane, nuts, mesquite, Jerusalem artichokes, algae, even coffee-bean pulp; there is no real scarcity of land to grow fuel. There is a scarcity of independent, original thinking, and Blume's book provides plenty of it, along with ample doses of amazing, startling, and sometimes scary information – ecological, technological, and political-economic. This is a vast, detailed compendium drawn from decades of experience by an alert, smart, and skeptical hands-on thinker. Blume has given us his biofuels bible, and we can learn from him and survive quite nicely or follow what he calls MegaOilron into oblivion.

Thom Hartmann, New York Times bestselling author and nationally syndicated host of *The Thom Hartmann Program* on Air America

Brilliant! This book should be on the reading list of every American!!

John Schaeffer, President and Founder of Real Goods, and Executive Director of the Institute for Solar Living

Dave Blume has written the definitive opus on alcohol as a fuel. From the 30,000-foot view to the most minute technical detail, Alcohol Can be a Gas! makes a strong case for the practical, ecological, political, and economic sense in converting to ethanol. It's heartening to see the world's original alcohol pioneer stay abreast of the times with a book that has the promise to knock some sense into our insidious fossil-fueled economy. This book is much needed in this era of Peak Oil and fast-accelerating climate change.

Joe Jordan Ph.D., Atmospheric Researcher, NASA/Ames Research Center, Seti Institute, and Cabrillo College

What a tour de force! This is the most comprehensive and authoritative guide through all the controversy about ethanol as transportation fuel, showing it as a clear winner in the quest for solutions to our environmental and geopolitical problems. Engagingly written, full of important and amazing information and resources, this book meets every challenge to the vision for a clean, democratic path to a prosperous future for all.

Joel Salatin, Farmer, and Author of You Can Farm and Everything I Want to Do Is Illegal

Finally, an alcohol book for the layman and backyard enthusiast. In our culture's collective, industrialized love affair with mega-everything, Blume cuts across the government-subsidized factories with ecologically practical models. Here is a viable energy system that can be embedded in a region, linking rural producers to urban users of energy and food. Self-reliance and resiliency follow community-based alcohol production, and we all owe a debt of gratitude to Blume for codifying his life's passion in what is a veritable compendium of information.

Dr. Jack Martin, Appropriate Technology Program, Appalachian State University; Vice-Chair of Renewable Fuels and Transportation Division, American Solar Energy Society

Ethanol champion David Blume has completed his opus, Alcohol Can Be a Gas! It is a great read. The history of petroleum, history of alcohol, technical coverage of production process, vehicle development (conversion), and feedstocks – it's all in the text, complete with charts and pictures. David's wit, wisdom, and hardcore experience illuminate this biofuel's potential. We have eagerly awaited this publication and will use it in our Sustainable Transportation and Biofuels courses.

Kirkus Discoveries

Written with enterprising do-it-yourselfers in mind, Blume offers countless hands-on technical solutions ranging from home stills to for-profit manufacturing strategies, and builds chapters on detailed charts, graphs, and step-by-step building instructions, giving activist-minded readers the data and resources they need to implement personal and individualized energy solutions. A well-executed, socially conscious, proactive, and rigorous call to action.

Review by Kirkus Discoveries

For those who think ethanol is the be-all and end-all of the alternative-energy revolution, think again. More than 20 years ago, veteran biofuel guru Blume (Alcohol Can Be a Gas, 1983) beat the drum for alcohol-based alternative fuels. Despite an impenetrable foreword by R. Buckminster Fuller, Blume's latest book is a well-researched and expanded update to his original work, incorporating 21st-century concerns over global warming, domestic-energy policy, grassroots biofuel solutions and the challenges of going green in a world dominated by the fossil fuel "oiligarchy."

Blume systematically and entertainingly builds his case for individual responsibility and activism in dealing with the nation's domestic-energy challenges, and he excludes no one in preaching his gospel of alcohol-fuel independence. For the novice, Blume tells the story of alcohol production's rich history in America, from the Civil War to today, and effectively demystifies the thorny pros and cons of the current national energy-policy debate regarding ethanol. This education alone is worth the cover price.

Make no mistake, the book is more than a bully pulpit for championing sociopolitical opinions on global-energy woes—it is a technical how-to book. Written with enterprising do-it-yourselfers in mind, Blume offers countless hands-on technical solutions ranging from home stills to for-profit manufacturing strategies and builds chapters on detailed charts, graphs and step-by-step building instructions, giving activist-minded readers the data and resources they need to implement personal and individualized energy solutions. A well-executed, socially conscious proactive and rigorous call to action. — August 11, 2007

Review by L. Hunter Lovins: Is Alcohol the Future of Fuel?

In his revised edition of Alcohol Can Be A Gas, David Blume provides an accurate, comprehensive case for the effective use of alcohol as a liquid fuel source. This book is far more than a survey of the basic issues surrounding ethanol. Organized as six books in one, the compendium presents Blume's vision for national utilization of alcohol as a solution to the nation's desire for transport fuels. It describes the business and economics of alcohol: how to make alcohol, alcohol co-products and how to use them to enhance products, and how to use alcohol as a fuel. The breadth and depth of information and the perspective that Blume brings to the work make this volume the definitive work on the subject of producing, selling, and using alcohol and its by-products. Assertions are backed by extensive references and solid science. Blume typically cites official government and academic sources.

Blume's insistence on "designing farming as a method of harvesting solar energy for multiple uses" (p.31) takes the book beyond single-issue thinking and offers integrated solutions to the challenges facing those seeking to grow food, produce and use liquid fuels, treat sewage, and more. The discussion in Chapter 3 provides a stand-alone manual on how to do farming right.

Blume's analysis refutes the old myth that alcohol production detracts from growing food. He also dispenses with the inaccurate assertions that alcohol production necessarily requires more energy than is obtained; that there isn't enough arable land; that it's ecologically unsound; that making alcohol takes away from food crops; that alcohol negatively impacts global warming; and more.

Book 4, "Using Alcohol as a Fuel" (Chapters 13 through 25) provides an example of the thoroughness of Blume's knowledge and coverage of the various topics relating to alcohol production and use. Because fuel injection systems, compression, and ignition are at the heart of the internal combustion engine, it is important to understand the issues involved in how switching to alcohol fuels might affect these systems. The presentation in these chapters is straightforward, easy-to-understand, and detailed in covering the important issues relating to carburetion and fuel injection.

Close-up photographs, charts, diagrams, tables, exhaustive references, and humorous cartoons makes the chapters both readable and authoritative. The author appears to have studied, tested, and analyzed nearly every conceivable combination of technologies. The book draws from this experience to give many important tips and techniques for preventing problems or dealing with the diverse challenges of using alcohol as fuel.

The section of cogeneration in Chapter 24 provides an additional example of the level of detail and relevance in the technical aspects of the book. Covering the issues surrounding combined heat and power, Blume offers timely, effective, well-documented, and well-illustrated analysis, replete with references, examples, photographs, and useful case stories.

The descriptions of "Community-Support Energy" projects in Chapter 29 nicely add to the overall presentation. By emphasizing community-based initiatives, the book places an important focus on what local citizens can do on their own, with or without government assistance. Linking alcohol production with community-supported agriculture provides an opportunity for efficiency, profitability, and sustainability at the local level. This places the focus where it can be most useful—at the local level, in neighborhoods, farms, and villages where families, work, grow food, and live their lives.

Review by Ty Doty in the *Activist Post:* The Alcohol Revolution

The following is a review of David Blume's book Alcohol Can Be a Gas; all figures and statistics come directly from Mr. Blume's book.

David Blume, an organic farmer and leader of the alcohol revolution, provides evidence that ethanol alcohol is a viable and renewable fuel source that can help to remove dependence on foreign oil and bring jobs back to America.

Imagine the US as an independent self-sufficient nation with a production economy once again!

Many people have concerns about food shortages because crops are grown for fuel instead of food. One of the greatest misconceptions about alcohol is that it will use up land that could be used to grow food. This belief is based on the use of corn to produce ethanol, which is very inefficient. According to Blume, there are other crops that can produce 3 times as much ethanol and those crops need not be grown on prime cropland, but can be grown on farmland that is not as level and has more shallow soil. Most of this farmland is arid and mesquite trees could passively grow there. Blume says, "mesquite harvested seedpods would generate 33 billion gallons of alcohol, without irrigation, fertilization or annual planting. That is another 21% of our annual gasoline needs from only 7.45% of our farmland."

Lowlands, swamps and wetlands can be used to cultivate high yielding plants like cattails, whicn are considered a weed. Blume says that cattails can be used inexpensively to treat sewage and that the "yields of starch and cellulose from cattails can easily top 10,000 gallons per acre. If all the sewage in the US were sent to constructed marshes, the 3141 counties would need only 6360

acres each to fulfill all of our foreseeable transportation fuel needs, both gasoline and diesel, at 200 billion gallons per year. This equals 1.4% of our agricultural land". No irrigation or chemical fertilizers would be needed. Additionally, they provide a profitable way to clean up rivers, streams and oceans by detoxifying chemicals and removing heavy metals like mercury which is evaporated out through the leaves.

Blume says that cellulose can be used as a fuel source and that the US has 30 million acres of lawn (this is about 40% of the total acreage used for corn), and it isn't counted as cropland or farmland. Grass clippings alone could generate over 11 billion gallons of fuel per year. This doesn't even include green waste from landscaping that could be added to the cellulose totals in each county.

Ethanol can also be extracted from the ocean while cleaning it! Dead zones are areas near coastlines with decreased concentrations of sea life due to elevated levels of nitrogen, usually caused by chemical fertilizer and industrial waste. The nitrogen causes a population boom in microscopic algae and then it decomposes. During algae decomposition, the oxygen in the water is consumed and kills off the concentrated sea life. There is almost 8000 square miles of dead zone in the Gulf of Mexico and dead zones also exist along the Oregon, Washington, California and and Eastern Sea coasts. Kelp is made up of brown algae; in China and Norway this kelp is dried to produce fertilizer. Blume recommends that the US adopt this strategy to eliminate the need for polluting chemical and petroleum fertilizers. He further advocates fermenting the kelp first to make alcohol and then fermenting the leftover mash a second time for methane. The California coast alone could yield almost 90 billion gallons of fuel. The remaining 2/3 of the energy as methane would provide all the alcohol plant process energy plus a huge surplus of gas/electricity for business and residential use. Combined with the other dead zones, all transportation fuel as well as the majority of natural gas could be replaced without using a square foot of farmland.

Blume says that the top four US crops are rice, wheat, corn and potatoes which are 75% starch and he suggests that malnutrition is a protein deficiency as opposed to a caloric deficiency. He advocates increasing protein production by cultivating oyster mushrooms that can be grown using just 25% of the grain straw that is annually burned off of fields as the fungi can efficiently extract the protein from the straw. Blume writes, "So if we really wanted to feed everyone, even without using a single animal as a food source, it would not be difficult".

The US uses 87% of its corn crop as animal feed; when alcohol is made from the corn, which removes the starch, the protein, fat, some of the cellulose, vitamins and minerals along with the yeast from fermentation remains. The remaining substance is called distiller's dried grains with solubles (DDGS) and is about one third of the volume of the original corn after the starch is removed. DDGS is a far superior animal feed that eliminates huge health problems in cattle because they cannot digest the starch in corn. Of course Blume, as an organic farmer, shuns GMO products.

Blume tells a fascinating story about his organic farm with less than 2 acres of uneven land in San Francisco that produced enough food to feed as many as 450 people. He converted the organic content of the soil from 2% to 22% and the adobe clay soil was transformed from 1 inch

of topsoil to 16 inches of topsoil. His little patch of land produced over 100,000 pounds of food per acre.

Blume's book covers how to convert your car to run on alcohol. If you have a flex fuel car, you're good to go. You can also purchase a conversion kit from his website for $400 to $700 (depending on the size of your engine). The kits are made in the US and allow you to burn straight gasoline, E85 or 100% ethanol. Alcohol fuel conversion kits have been used successfully in Brazil on over 50,000 cars over the last 20 years with no reports of of engine damage resulting from the kits or running on ethanol. Small 2 stroke engine problems are preventable by using a lubricant and the proper grade of alcohol.

Rockefeller foisted 'prohibition' on the US in order to create a fuel monopoly with gasoline; Ford's Model T originally ran on alcohol that people could grow and distill themselves.

America is abundant and is still full of opportunity! We must think for ourselves and stop allowing big corporations tell us that the only source of energy is from that which they derive a profit. If we work with nature, we could feed and fuel the world in addition to massively reducing pollution.

David Blume's book, *Alcohol Can Be A Gas,* may be purchased from his website which contains a wealth of information. —Ty Doty is a Naturopathic Doctor (ND), Homeopath and Clinical Nutritionist with a focus on natural health and preventative therapies. He resides in Colorado and may be contacted through his website at www.invisionhws.com original post at https://www.activistpost.com/2011/01/alcohol-revolution.html

Keith Addison: (Biofuel) Alcohol Can Be a Gas! Review

David Blume's "Alcohol Can Be a Gas! – Fueling an Ethanol Revolution for the 21st Century", Foreword by R. Buckminster Fuller, International Institute for Ecological Agriculture, California, 2007

When David Blume emailed me about reviewing his new book he said: "It's destined to be considered the bible of small to medium scale alcohol production", and I thought uh-huh, heard that a few times before.

But he could afford to boast: it IS the bible of small to medium scale alcohol production.

Not only that, Blume's managed to give it such sheer sweep that it's become a little difficult to discuss just about any biofuels production in depth, alcohol or other, without taking some account of his book. You might not agree with everything he says, about Peak Oil perhaps, or maybe about subsidies and tax incentives, or the evil antics of "MegaOilron" (Big Oil et al), or maybe vegetarianism. But it's all pertinent – Blume isn't short on opinion, but he isn't short on straight facts either, nor on context and background. He's pushed the whole issue a few steps forward.

Alcohol fuel (ethanol) is supposedly for gasoline engines, not diesels, but if you have a diesel you'll find the book very informative. Informative too if you're a biodieseler, or if you use SVO, or if your interest is biogas, or microturbine cogeneration.

But the main focus is on fuel ethanol as an alternative to gasoline, and with ethanol and other biofuels right in the thick of the raging worldwide row over soaring food prices (and oil prices), largely in the role of scapegoat, Blume's contribution is substantial and timely. Chapter 2 is titled "Busting the myths", and Blume does a good job of it, including the "Food vs fuel" myth, and he gets it right.

The myth-busting doesn't stop there though, the book is peppered with it. For instance, everyone knows you can't run an ordinary car on E-85 fuel (85% ethanol 15% gasoline) without converting the engine first unless it's a special "flexible-fuel vehicle", right? Blume might change your mind about that, in a thorough and detailed treatment of the real options of using alcohol as fuel.

Blume has been working with alcohol fuel for 30 years and he brings a wealth of in-depth information and direct experience to the subject. He wrote the first version of this book in 1983. His account of why it wasn't published then (in spite of a contract) makes a good read, and helps explain his very obvious lack of affection for "MegaOilron", apart from all the usual good reasons (he has those too, it's not just spleen).

This new version of the book is a complete rework and a major expansion of the original. Blume raised $250,000 to finance the project (no corporate funding) and spent four years researching it full-time, working with many other people on the project and travelling extensively for on-the-ground investigations, not only in the US but also in Brazil and India.

The result is a big book, 594 big pages, with loads of photographs, illustrations, diagrams, charts and tables, and packed with information.

Actually it's six books in one. Book 1, "Understanding Alcohol: Visions and Solutions", covers the history and busts the major myths, along with a chapter on the permaculture approach (Blume's an organic farmer, which helps a lot, he makes essential connections that many others fail to see), another chapter on nasties like tarsands, oil shale, nukes and so on, and a whole chapter on developments in Brazil.

Books 2, 3 and 4 cover the nuts and bolts of making alcohol, handling the co-products, and using the fuel – detailed coverage, good information on all aspects of distillation, thorough treatment of feedstocks, good on integrated systems for co-products use, detailed information on engine conversion, including two case-study conversions.

Book 5 is "The Business of Alcohol: Hands-On Advice", Book 6 is "A Vision for the Nation". Plus appendices, a useful 22-page glossary, and, mercifully, a good index (21 pages).

The main focus of the book is on the US but it's not just for Americans, it's for anyone really. There's a lot of it, but it isn't a difficult read, Blume's a clear writer with a breezy style and the advantage of someone who really knows his subject.

Blume describes the book at the beginning as "a complete tool kit to revolutionize our transportation energy system, combining a broad, sweeping vision with intricate detail", and indeed it does that.

He says: "This book is not about providing unlimited clean fuels for SUVs. It's about shaping energy policy now with our own individual and group actions, to make sure the energy future we get is the one we want and not the one the Oilygarchy is planning for us. This book … puts both the power and the responsibility for implementing the solution in the hands of ordinary people, working together at the local level."

We've been saying things like that here for a long time, haven't we?

And at Journey to Forever.

You'll like David Blume, he's downright good value, IMHO.

Keith Addison

Journey to Forever

KYOTO Pref., Japan

original at https://www.mail-archive.com/sustainablelorgbiofuel@lists.sustainablelists.org/msg72812.html

Review by Albert Bates in *The Permaculture Activist*

Arriving in Sao Paulo for IPC-8, I checked the online schedule for the Permaculture Convergence and saw that the organizers had set me down for a morning session on "making money from tree planting" (I have since turned that into an article for this issue of The Activist). Caught by surprise, I had to scramble to prepare a powerpoint and one of the ideas I thought to explore was biofuels. Conventional wisdom has it that "agrifuels" are in competition with food production and climate remediation. I dashed off an email to David Blume asking for an example of "permafuel."

He replied, "Well to take a page from the book. In semiarid areas where the temperature goes no lower than 0 degrees F you can plant an overstory of mesquite to provide both 340 gallons of alcohol per acre from the pods and fuel the plant with coppiced branches from the tree. In the understory you plant perennial Opuntia (nopales) thornless cactus, and between there and the dripline and beyond you plant the starchy root crop, Buffalo Gourd, for a total yield of far over 1000 gallons per acre without irrigation."

There you have it, a polyculture for food and fuel. But what about climate change? I wrote him back, “Would you say the guild above is a net carbon sink?”

He responded, “It is absolutely a massive carbon sink. Pretty much all arid country crops put the majority of their growth underground and have a robust mycorhyzzal feeding regime. Perhaps 80+% of carbon produced in the top growth is exuded for rhizosphere associates. Mesquite is unique in that a large portion of its root burrows deep to support it with water extracted from far below. There have been recorded instances of mesquite going down 160 feet for water.”

And that, in a nutshell, is Farmer Dave’s permafuel thesis. That he takes several hundred pages to flesh it out, in Alcohol Can Be a Gas! Fueling an Ethanol Revolution for the 21st Century, is an enduring blessing for permaculturists everywhere. This six-volume set, bound into one thick paperback, is both required reading and a standard reference on a par with A Pattern Language and David Jacke’s Edible Forest Gardens.

The six books contained in one are, in order, Understanding Alcohol: Visions and Solutions (including “busting the myths,” polyculture and photosaturation, and Brazil’s national program dissected), Making Alcohol: How to Do It (including 30 odd feedstocks from algae to whey, the sugar method, the starch method, fungal and bacterial enzymes, fuels, and distiller construction), Co-Products from Making Alcohol (animals, aquaculture, mariculture, mushrooms, methane, etc.), Using Alcohol as Fuel (carburetion, injection, small engines, flex-fuel conversions and cogeneration of heating, lighting and cooling, and typical conversions), The Business of Alcohol: Hands-On Advice (legal and economic considerations and case studies); and A Vision for the Nation (state and federal incentives, Community Supported Energy and permaculture).

Ethichol

Just exactly what is the appropriate role for alcohol fuels is an old, but ongoing discussion, and it has been known to get heated at times. The Tortilla Rebellion in Mexico, catastrophic overplanting of maize and soya, gene splicing by multinationals for cellulosic substrate alchemy, forest clearing worldwide –these are serious concerns.

As I write this, the U.S. Senate is considering legislation to increase ethanol production by giving generous subsidies to the U.S. farm belt. The pending bill mandates the use of 15 billion gallons of biofuels annually by 2015 and 36 billion gallons by 2022 (up from 8.5 billion subsidized gallons now). Nearly all of this would be corn ethanol, taken from grain stocks, with the stover burned or plowed in. Beginning in 2016, the government would ask farmers to add the corn stover, along with switch grass or wood chips, to make annual increases of 3 billion gallons in “cellulosic” ethanol. This legislation faces opposition from Big Oil and food manufacturers, but is just the kind of massively soil-destroying, economically bankrupting, petro-addicted type of legislation that is likely to be viewed by politicians as harvesting votes in the Iowa caucuses.

By showing how ethanol can be ethically produced in combination with food, soil, carbon sequestration and other objectives for healthy system design, Blume provides a rescue remedy for our planet at a time when it could scarcely be needed more.

Loek Boonkamp, who studies agricultural trade and markets for the Organization for Economic Cooperation and Development, estimates replacing just 10 percent of the world's current petroleum use with biofuels would consume about 30 percent of all the grain, oilseed and sugar produced in the U.S., Canada, the European Union and Brazil, not to mention a huge volume of water. Blume takes Boonkamp's argument head-on.

The US has 1500 million acres of agricultural land and uses 70 million — about 5 percent — for corn. Mesquite covers 70 million acres of desert land. Harvesting mesquite pods would yield more alcohol than corn without any inputs of soil, fertilizer or water. The US could achieve similar yields from the lawn clippings coming off suburbia on any given Saturday (30 million acres at last count). There are dozens of these examples in the book. Moreover, one has to consider how much of that corn produced in the US is actually used as a food, and how much is used in floor wax, plywood, crayons and other products.

But then, why use farmland at all? Why not harvest ethanol from cattails or dried seaweed? Willows and bamboo planted on berms separating long canals of cattails, with greywater, spent mash and fermentation carbon dioxide returned to the roots could yield 10,000 gallons of ethanol per acre.

The Chinese are getting 4.8 dry tons per acre off seaweed from coastal waters, and the Vietnamese, who farm shrimp from April to September, harvest algae from the same shallow lagoons and estuaries the rest of the year. Kelp grown on nets can cover hundreds of acres of ocean and provide bread flours, carrageenan, agar and other ethanol co-products while also restoring health to over-nitrified "dead zones." Blume estimates the energy return on marine ethanol is on the order of 15 to 1, significantly better than current returns on petroleum exploration and production.

The Downside of Success

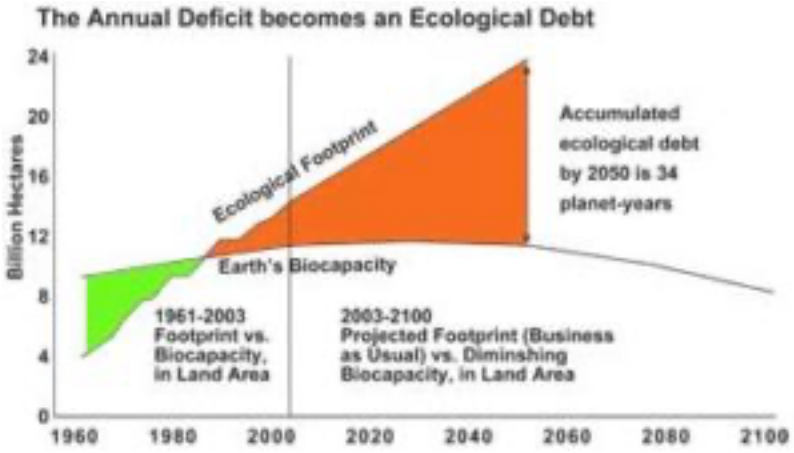
In Albert Bartlett's classic lecture on exponential growth, he uses the example of a bottle filled with bacteria. Bacteria grow by doubling, so one bacterium divides to become two, the two divide to become four, and so on. Suppose we had bacteria that doubled this way every minute. Suppose we put one of these bacteria into an empty bottle at eleven in the morning and then observed that the bottle was full at 12 noon.

First Question: When was the bottle half full? Answer: 11:59, one minute before 12, because they double in number every minute.

Second Question: If you were an average bacterium in that bottle, when did you first realize that you were running of space? Answer: At 12 noon the bottle is full. One minute before that it's half full. Two minutes before noon it's a quarter full, then an eighth, then a sixteenth. At five minutes before noon, when the bottle is only 3 percent full and 97 percent open space just yearning for development, it is unlikely you, being a bacterium, would realize there's a problem. If bacteria had human intelligence, you might see your predicament in the last ten seconds.

Last Question: How long can the growth continue as a result of this magnificent discovery? Answer: Suppose the bacteria are very smart — even smarter than humans — and they go out in that last ten seconds and find three more bottles and get back with them before noon. At 12 noon, one bottle is full and there are three to go. At 12:01, two bottles are filled and there are two to go, and at 12:02 all four are filled and that's it. Game over. They'd need to find four more bottles to go another minute.

The WorldWatch State of the World 2007 report includes a graph showing that Earth's carrying capacity was crossed in 1989-1990. Mathis Wagernagle calculates that we have been in deficit spending ever since, adding stress and diminishing resilience with every passing year, so that by 2050, at present rates, we will be 34 planet years in debt (see graph).

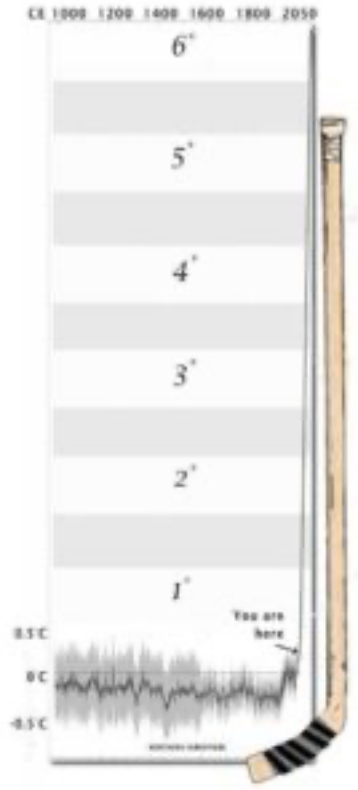


Source: François E. Cellier, Swiss Federal Institute of Technology, Zurich, internal seminar, April 2007, after Mathis Wagernagle, "One Planet Economy: An Empirical Baseline for SD," Alliance for Global Sustainability Annual Meeting, March 19, 2007.

Says Bartlett, "[I]t is an inconvenient truth that all proposals or efforts to slow global warming or to move toward sustainability are serious intellectual frauds if they do not advocate reducing populations to sustainable levels at the local, national and global scales."

That is where David Blume's permafuel formulation comes in. I recently got into an argument with the author about population sustainability. We went around about "what good is it to put people in ethanol-powered cars if by doing so they can postpone addressing the fundamental problem of consumer society." After assuring me that he understood the point made by Bartlett, and the relationship between development, womens' rights, infant mortality, senior care and fertility, he reminded me that his prescription of small-scale, polyculture ethanol production bore little resemblance to the industrial, mechanical, globalizing production meme. Localized societies, whether island cultures, forest cultures, mountain cultures, or whatever, do not tend to overpopulate. They stabilize at equilibrium with their resource base. Local fuel production is inherently population-stabilizing, if for no other reason, because water supply is a limiting factor.

The 2050 Stanley Cup



Globally averaged temperature change for Northern Hemisphere from 1000 to 2050 (projected) based on measurements compiled from the Hadley Centre in the UK, the UN Grid Arendal project in Norway and consensus projections by IPCC and others, adapted by author.

Two decades ago, when I was writing Climate in Crisis, I first heard the reference to the growth of greenhouse gases as a "hockey stick" but it wasn't until more recently that I realized I was looking at the hockey stick from the wrong end. I saw the millennial timescale on the x axis as the handle, the sudden jump of GHG and concommitant temperature change as the blade, which had thrust us suddenly half a degree warmer in the 20th Century. Now I see that I was holding the stick by the blade. The y axis is the handle. According to the IPCC report just released, world temperatures may rise 6 degrees by 2100, or perhaps 2050. It really doesn't matter even if the process takes several centuries, because a change of that magnitude would spell the end of terrestrial life as we know it. The Anthropocene will draw to a close and every form of life on Earth will adapt or perish. —August 2007

Review by Robert Nabloid in *Seeking Alpha*: Alcohol Can Be a Gas: Debunking Myths About Ethanol

I recently read a book titled, Alcohol Can Be a Gas! It is an excellent 600 page book. A lot of time and research went into it. The book teaches almost everything you'd need to know to produce ethanol. I highly suggest you read the book if you're at all interested in learning more about the ethanol industry, especially if you're interested in investing in the industry. It might teach you something that could help you decide which ethanol companies are on the right track. I

for one, won't invest in producers using corn as their primary feedstock. There are many other efficient crops that make economical sense and don't depend on government subsidies.

There are a lot of myths circulating about ethanol, so I thought I'd briefly show how the book debunks some of them.

Myth: It takes more energy to produce alcohol than it's worth.

This myth is false, perpetuated by people that believe corn is the only crop that can create ethanol. Corn isn't a very efficient crop, but luckily there are crops out there that are MANY times more efficient than corn. Brazil uses sugarcane to produce energy in a very efficient manner and is one of the most energy self-sustainable countries on the planet. The biomass parts of the plant that can't be turned into ethanol are used to help distillation. It's a very efficient method. There are other crops that are even more efficient than sugarcane, as alcohol can be made from anything with sugar or starch. There are also many companies and researchers working on creating cellulosic ethanol which will allow an even greater variety of plants to create ethanol. Regardless, some ethanol crops can be made very efficiently and produce MORE energy than consumed. It all depends on what crop, how it's being grown, etc.

The people that cite this myth also often discount, or completely forget, the byproducts that result from manufacturing ethanol. Even corn ethanol results in a byproduct called DDGS. This 'dried distillers grains with soluble' still contain all of the protein and fat, and much of the cellulose, vitamins and minerals. The only thing that has been removed is the starch. This byproduct can still be used as an animal feed, and has been proven to be better than corn when fed to cattle (quicker cattle growth!). The removal of the starch, which goes through cattle undigested, allows quicker digestion and growth of the animal when DDGS is used.

Myth: Not enough land for food and fuel.

In terms of corn growth, corn only utilized ~8% of arable farmland, about 17% of the prime land, in the U.S. However, the reason so much corn is grown is to support the cattle industry and now the food industry in general (sugar from corn is now used in many of our soft drinks and other food products). In fact, the reason the U.S. ethanol industry uses corn is because for years, due to government subsidies, farmers have been growing more corn than we know what to do with. Yes, ethanol production in the United States began using corn as an answer for the overproduction. Otherwise, much of the U.S. ethanol would be grown using much more efficient crops and crops that don't have subsidies.

You can't forget that the byproduct of producing ethanol still leaves us with DDGS, which can effectively feed many animals. Also, if it were necessary, we could grow fish. Cattle take about ten pounds of feed to produce one pound of meat. That isn't very efficient. We can improve the situation, if you're truly worried about starving, by switching to fish. Fish only require 1.5 pounds of feed to produce one pound of meat. We could also use natural desert plants, on government land, for ethanol purposes, without any additional water or using up valuable farmland – Mesquite! The ocean can also be used to produce marine algae. What I'm trying to say is, many plants can be used on a variety of lands (and even sometimes on the ocean).

Myth: Ethanol is dirtier than gasoline.

Ethanol actually burns a lot cleaner than gasoline! Alcohol doesn't have many of the harmful chemicals that gasoline does. Just go get your emissions checked while you're running on 100% ethanol – they will assume their machine isn't working because almost none of the normal pollutants from gasoline are present.

One part of the equation often forgotten is that during the growth of the plant, a lot of carbon dioxide is converted to oxygen, and a lot of carbon dioxide is sequestered in the cellulose tissue. Growing plants is good for the environment!

Summary

I didn't include all the facts. The book, Alcohol Can Be a Gas! is an excellent one that has been well researched and contains a plethora of information. I'm 100% in favour of solar technology, but I think we often forget that plants are natures' sustainable solar technology. We can use plants for fuel and food in a sustainable manner.

Often times the ethanol is just one piece of the puzzle. If you want to increase food production of both protein and plants, while solving our energy needs, it can be done. You take the DDGS byproduct from the crop (whatever crop you decide to use) during the production of ethanol. This byproduct is very valuable. You can either sell it to farmers/feedlots or you can grow your own protein. Cattle will grow faster with it! Even better, you can grow fish extremely efficiently. The fish create their own effluent (waste) that is just like a liquid fertilizer. The fish waste can be pumped into a greenhouse that is growing highly valuable vegetables/herbs/flowers/fruit/etc. You just got free fertilizer to grow a high quality crop! The plants take the effluent out of the water and the water can then be recycled back into the aquaculture system and is now safe. Yup, the fish feed the plants and the plants clean the water for the fish, which reduces the amount of water needed to grow fish. Now you can sell ethanol, high quality greenhouse crops, and valuable fish. Talk about efficiency and making economical sense – we can feed more people, make more money, and solve our energy problems. Not bad, eh? —November 18, 2008 original at http://seekingalpha.com/article/106560-alcohol-can-be-a-gas-debunking-myths-about-ethanol

Review by William L. Seavey in *Hopedance Magazine*

You've heard a lot about ethanol–and if you're at all even interested in the subject, have no doubt formed an opinion about it.

I am asking you suspend your prejudices or beliefs for the duration of this review. Because there is a new book (25 years in the making) that is the absolute final word on the subject. It's Alcohol Can Be a Gas!, by Northern Californian David Blume. It's 640 large size, very entertaining and technical pages.

(P.S. For those of you who are clueless, ethanol IS alcohol–grain alcohol, specifically–the same thing you find in alcoholic beverages.)

The author has been experimenting with alcohol for use as automotive fuel for decades and I first observed a demonstration by him at Solfest three years ago. At that point I was just getting started with my alt fuels research, and noted he was trying to raise funds for his book.

Blume is no corporate, Archer Daniels Midland (ADM) sponsored lackey. He is to alcohol fuel what veggie oil co-ops are to Willie Nelson's well funded efforts to establish interstate biodiesel fueling stations for truckers, if that is even an apt analogy. He has not prospered from or even ridden the boom in ethanol production in this country–in fact, his book was independently published only after hundreds of small donors (like me?) invested the quarter million dollars he needed. It wasn't easy. Big Oil (which he calls MegaOilron) killed Blume's efforts way back in 1983 on San Francisco's PBS station KQED–it was all set to go when Chevron threatened the station with loss of its sponsorship. A suit ensued, but Blume had to eventually back down.

What I learned sometime ago from Blume is that, were there adequate sources of ethanol (only one public pump exists in California, in San Dieg–but Blume is working on opening one in Santa Cruz), the existing automotive technology in what's called "flex fuel" (FFV) vehicles would give Americans it's quickest leg up in replacing petroleum products in cars. GM, Ford and others have at least 5 million vehicles that can run on gas or E85 ethanol (85% ethanol, 15% gasoline).

Yet today ethanol is mostly used as a substitute for noxious MTBE, which boosted mileage but polluted ground supplies–including here in my town of Cambria.

So yes, ethanol is a fuel that can be used in gasoline engines, as it is in Brazil, where 80% of the cars on the road use E96 (almost pure alcohol). Are there any drawbacks? Yes, ethanol does not have the BTU's of gasoline–for example, the same volume of gas will propel a vehicle about 20% further. But as a fuel it is superior to gasoline in many other ways–engine performance, with 105 octane (why race cars use it), safety (it is far less flammable), emissions (it burns very cleanly), and availability (local farmers can grow the feedstock). And, in fact, the mileage hardly matters when Blume shows you how to make the fuel for less than a dollar a gallon and then shows you how to get back 61 cents a gallon in cash from the IRS.

And you heard it first here–as an emergency fuel, a 50/50 ethanol and gasoline blend could get your existing car down the road, without any modifications. (But modifying a gasoline car to run on alcohol would cost under $300 based on the directions in Blume's book–or just a little more to convert a diesel engine to run on "moonshine".)

The debate on ethanol is raging as I write. In the federal energy bill that is about to be voted upon the likelihood is that fuel economy standards (to 35 mpg by 2020) will be increased for the first time in 32 years, there is an ethanol rider. Good Democrats are split about the rider, since it offers farmers subsidies, and there are concerns about ethanol's EROEI (energy return on energy invested) and industrial impacts. Currently ethanol production, at least as produced in the United States, is possibly a negative returner. The main feedstock, corn, has escalated in price–possibly not due to ethanol demand as is reported in the press but to a doubling of the natural gas based fertilizer used to grow it–and there is concern that ethanol production will create a food vs. fuel dichotomy.

Blume addresses these issues in detail in his book. The EROEI (Energy Returned on Energy Invested) studies are detailed to a degree I have never seen before. (There is actually a preponderance of studies that ethanol is a net energy gainer).

Blume makes it very clear that there are many efficiencies that could be implemented–the Brazilians, for example, have spent a couple decades implementing them, and now have a 9:1 energy return to energy invested ratio. (Interestingly, this is close to what gasoline producers claim to be getting these days, but if you factor in transportation by tanker, tariffs, subsidies, and exploration costs, it is probably much less). Blume says it is indeed much less, a minus 20%, since oil needs to be burned in transportation and refining before it gets to the gas tank. And Blume is not really a proponent of large scale ethanol operations anyway–he sees small distilleries as a way to energy independence, much as distributed solar PV in neighborhoods or communities is or could be. (Blume, by the way, is an organic farmer and permaculturalist).

The feedstock issue is also detailed by Blume, who has no doubt experimented with every organic material on earth. There are long lists of feedstocks that clearly indicate that ethanol can be produced from nearly anything cellulosic, and his philosophy is that farmers should select which ones are viable based on site appropriateness. One of his major theses is that we don't even have to go to cellulosic ethanol if we just switch to high yield starch or sugar crops that outstrip corn and can grow in deserts, marshlands, sewage treatment plants, and even in the ocean as in the case of farmed kelp. His book reveals the dozens of feedstocks which are available, and rates them by their yields per ton for 199+ proof fuel. (Corn, by the way, is not the best one, nor is sugar cane.)

Just a few parting comments. It seems to me that we'd do far better diverting some alcohol production AWAY from "spirits"–a campaign could be started "Don't Drink and Drive–Drive with 'DRINK'!" The criticism that burning ANY fuel adds C02 to the atmosphere may be true–EXCEPT that when you grow a plant, the C02 it captures in production is only released when it is burned–so it is basically in equilibrium.

Also, I learned (some time ago) that although corn is not the best feedstock, much of our production goes to feed farm animals–and they actually get fatter on the post-processed mash than they do on the raw kernals needed for ethanol production.

There is so much oil company propaganda that the general public has a hard time discerning fact from fiction about "alcohol fuel." Alcohol Can be A Gas cuts though the rhetoric and shows us a positive, viable, ecological, permaculture approach that will carry us through the upcoming rocky Peak Oil disruptions.

Let the debate go on, but at the end of the day we clearly need this biofuel as a part of our energy independence and self-sufficiency mix.

Review by Shodo Spring: Sustainable Ethanol: Not an Oxymoron?

Today I opened another email, urgently asking me to contact Congress and oppose all biofuels of any kind. It was fervent, impassioned, and certain. As they all are, as I once was. Ethanol means corn, genetic engineering, industrial agriculture, and world hunger. Right?

First, about the image of ethanol: David Blume, who proposes small-scale sustainable ethanol as part of our long-term future, says: "A complete and total wall has been erected against any positive stories about ethanol, built brick by brick in a months-long relentless campaign by the American Petroleum Institute."

Did you get that? The focus on obviously-stupid corn-based ethanol has been fostered by big oil, and if when we think ethanol we immediately think "corn – causes starvation" it is because of big oil's advertising efforts. When we discuss other biofuels, we focus on scarcity of agricultural land and not getting distracted from the need for energy descent. Yet these myths (not enough food, not enough land) were debunked in 1986 by Frances Moore Lappe; somehow we just weren't listening.

I had been puzzled when my friend and Permaculture teacher Peter Bane spoke favorably about Alcohol Can Be a Gas! I promised myself to investigate at the nearest opportunity, and did so as a project for an environmental physics class in fall 2008.
I spent many hours with the book and on the Internet, checking facts, finding data, trying to "do the numbers." I didn't come close to completely figuring it out – but I did enough to conclude that Blume is right. Ethanol can be grown sustainably and, on the land we have, we can grow enough ethanol to power a reasonable society – not the insane consumer society we have now, but a more reasonable way of life.

Revisiting my work 6 months later, I revised a few things and offer these conclusions:
1. Ethanol can be produced sustainably; in fact it can help rehabilitate depleted soils. It's most efficiently produced on a local scale. Done right, it could even help reduce world hunger.
2. Cars and trucks can work well with ethanol, and the conversion is fairly easy.
3. We could make a lot of ethanol now, using waste from the Industrial Growth Society, and it would make the energy descent less painful.
4. The sustainable culture in our future would do well to include some ethanol, sustainably produced, to be used for emergency vehicles, buses, trains, community vehicles (shared pickup trucks?), and possibly even in industries such as manufacturing bicycles, recycling metal for tools, maybe keeping phone and Internet systems alive.
5. We need more people involved in exploring this; we need to think for ourselves.
Here is a brief summary. Rather than footnoting, I'll cite Blume's work as I go along, and list other references at the end.

1. Ethanol can be produced sustainably; in fact it can help rehabilitate depleted soils.
Cellulosic ethanol is made from a wide variety of plants – perennial grasses, trees, and shrubs – which can be grown in polycultures in ways that enrich the soil. The byproduct of ethanol production includes protein, fat, some cellulose, yeast, vitamins, and minerals. It is a high quality cattle feed which actually is healthier for cattle than grain and grass. These byproducts can be directly spread on fields as a high-intensity fertilizer, or fed to livestock and the manure returned to the fields. Or they can be put into the compost, or used to grow mushrooms. The most

efficient setup is a small plant (producing under 500,000 gallons per year), with pipelines sending byproducts to nearby fields and pastures. (See chapter 11.) We already know how to do this.

About world hunger: first we need to remember that world hunger is caused not by food shortage but by distribution problems – that is, food is made for profit, and giant corporations have everywhere destroyed subsistence farming and replaced it with products for the world market – causing starvation. The ethanol revolution that Blume proposes includes the desperately needed relocalization, so it is at least consistent with the needed shift in food practices. (Chapter 11 again, plus Lappe's book and website listed below.)

2. Cars and trucks can work well with ethanol, and the conversion is fairly easy.
This is strictly from Blume's work; I didn't evaluate it. Chapters 14-23 and Appendix B are about how and why to convert your car to flex-fuel, including how to fix problems and what to add so it starts in cold weather and so forth. He says the conversion costs about $300, if it's necessary. He also says – a high-compression engine works best, with pure alcohol the engine will last almost forever, and obviously a hybrid is a good idea. Brazil has been running flex-fuel vehicles for decades.

3. We could make a lot of ethanol now, using waste from the Industrial Growth Society, and it would make the energy descent less painful.
When I did the project for my physics class, my focus was on numbers. How much can we make, sustainably? But some of the sources I counted would disappear in a post-industrial world. I am including this section because at this time in 2009, governments are going a little crazy trying to figure how we will run things. Conservation is barely addressed, let alone energy descent. Nuclear and coal both have unacceptable consequences – and both will run out soon enough anyway. Building ethanol plants – many small ones – could provide a relatively steady source of energy through the transition. Some "feedstocks" will disappear as we wind down.

First, let me mention potential sources for ethanol feedstocks which I was completely unable to number – but they're currently big. Waste food from restaurants, hospitals, cafeterias, and the like. Wasted paper from paper mills, wasted wood from wood plants. Yard wastes. The dumpster at your local grocery store – an increasingly popular food source among the poor. Massive amounts of food thrown away before it ever reaches the stores, because of imperfections. Remember that many things that cannot be used as food are perfectly safe to turn into fuel. Later we won't have these surpluses, because we will compost or recycle absolutely everything, but right now we have them.

Second are sources which will continue to be available, but I could not find data for calculations. Kudzu. Euonymus. Reed canary grass. Purple loosestrife. Poison ivy, poison oak. Milfoil and other aggressive water plants. Every area has its own problem plants. Harvest them! Then plant some of these – but how many acres? Switchgrass in polyculture: 1500-5000 gal/acre/year; Tipuana tipu in polyculture with a variety of smaller plants, some edible, over 7000; palm tree sap (just the sap!) 2140 gal/acre/year. There are more, but I'm skipping plants grown in monocultures. For a lot more options, see chapter 8.

Third are the three sources I focused on for numbers, selected specifically to restore damaged ecosystems while causing no harm. Present U.S. use of gasoline is 11 million barrels per day or 170 billion gallons per year. Ethanol contains about 30% less energy than alcohol, so we'd need 240 billion gallons per year – to keep being stupid. (2006 numbers; adjust for changes in population and lifestyle.)

Restoring wetlands while treating wastewater. Since Europeans arrived in North America , we've lost over half our wetlands – about 115 million acres. We can't replace them all. Suppose we replaced just 1% of these with constructed wetlands for wastewater treatment – with a cattail/willow or cattail/bamboo polyculture yielding up to 10,000 gal/acre/year – we get 11 billion gallons per year of ethanol, plus oxygen, some wildlife habitat, and absorbing nitrogen and waste. Some of the energy needs to be used for the harvesting process; I don't have numbers for that.

Reclaiming desert by mesquite plantings:
Of the U.S. 2.3 billion acres, 587 million are pasture or range-land, and 40% of those are at risk of desertification. (Unknown: how much already lost to desert.) Imagine half of this land is suitable for mesquite; plant mesquite on those 120 million acres, harvesting mesquite pods for ethanol feedstock, for over 40 billion gallons/year. The mesquite would provide valuable byproducts and would support plantings of pimelon (wild watermelon), prickly pear, and other plants for food, medicine, additional energy, and ecosystem stabilization. First verify that mesquite actually heals desert rather than increasing desertification – which is the majority opinion.

Heal dead zones in the ocean through algae:
Both microalgae and macroalgae (such as kelp) grow rapidly and are good feedstocks for ethanol; a 1970's project at the National Renewable Energy Laboratory found a yield of 5000 gallons/acre/year on microalgae. Giant algae farms are an option. However, I spoke with an inventor who thought he could stop global warming by absorbing carbon dioxide: growing algae on vast areas of ocean, harvesting it for methane, and sequestering excess carbon at the bottom of the ocean. My calculations are based on the more modest idea of using his design to harvest algae only on the ocean's dead zones near the U.S. , yielding 32 billion gallons/year. Dead zones result from excess carbon dioxide, so this would be a recovery process. Obviously, this scheme should not be taken seriously until safety tests have been run – the ocean is not expendable. I don't think it will ever happen.

So my total was 83 billion gallons – reduced for some reasons, increased for others – out of 240 billion. That's at least a third, barring fatal flaws. (Energy cost of building processing plants.)

4. The sustainable culture in our future would do well to include some ethanol, sustainably produced, to be used for emergency vehicles, buses, trains, community vehicles (shared pickup trucks?), and possibly even in industries such as manufacturing bicycles and recycling metal for tools and such.

There's not too much to say about this. Since producing ethanol gives you a higher quality fertilizer or animal food plus the energy, it seems like a good idea to have some. If we go

completely back to the Stone Age, we have 6 billion people and can only support 1 billion; this is a serious problem. Everything is going to be bootstrapped – making solar panels with solar panels, for instance, processing the metal for wind towers with solar, wind, or what? Having sustainable ethanol gives us another option.

Final comments:
Blume also has a list of ways the government could help the move to sustainable ethanol – and the end of Big Oil – mostly funded by ending oil depletion allowances. (Book 6) He has instructions for how to build your ethanol plant, what to grow, how to convert your vehicle, and lots of tables for people who actually want to do that. (For hands-on support or training, you have to go to the website.)

I'm thinking about my bicycle, which I'm riding regularly and getting stronger after decades of inaction. Some day (maybe when I'm 90, maybe sooner) it will need to be replaced. As will my shovels, hammers, knives, tools of all kinds. Nails and screws. Metal could help us protect our forests – which could be in great danger. Energy is going to be scarce. Let's learn ethanol and use it. Let's start now. —2008

Resources:

• David Blume, Alcohol Can Be A Gas!: Fueling an Ethanol Revolution for the 21st Century (Santa Cruz : International Institute for Ecological Agriculture, 2007).
• Frances Moore Lappe et al, World Hunger – 12 myths (first edition 1986) and http://www.smallplanet.org/
• David Blume's comments about feeding the world – http://www.permaculture.com/drupal/node/141
• Alternative Energy Blog: "City Trash plus Farm Leftovers May Yield Clean Energy": http://blog.alternate-energy.net/entries/entry_77.php#body
• "Energy Content of Various Materials" – Environment Agency , United Kingdom: http://www.asiantaeth-yr-amgylchedd.cymru.gov.uk/commondata/103196/135835?referrer=/yourenv/issues/plastics/141613/
• "What should biofuel agriculture look like?" an extensive list of criteria, much more detailed than mine. http://timberbuysell.com/community/DisplayNews.asp?id=1779
• Daily energy news from around the world: http://energybulletin.net/
• US Department of Energy: Transportation Energy Book: http://cta.ornl.gov/data/index.shtml
• US Department of Energy: biofuels data: http://cta.ornl.gov/bedb/biofuels.shtml
• The United Nations Convention to Combat Desertification, 1997, http://www.un.org/ecosocdev/geninfo/sustdev/desert.htm
• Major uses of Land in the United States , 2002, http://www.ers.usda.gov/Publications/EIB14/
• History of Wetlands in the Coterminous United States , http://water.usgs.gov/nwsum/WSP2425/history.html
• This is the website of Mark Capron, inventor of the "Plankton Ocean Digestor" which produces methane fuel on the ocean while sequestering carbon. http://www.podenergy.org/
• This website is dedicated to explaining simply the concept of "energy returned on energy invested." It's funny too. http://www.eroei.com/
• USGS Land Cover Institute http://landcover.usgs.gov/

• Waste and Recycling Statistics,
by ZeroWasteAmerica.org http://www.zerowasteamerica.org/Statistics.htm
• USDA Agricultural Research Service: “Global
Change.” http://www.ars.usda.gov /research/programs/programs.htm?npnumber=204&docid=855#cwwcfrrs
• George Monbiot: Heat: How to stop the Planet from Burning.
• When I did this project I didn’t know about Transition Towns. Now I do. The most thorough introduction (apart from going to a training and then starting Transition in your own town) is in Rob Hopkins’ book, The Transition Handbook: From oil dependency to local resilience (2008: UK , green books). But the website is also good and can help you get
connected. www.transitiontowns.org

Review by the *Energy without Oil* Weblog

Its time to take a bit of action, become a footsoldier for Ethanol. We need to start to fight back against the propaganda of the MegaOilRon. If nothing else, begin to think in a different way as to how our energy and food sources are supplied and who controls them.

In his website at Alcohol can be a Gas, David Blume offers a chance to begin to take action to contradict and re-educate the public about the propaganda the “beneficial” Oil companies that make up MegaOilRon have been spoonfeeding the sheeple (no that is not a typographical error) ever since Rockefeller destroyed the home and farm still in the sucessful effort to make gas the only fuel you can use. And he piggybacked (although I would prefer to use a more colourful expression) the prohibition movement to do it.

Alcohol Can Be A Gas is a history lesson, a full outline of the various crops that can be used, and a proposal on how these can be integrated together and should be used to enrich the entire ecosystem that is being used. It is a methodology, a textbook and a how-to manual to upgrade most of the various internal combustion engines into a pure alcohol burning machine.

In fact, Alcohol Can Be a Gas is not really a book only about the distillation of Alcohol, although explicit instructions on how to make the mash, distill the wort and deal with the intricacies of the product are thoroughly illustrated. It is a treatise on how Ethanol can become the cornerstone of a new way of farming life and a comment on the importance of working with Mother Nature, not trying to fool and subjugate her.

Permaculture is a recurring thread throughout the book, and it is this foundation that the production and use of Alcohol as a gas is built upon. Standard industry has so programmed to deal only with the bottom line and the product it is producing, it has become terribly shortsighted in its rammifications to the entrire eco-system. Everything left over after production is sent out to the trash in some form or other.

David Blume’s philosophy of permaculture uses the concept that things should be planted in synchronicity, each crop and animal is symbiotic with the rest of the syxtem as a gestalt. All help each other to get the most from each planting. The thesis then builds to the conclusion that there

is nothing in an alcohol distillation plant that should be allowed to go to waste, ever. It should be a clean, environmentally neutral, zero pollution establishment.

In the later stages of the book, Blume makes the case that the production of ethanol is only the first..and possibly the least profitable, product that can be made by a co-operatuive effort, both societally and with the understanding of nature. One chapter offers an illustration of the way the plant interactis with its products to provide much greater proficts to the operators and huge benefits to the consumer.

Major statements by challengers to ethanol try to make the case that it takes way too much energy to make a single gallon of ethanol than it is worth… They argue vehemently that with all the fertilizer, pesticides and added acreages needed to grow the corn for ethanol, it is hardly worth the effort. Once you add to that all the extra energy needed to actually ferment and distill the corn, you might as well give up and leave it to the status quo… The Oil companies want you to beleive there is no need to put out the effort to even try to make it better. What is worse, as far as the detractors are concerned, all that corn is used up for ethanol so it is obvious it can't be used to feed the hungry mouths that seek it should have been used to feed in the first place.

What a crock!

Permaculture promotes and espouses a whole different and radical attitude to the production of energy from crops. First of all, it is based entirely in organic farming, the elimination of pesticides and toxins presently used to grow our food crops. The ethanol that is squeezed from corn is not the final product of corn, far from it.

David Blume makes the powerful argument that ethanol is simply liquid solar power, through fermentation, the starch and sugar have simply been removed. What is left after that process is a far superior feed for livestock than raw, untreated corn. The remainder, known as dried distillers grains are much better for ruminants such as cattle after the process where the original protein is remains, but the sugar is gone. It is the sugar that causes a myriad of diseases in ruminants, and by removing it cattle grow faster on less volume. Distilled corn by-products actually allow the digestive system of cows work the way it has been designed by nature.

He takes the case much farther, stating that Monsanto has gone to great expense to produce genetically engineered corn that is resistant to the pesticides that are required to kill the pests that have been so prevalent for corn and artificially increased crop yields over the past few decades. But the cost for that is the requirement to increase the amount every year to counteract the loss of beneficial insects and field degradation – to the major increase for Monsanto's bottom line. He makes the case that corn stalks, left lying on a field after harvest tend to naturally act as a herbicide on many types of weeds, but allow new corn to grow up through the stalks. When the leftovers of corn distillation are used as a fertilizer on the fields instead of artificial chemicals, the soil tends to regenerate and increase in fertility rather than degrade. Not something the oil companies want you to know since they are in the business to make fertilizer…. of course terrorists wouldn't like the corporate farmer to go natural either, natural fertilizers may burn some, but they don't blow up real well either. The oil companies and Monsanto have a very

vested interest in ensuring that Ethanol is made just like they want everything else made, focus only on a product and waste the rest.

Permaculture is much more labor intensive. People don't burn oil to work, and the whole concept of the corporate farm is to remove people and replace with massive fossil fuel burning machines spewing out lots of oil based fertilizers onto fields that grow genetically manipulated corn. When products are grown organically, yields can be seen to increase dramatically, one of the book's appendices shows a "mandala" plot of 30 foot diameter that will feed four easily, how much will 30′ x 30′ of just corn feed, I wonder?