BREAKING THE 'ROYAL ADDICTION'

Alternative Fuels for Energy Security & a Cleaner World

Josh Tickell is a one-of-a-kind investigator who came to his expertise in biodiesel fuel by a circuitous route. In this interview he tells of his assault on fast-food restaurants for free french fry grease, only to abandon the homespun food for a hard look at biodiesel.

He was raised in Louisiana among the oil refineries. After seeing many people suffer from respiratory illness, he gravitated to his life's work, namely traveling around the country, his quest an answer to that baffling energy equation. He touched base with farms to learn more about the source of all energy, the sun, and the conversion of solar energy via photosynthesis. On a farm in the former East Germany, he encountered farmers making biodiesel from rape seed.

He said to himself, "If this is real, it will change the world." The rest of the story is contained in his answers to our questions.

Josh Tickell

ACRES U.S.A. What is the title of your new book?

JOSH TICKELL. It's called *Biodiesel America* and the subtitle is *How to Achieve Energy Security and Free America from Middle East Oil Dependence.* That's big money, growing fuel!

ACRES U.S.A. You're talking about fuel for the trains, the trucks, the diesel cars and so on? Are you talking about all of them or are you just talking about a niche approach?

TICKELL. That's a great question! Basically, when we ask about which cars and which engines biofuels will run in — biodiesel, which is what the book concentrates on, will run in any diesel engine. Whether it's installed in a truck, a bus, a boat, a plane, a train or even a car, any diesel engine can use biodiesel fuel. But here is the exciting part: it will use it *without any modifications at all.*

ACRES U.S.A. The same as diesel fuel.

TICKELL. Right! You'll pour the stuff in and it becomes natural to that engine. So we're talking about a market that's a billion gallons — one out of every three gallons of fuel sold each year in this country is diesel. That's a huge portion of our fuel needs in the United States.

ACRES U.S.A. But how do you source the materials to make fuel from a biological base?

TICKELL. Biodiesel is essentially a vegetable oil-based fuel. That means it is produced from soybean oil, peanut oil, canola oil, sunflower oil and hemp oil, any type of natural, plant-based oil could be turned into biodiesel. That is a huge agricultural bonus. Our farmers, as you probably know, are losing their farms quite rapidly in the United States. We've laid fallow over 24 million acres of farmland in this country.

ACRES U.S.A. Taking costs into consideration, what does it take to produce oil crops in an economic way to compete in the market with imports?

TICKELL. Everybody says, "This stuff sounds great, so how much does it cost?" And the reality is that under present conditions biodiesel costs just a little more than diesel fuel. Nobody wants to hear

that, we all want fuel that's the same price or cheaper. Historically, though, over the past six years, biodiesel prices have come down from being almost double that of petroleum fuel to being just about on price parity. At times it has even been cheaper. It was cheaper recently in California and several other places in the country. Thus, we are reaching the point at which diesel fuel and biodiesel are trading places, cost-wise. The price curves are intersecting.

ACRES U.S.A. Especially since we're being promised $100/barrel oil, $5/gallon gasoline down track a ways.

TICKELL. It doesn't take a rocket scientist to figure out that oil prices over time have continued to go up, and I'm talking about oil prices adjusted for present currency. The real price of oil has consistently gone up over time, whereas the price of producing what we call "feedstock" — the actual soybean, the sunflower, the canola — for biodiesel or for other biofuels, such as ethanol, remains relatively constant. Naturally, those price curves are going to intersect. The other thing that plays into cost is the size of the machinery used to make biodiesel. When biodiesel took off in the late 1990s there were only two production facilities in the country capable of making the fuel. There are now about 17 such plants and about 13 more under construction. You've got to reach a market size big enough to produce the quantities that will bring those prices down a little more — and that's happening as we speak.

ACRES U.S.A. But the naysayers say that it costs too much to produce and that you're using fossil-fuel energy to produce these crops — does the equation still work out?

TICKELL. The reality is there's no free lunch. We're in a world turned by physics, regardless of what people like to think, and that cuts both ways. First, let's look at the biodiesel side of the equation. You have to use energy to produce the biodiesel. You've got tractors, you've got farm equipment, you've got input, you've got fertilizers, you've got all of the necessary components to make that fuel, so what has been done with biodiesel is something called *life-cycle analysis.* That means every component — from the seed to the gas station, right up to the moment that you actually pump it into a vehicle — is taken into account and assigned an energy value: this costs this much energy, and that costs that much energy. These life-cycle analyses have been done in the United States and Europe for years, and basically what they found is that the minimum energy balance ratio — the minimum amount of energy that you get out of biodiesel for every one unit of petroleum energy — is three to one. Thus, for every BTU of petroleum that I'm putting into the process, I'm getting three BTUs of finished product with biodiesel. Now, some people will immediately say, "No, that's not possible, you've just said we're dealing with physics, and we all know that if you put energy into something you're not going to get more energy out."

ACRES U.S.A. Yes, but the real source of the energy is the sun.

TICKELL. Exactly. All we're doing is taking advantage of an already existing energy source, the energy source that really runs the planet, and transforming it into the form of crops. We're assisting the process a little bit, we're pushing it along, but really the crops do most of the work. They assemble the carbon, the hydrogen and the oxygen into hydrocarbon chains that we then use as fuel. The beauty of the process is that we do little work — the plants do most of it. Now, the Department of Energy tells us that for every gallon of finished petroleum product, it takes 1.2 gallons of petroleum to make it. They call that a "negative energy balance" ratio. It literally takes more energy to make a gallon of gasoline than is in that finished product. When you look at the economics of all this, the reason why petroleum seems cheap today is twofold: one, the price is artificially deflated through our tax dollars; and two, the scale and scope of the petroleum industry is such that they can control commodity markets. They control the entire market from start to finish. Under those conditions, we don't perceive the real pricing of petroleum in this country.

ACRES U.S.A. Have you factored in the *full* cost of petroleum — the price of the associated serial wars and ocean pollution and so on?

> "Ethanol tomorrow is going to be made of everything from poplar trees to wild grasses to pieces of cardboard that people no longer want."

TICKELL. That's a great question — how do you quantify what petroleum really costs? Do you stop at the point where 20 to 40 million Americans suffer each year from asthma that's primarily caused by car emissions? Do you factor in the fact that increased carbon dioxide in the atmosphere is accelerating this thing that we call climate change? Then we've got things such as Katrina, costing the country billions of dollars. I'm not an economist by trade, so I look toward organizations such as the Lawrence Livermore National Laboratory and the National Geographic Society, which have done those studies. They say that we have to factor in some environmental costs, but we can't justify them all. They peg the real price of petroleum at around $4.70 a gallon, almost twice what we actually pay at the pump.

ACRES U.S.A. We're told that at $3 a gallon at present commodity prices, ethanol becomes quite feasible. As a matter of fact, the $3 level would probably bring on a rush of ethanol production.

TICKELL. You would be surprised! I just attended the National Ethanol Conference, where we saw such an incredible increase in construction in ethanol plants over the past couple of years. People are putting up 100-million-gallon plants like they're going out of style. So, the price is starting to waiver

close to $3 per gallon. We know that's the break point. The reason why the oil companies were able to reap big profits during the hurricanes is that they increased the price for a little while. They won't keep it there, not unless they have to — but the reality is, they're eventually going to have to keep it higher than $3 because of what's going on in the Middle East right now.

ACRES U.S.A. And that will invite a flourishing of ethanol production?

TICKELL. Absolutely. We are going to see an enormous amount of ethanol and biodiesel production, and it's interesting to see that growth is spreading in other areas of alternative energy. Texas, for example, is becoming the nation's largest wind-farm state. They're putting up wind turbines in ranch areas and across cow land because it's the cheapest way we can produce electricity today and the long-term investment is so lucrative for these ranchers and farmers. We are literally seeing fields of fuel popping up all across our country.

ACRES U.S.A. In terms of BTUs, how do these things stack up? Gasoline, ethanol, and we hear about hydrogen, which doesn't seem to factor in too well from our point of view. Maybe you can explain it?

TICKELL. Certainly. In the book *Biodiesel America,* we break this down for folks because I've been working with energy for a decade and I know it's confusing. It's still confusing to me at times! What we do is go through each energy source — biodiesel, ethanol, hydrogen — and say, *this is what it costs to make it, this is how much energy it takes to produce it, and this is how much energy is in your final product.* Our baseline is this: Gasoline is about 135,000 BTUs per gallon. That's a lot of energy. It's essentially rocket fuel that we use in our cars. Ethanol and biodiesel both contain less. Ethanol is around 112,000 BTUs and biodiesel around 120,000 BTUs.

ACRES U.S.A. Hydrogen?

TICKELL. Hydrogen doesn't even compare.

ACRES U.S.A. Hydrogen, first of all, is the smallest element — it goes through any cylinder that you can put it in. How can they propose it, even hold it up as the President did, as a possibility for fuel?

> "We don't need the same kind of infrastructure to make biodiesel that we need to make petroleum."

TICKELL. I think any person who's had a basic Physics 101 course, a basic Chemistry 101 course, looks at the hydrogen hype and says, "What is going on here? Have these people not taken science classes?" Hydrogen is the most basic element that we know, and the key to understanding why it will not take off as a fuel source in the United States — and this is according to the Department of Energy — is that *hydrogen never occurs in nature by itself.* H2? No, it's H_2O. In order to isolate that bipolar molecule of hydrogen, we have to break it off of something, remove it from something else. Ninety-five percent of the hydrogen made today comes from coal, oil and natural gas. The push behind hydrogen comes from our private energy industries — its production would require oil, coal and natural gas, which would make the oil companies a tremendous amount of money.

ACRES U.S.A. Is that why the President's handlers would allow him to make such a statement?

TICKELL. Absolutely. It's why California taxpayers spent $100 million to build a hydrogen highway that will never happen. They basically flushed that money down the toilet. It's pathetic that we've been led down this path — any basic chemist, any basic physicist will tell you it's impossible to make hydrogen available in that format. It can take up to 10 times more energy to produce than the hydrogen fuel will provide. We're talking about an economy, about a nation, about an international consortium that cannot currently sustain itself with the energy we have, never mind needing 10 times more energy to do the same thing. I think you hit the nail on the head — hydrogen is just not viable.

ACRES U.S.A. Let's go to ethanol, which is also a biocrop.

TICKELL. Ethanol is a bio-based fuel, compatible with many gasoline engines at a low blend — such as 5 percent ethanol with 95 percent gasoline — and many newer engines are compatible with ethanol at higher blends, up to 85 percent ethanol. It's a very versatile fuel and it's already being used to the tune of about 5 billion gallons each year in the United States.

ACRES U.S.A. How does it stack up economically compared to gasoline?

TICKELL. Economically, ethanol is not quite as energy-dense as gasoline. Generally, cars that run on ethanol will use a little more fuel — up to 15 percent more. That means you're going to have to produce a cheaper product to stay competitive with gasoline. Economically speaking, we're not quite at the price-break point. Again, the real cost of oil is about $4.70 a gallon, but we're paying some of that in our taxes and our health bills, in a lot of hidden places. So until gasoline surpasses $3 a gallon at the pump, ethanol doesn't get to be price competitive.

ACRES U.S.A. Some years back we were running a little magazine called *Gasohol U.S.A.,* and we folded up the whole thing after Jimmy Carter left office — nobody seemed to be interested for a long time, although we think it's coming back. At that time, one of our scientists computed that if we planted fast-growing poplar trees along the highways in the rainbelt part of the country and harvested them every second year, we'd go a long way — if not the entire way — of fueling the

automobile fleet of the United States. Would you comment on that?

TICKELL. Absolutely. The new process, the new buzzword in the ethanol community, is *cellulosic ethanol production.* What that means is very exciting — it takes anything that's made of cellulose, anything with fiber in it — wood, pulp, paper chips, cardboard, any dense hydrocarbon product — and uses bacteria, much like the bacteria in a termite's stomach, to break it down. The result is alcohol. We're taking a natural process, something we already know works — humans didn't develop it, nature gave it to us — and we're using that to produce a fuel. The process is extremely efficient. It's less expensive, and the ethanol is very high quality. Most of the new ethanol plants that are being built around the world — and this is not just happening in the United States, by the way, we're talking about an international trend — are cellulosic compatible or cellulosic capable. So within the next few years, they'll be switching over from conventional crops such as corn or sugarcane to unconventional crops such as poplar trees and switchgrass. Can you imagine — you'd grow grass and then turn that grass into fuel?

ACRES U.S.A. That brings us to the next point we'd like to cover. We tend to think in terms of corn — and we know what corn does to the soil over a period of time — but there are a lot of other biological crops out there, some of them wild. Why couldn't they be harvested?

TICKELL. The reality is, there's a lot of corn grown in the United States. It's our number one crop and there's a lot of leftover corn, so that's what ethanol is made of today. But ethanol tomorrow is going to be made of everything from poplar trees to wild grasses to pieces of cardboard that people no longer want. That's the ethanol that we look forward to, and it's going to be cheaper than gasoline. It's going to be available across the country, and yes, America actually wants that! It is a solution and it will run in our gasoline automobiles.

ACRES U.S.A. One other sidebar to this story is a lot of talk about reclaiming the oil used to make french fries in the fast-food places — do you have any comments on that?

TICKELL. I began my biodiesel career by traveling around the country in the *VeggieVan,* a brightly painted van covered in sunflowers and I towed behind me a machine that I designed called the "Green Grease Machine." I'd pull up to the back of a fast-food restaurant, I'd pull a hose out, I'd suck up the grease, and I'd go down the road and make biodiesel fuel for my van. So in a way I feel somewhat responsible for this new trend of folks making their own fuel.

ACRES U.S.A. But it's a niche answer, right?

TICKELL. It could be compared with the beer-brewing market in the United States, which is substantial. I'm certainly one of the consumers for that beer, and I know a lot of other folks who are, as well. I like to do hobby things just as much as the next guy, but converting my bathroom into a beer facility is just not something I want to do. Same thing with biodiesel. The fact is, you can make it yourself. It makes a great hobby project, a great science-fair project, and it shows that *we don't need the same kind of infrastructure to make biodiesel that we need to make petroleum,* but the reality is that most of us in our busy daily lives want to pull up to that pump, get our fuel, and get going — and biodiesel allows us to do that, too. I think homemade biodiesel is a fun thing that sometimes is taken a little too seriously, but at the end of the day most of the biodiesel made in this country is going to be made in industrial facilities.

ACRES U.S.A. It's not going to be reclaiming the oil from the fast-food joints.

TICKELL. Not on an individual level, and I think that's the critical distinction because 3 billion gallons of used cooking oil and animal fats are produced in the United States each year, so that's a good chunk of fuel. That's 5 percent of our diesel needs right there, just free off the top, the fat of the land so to speak.

ACRES U.S.A. We can't be sure where the fast food industry is going, either. It started out in about 1955 and it took them until 1970 to get $3 billion worth of business. By the end of the century they had it up to $100 billion, but now we understand it's faltering a bit.

TICKELL. I think people are realizing that if it's the same thing that can run a car it's probably not the right thing to put in their arteries. It's obvious, but it tastes so good and is so convenient that sometimes you just ignore the negative aspects. Over time the fast-food industry may wane and disappear, but the reality right now, today, is that it's a great source of potential fuel for the country.

ACRES U.S.A. Let's return to the actual industrial procedure that would make it possible to fuel America with biodiesel.

TICKELL. In my book or on the website *www.biodieselamerica.org,* one of the things that I really go into is how this started. Did we just think of it yesterday or has it been going on for a while? The reality is that Rudolf Diesel, the man who invented the diesel engine, actually invented it to run on vegetable oil a hundred years ago. Now that was before Rudolf Diesel's body was found floating in the English Channel. In fact, a lot of these alternative technologies that we're exploring today have been around for quite some time. Henry Ford was the largest promoter of ethanol fuel in history. He built an ethanol plant and competed with Standard Oil. Then at a little meeting in New York City with some bankers and oil and coal men, a little thing called Prohibition was cooked up. The resulting law made sure that no ethanol for cars could be produced in this country for 13 years, killing Henry Ford's ethanol dream. We see this over and over again in history — somebody has a better, brighter, faster, cleaner, simpler idea and the powers that be make sure that it doesn't come to fruition. What we're dealing with is a technology that's been tried and true — it's 100 years old, it's been tested in Europe for about 35 years, and tested in the United States for about 20 years. We've spent $50 million testing biodiesel on 50 million miles of U.S. roads and found that it is absolutely compatible with diesel engines. It is much cleaner in its emissions profile and is a very versatile fuel. It operates under almost all of the same conditions as diesel fuel, with the

exception of cold-weather applications. Biodiesel is also mixable with diesel fuel in any ratio. You can have 2 percent biodiesel and 98 percent diesel, or you can have 98 percent biodiesel and 2 percent diesel. This allows users like me to power my Volkswagon Golf — I drive it everywhere — by 100 percent biodiesel. But let's say I'm out there in Anaheim, California, far, far from where I live in Venice Beach, and realize I forgot to fill up. I can pull up to a diesel pump and add regular diesel fuel and my car won't know the difference. It will keep running just fine.

ACRES U.S.A. You mentioned cold weather. What's the problem there?

TICKELL. If you've ever put salad oil in your refrigerator, you've seen it stratify into layers — it gels in cold conditions. That's getting better over time because European developments in the technology allow them to use their fuel down to -10 degrees Fahrenheit. Our fuel however, is still only compatible to about 30-40 F.

ACRES U.S.A. What do they do?

TICKELL. The Europeans have developed a special cold-flow process technology. They haven't really wanted to license it out without a whole lot of money, so it's taking a little while to, shall we say, "mimic," that technology in U.S. plants.

ACRES U.S.A. But you feel that is down track a ways?

TICKELL. Yes. I'm already seeing several of the plants touting the fact that they're able to produce the fuel at that level. What's happening now is that in places such as Yellowstone National Park, where the vehicles do operate down to -30 degrees, they're mixing biodiesel with diesel fuel. The blend they use typically is something called B20 — 20 percent biodiesel and 80 percent diesel — which operates at lower temperatures.

ACRES U.S.A. In terms of pollution, how does biodiesel stack up against diesel, gasoline or ethanol?

TICKELL. That aspect of biodiesel is perhaps one of its greatest selling points. It's really important for us to look at that — I mean very, *very* important. When we look at diesel fuel, we look at about 22 different emissions. One of the most critical is not present in most other forms of petrochemical exhaust. It's called *polycyclic aromatic hydrocarbon* — PAH. These PAHs are carcinogenic — they're actually the same emissions that come out of the back of a cigarette. In tests, lab rats and other animals that are exposed to these types of chemicals develop cancer, and the same is true with humans, unfortunately. Thus, every single diesel exhaust pipe is essentially a big cigarette. Here's one reason why this is so important: About 24 million American kids ride school buses every single day, and their average time spent inside a bus is an hour and a half a day. It turns out that the concentration of PAHs *inside* buses is actually much higher than it is outside, just due to the design of those things. They're big, long cylinders that eventually suck up the gases from outside and pull them inside. That's like sending your kid to school with a cigarette in his mouth and telling him he'll get there in an hour and a half. That's why one of the biggest pushes toward converting to biodiesel is in the school bus area. It's too expensive to replace those buses. There are approximately 400,000 diesel school buses in the country, and each is worth well over $30,000. You're looking at a lot of money. It's a lot cheaper to change the fuel to biodiesel, and we've seen this succeed in over 200 school districts across the country. But that's just a drop in the bucket.

ACRES U.S.A. Does biodiesel have these carcinogens?

TICKELL. It does. Biodiesel also emits PAHs, but at organic levels, meaning it drops the overall PAH emissions profile by about 75 or 85 percent.

ACRES U.S.A. Which is significant.

TICKELL. It's so significant because although no fuel is perfect, at least we can get it down to a level where humans and other plant and animal life don't get damaged by it. That's the critical thing.

ACRES U.S.A. What you're suggesting is that these school buses very badly need a design overhaul.

TICKELL. We should have healthy school buses for our kids, and the fact that this hasn't been properly addressed is just one more thing on our list of what you find when you start to look around and really peel off the layers. In the meantime we've got close to half a million of these things on the road and they're driving every day so it's crucial to do something quickly — a much quicker fix than a long-term overhaul of our entire bus fleet. So that's one of the areas that biodiesel really helps out in terms of emissions. The other is something I feel very strongly about — carbon dioxide emissions. We in the United States seem to have decided that perhaps global warming and climate change aren't big issues, but they're *huge.* In fact, the global consortium of scientists who work on climate change are now monitoring phenomena that we heretofore thought would take hundreds of years and have discovered that they are transpiring in five to 10 years. The carbon dioxide we put in the atmosphere, 150 times that of pre-industrial society, is the kicker. It's like a catalyst, and that catalyst is creating very, very, very fast change in places such as the Greenland Ice Shelf, which is melting so quickly that if the rate continues to increase at the current pace, we're looking at the whole thing being gone in the next 25 years. That alone means a 3 to 5 foot rise in our sealevels around the world.

ACRES U.S.A. That makes a beachfront property questionable at best.

TICKELL. We're talking about changing the entire coastline of every country on Earth. That's very serious. We're talking about major changes in terms of our atmosphere and how it works. For us to begin to mitigate our emissions, to begin to slow this process down is critical. I don't think anybody seriously questions that.

ACRES U.S.A. So, how does biodiesel stack up in terms of carbon dioxide?

TICKELL. What we do with biodiesel is essentially pulling carbon from the

ground and turning it into plants, which we then turn into fuel. So here is a sunflower, it's growing — what does it need to live? It takes carbon dioxide from the atmosphere, and it takes hydrogen and oxygen and builds hydrocarbons. We turn that sunflower into oil and then we burn it. What do we produce? Carbon dioxide. We produce the same quantity of carbon dioxide that we do with diesel fuel. The big difference is *where the carbon originally comes from.* With diesel, the carbon came from a sink, a stored place in the earth, something that's been inside the earth for about 100 million years. That's stored potential energy, and when it's released into the atmosphere, it adds to the levels already present. With biodiesel, we take it out of the atmosphere, turn it into plants, and put it back into the atmosphere. That's what we call a carbon cycle — we're not adding more to the atmosphere.

ACRES U.S.A. Should be a total exchange, shouldn't it?

TICKELL. It's a total exchange. It's mimicking the natural process. When you grow a flower, that flower eventually dies and decomposes and releases its carbon dioxide. All we're doing is taking that natural process and speeding it up, but we haven't changed the essential physics of the process. With biofuel, then, we virtually put a halt to our carbon emissions from fuel — as I said before, that's *critical.* This is a transition we could see in this country within five to 10 years. We could literally pull our carbon emissions down to 30 percent of what they are today.

ACRES U.S.A. Will we back away from hydrocarbons from the ground *before* we run out of oil that's reachable?

TICKELL. Great question! Are we intelligent enough to look down the track and see that the train we're all on is headed for a cliff? We need to slow that train down and stop it, and we need to build track that points in a different direction. Are we intelligent enough to take that big picture approach to how we run our society, or are we so driven by our current culture that we can't see beyond the track right at our feet? I can't honestly answer that question, but I can tell you that in Europe, countries are looking *way* down the track. Sweden has announced that in 15 years they will be petroleum free, and they're creating government mandates to make sure that happens. They are not taking any chances, they are not putting it in the hands of industry and the five largest corporations in the world, which are driven by profit motive. The Swedes are making sure that they create laws that guide that train away from that cliff so that their country remains sustainable.

"Rudolf Diesel, the man who invented the diesel engine, actually invented it to run on vegetable oil."

ACRES U.S.A. Brazil, apparently, has already achieved this.

TICKELL. Thank you! Let's take a reality check here. When we compare America to Sweden, we're comparing apples to something that at least looks like an apple. When we compare America to Brazil, we're comparing apples to oranges. Brazil has a developing-world economy. It does not have the education we have, it does not have the infrastructure we have, and yet it's able to produce 50 percent of its fuel from sugarcane. Basically what I'm saying here is that, with a very simple plan, we can get America from where we are today to where we should be as a nation to continue to grow and compete in the world market economy. It would be a tragedy for us to sit on our laurels and watch as other countries leave us behind because we didn't want to end the royal addiction. I think biodiesel will play a major role in that, especially in the early stages, which is where we are now, because it's so easily used.

ACRES U.S.A. What is driving our "royal addiction," as you phrase it?

TICKELL. My book delves into the history of how we got into this oil predicament, how we became so dependent on one substance to run our entire lives. We drive up to the gas pump every day, fuel up, and drive off, never thinking about where the majority of that oil has come from — or where the majority of our dollars are going. We get very deep into that in the book and show you where your oil comes from, where the money goes, and how that relationship really plays out, which is pretty shocking when you examine it. And then we go another step and we ask, what's going to happen next? Our near-term energy future will really be decided by what's about to happen in the Middle East, and that's really where the rubber meets the road in terms of what's going on with our gas prices, with fuel availability and with our military maneuvers. We're talking about the majority of our economy. We spend $400 billion on overseas conflict resolution, and most of that goes to the war in the Middle East. We also spend over $100 billion on oil from the Middle East. Add those up and that's the majority of our economy right there. It's all going to change, though, and it's going to be very rapid. A lot of people are going to be shocked and surprised, and it's going to send America into an economic crunch. Understanding that interplay is critical, and we feel that every American has the right to know where their gasoline comes from, where their money is going, and the politics and policies and interaction with the Middle Eastern countries that result from our oil dependency.

ACRES U.S.A. We're just talking here about the base cost of that war, but taking care of those wounded veterans — some 25,000 of them so far — for the rest of their lives along with other peripheral issues is going to run that cost up to maybe a trillion, or even more.

TICKELL. We're dealing with a Middle East energy crisis, and all of this is connected. We get into that in the book and

I am very, very clear in terms of which countries, what's going on, where's the money, where are the terrorists and how does it work. It's all connected. Every time I stick that gasoline nozzle in my car, I'm abetting that situation. So I have a right to know and that's why I put it in the book. We look at the Middle East and then we go into present-day situations — what's going on in the American economy, how much money we're spending on fuel, *and* what's going on with our farmers. A good portion of the book goes through the farm states and what's happening to farmers in America.

ACRES U.S.A. Especially over the last 50 years!

TICKELL. Right. We get a little context for what's going on, and from there we really get into the dynamics of different types of energy. Most of us take for granted that our world runs the way it does. The alarm clock goes off, we wake up, get out of bed, and turn on the light switch, etc. From the moment we wake up until the moment we go to sleep, our world is maintained by different forms of energy and the book goes through them — hydrogen, methane, natural gas, biodiesel, ethanol, gasoline — all of the different forms of energy and all of the different ways of producing that energy.

ACRES U.S.A. In other words you discuss those issues in layman's terms so they can understand it.

TICKELL. The point is, this information is not rocket science. Anyone can get it.

For more information on Josh Tickell's *Biodiesel America* and news and resources on alternative fuels, visit *www.biodieselamerica.org* or contact Biodiesel America, 8033 Sunset Blvd, #154, Hollywood, California 90046.