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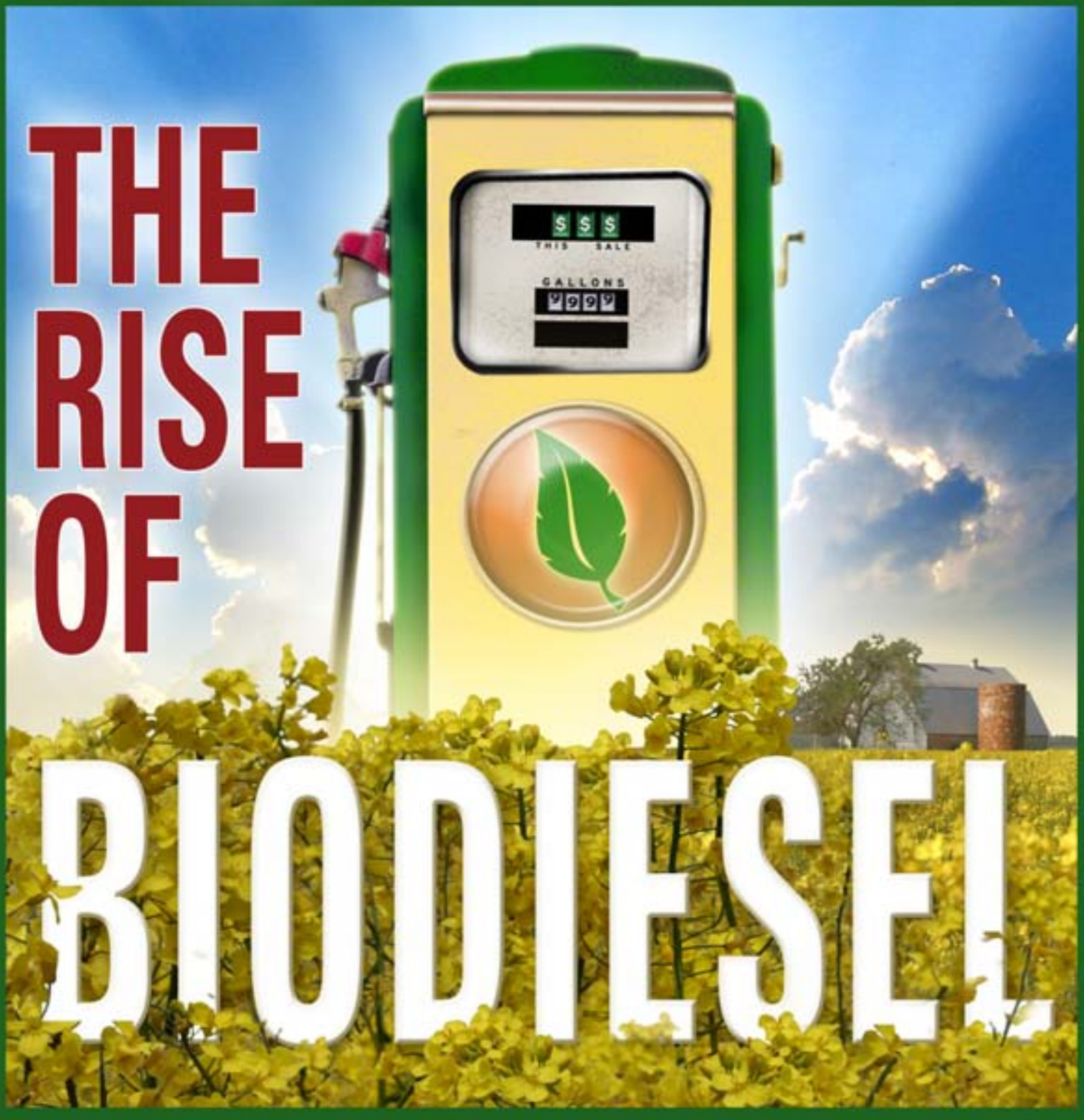
SPECIAL REPORT

THE RISE OF BIODIESEL



THE RISE OF BIODIESEL

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FOREWARD

November 28, 2006

I write this introduction from a setting that could hardly be more compelling to the topic of global warming. A few days ago marked the wettest November ever recorded in my home state of Washington, (USA) with rivers rising as high as 12 feet over normal.

After that we were hit by four consecutive windstorms in 5 days, the worst topping 70 miles per hour. Now, still within two weeks of the floods and winds, we have seen a completely unseasonal snow storm, followed by a cold snap that brought wind chill temperatures several degrees below zero, freezing salt water in the Seattle marina. Common in other climates, these highly unusual conditions for our region can only be the warning signs of global warming.

Then, yesterday on NPR, I heard a report that discussed how over 1,000 scientists from more than 100 countries had released a statement of agreement that global warming was a reality. They not only agree it's occurring, but claim the planet's thermostat is accelerating at a faster rate than ever before predicted. This at a time when the top US environmental policy-maker has called global warming "The biggest hoax ever perpetrated on the American public." His statement comes despite the fact that the top ten warmest years on global record have occurred since 1990.

The US is the leading producer of greenhouse gas emissions, responsible for 25 percent of the world's output even with only 5% of the world's population. However, the US and Australia are the only countries that have refused to become part of the Kyoto Treaty regulating them. Other nations are taking the issue seriously, and are looking to biodiesel to help reduce greenhouse gas emissions.

The current Bush administration's view is so widely disagreed with that, starting tomorrow, the US Supreme Court will begin hearing a lawsuit brought against it by 18 states and a coalition of environmental groups. The suit is on a topic directly connected to the use of biodiesel: the administration's refusal to issue regulations limiting petroleum-created carbon emissions.

Because of these factors, much of the information about biodiesel and the threat of greenhouse gases simply hasn't been in the US news like it has in most other nations. When our American preview readers have learned about the head start many other countries have in the use of biodiesel, their reactions have been nothing short of astonishment.

Clearly, world and national events are now combining to thrust the topic of biofuels — especially biodiesel — into the forefront. The topic is being broached on a wide range of fronts, from farmers to virtually every segment of the business community. As always with emerging topics, factual information is often mixed with mis-information. The goal of this publication is to 'cut to the chase' in this regard, i.e., to impart a true sense of what biodiesel can and cannot do as its use rises.

This project is the brainchild of Saphir Lewis, editor of WorldPeaceEmerging.com. A visionary in many areas, Ms. Lewis became convinced of the importance in offering a snapshot of biodiesel to a wide-ranging audience; how it's made, what's happening with it around the world, and what the increase in its use as a petroleum-diesel replacement will mean for the global economy and marketplace.

I have been involved for many years in the global power sweeping industry, one that makes widespread use of diesel fuel. From that perspective, I was familiar with the biodiesel topic when Ms. Lewis recruited me to be the writer for this book. Still, my own knowledge has been advanced dramatically while developing the research information provided me into a coherent whole.

On that note, many thanks to Nate Haney, Executive Editor of WorldPeaceEmerging.com, for his research into the subject of biodiesel. If not for his tireless help and assistance, you wouldn't be reading this now.

When you have learned about the facts of biodiesel through this special report, I encourage you to pass the information along to others. This topic will soon be affecting us all, and we will all benefit from knowing more about it.

I also encourage you to visit Lewis' and Haney's WorldPeaceEmerging.com website and to take advantage of the extraordinary information it offers. We can only hope their vision of peace on our planet advances as quickly as the biofuel you'll be reading about in these pages.

— *Ranger Kidwell-Ross, MA*
Editor, WorldSweeper.com

AUTHOR INFO/BIOGRAPHY

Ranger Kidwell-Ross is a graduate level economist who is the world's leading writer for the pavement sweeping industry. In 1993 he founded *American Sweeper* magazine, which he edited for more than ten years. In 2005, this concept was expanded to include power sweeping worldwide via his founding of the website, WorldSweeper.com.

He has traveled throughout the US, Asia and Europe advancing the environmental benefits of using the correct street sweeping methods and machinery. Since 1994, Kidwell-Ross has received a total of 19 national writing awards, including a rare APEX Grand Award for his online travelogue on power sweeping in European countries.

Ranger Kidwell-Ross makes his home in a rural setting situated in the northwest corner of Washington State, USA.

INTRODUCTION

Humanity is at the dawning of a new millenium. With the specter of extinction suddenly a reality for literally hundreds of species, a new era of caring is starting to influence the world's business climate.

Current production methods seemed logical during the post-World War II frenzy of unbridled industrial growth. Today, these are being exposed as unsustainable and environmentally bankrupt. Through photography, television and the world's first true mass media, the Internet, people worldwide are being exposed to vivid views of pollution-created climate change. A clear majority of experts now agree that man-made global warming is contributing to an increase in hunger, poverty and war throughout the planet.

Unfortunately, we are only now beginning to explore a long-range vision of sustainability that includes clean air and water, preservation of our resources and a decent standard of life for every person on earth.

Most agree that cleaning up existing messes has first priority, along with re-examining current practices in a wide variety of areas, from family farming to urban planning. People around the globe are at work developing resource-efficient, sustainable practices that will provide more positive outcomes. This is already creating a shift in global trade balances and a reworking of government involvement on all continents.

Fortunately, the collected ingenuity of humankind is rising to the occasion. Most authorities agree the most urgent changes needed to address global warming are in the areas of transportation and the burning of fossil fuels. Of all the new options that have emerged, the twin biofuels, ethanol and biodiesel, are being seen as the solutions offering the most immediate, quantifiable results. As a result, nations on every continent are looking toward biofuels as an important first step toward creating a sustainable, environmentally-sound future for their citizens.

When you finish this book you will have a clear overview of the leading biofuel now sweeping the world – biodiesel. Along with an overview of what biodiesel is, how it's made and who is currently using it, we'll also take a look at the pros and cons, investigate the controversies and attempt to dispel any misinformation you may have encountered.

You'll learn about the many feedstocks that may be used to produce this fuel; you'll even find out how to get a kit that will let you produce biodiesel in your garage, if you so choose. You'll find out how the biodiesel movement has captured the imagination and funding of nations and multi-national corporations around the world. Finally, you'll learn about the potential that biodiesel offers for social and environmental improvement.

As we tour the world – and the world of biodiesel production – you will see what's happening right now, as well as gain insight into what to expect in the near future when biodiesel usage hits the mainstream.

Only time will tell if biodiesel can live up to its current hype as at least a partial panacea for the world's addiction to petroleum, and as a catalyst to reduce the wars and genocides that seem to surround petroleum procurement.

From our vantage point today one thing about this topic seems clear: Biodiesel, a word that, along with 'biofuel,' is still shown as a misspelling when typed into Microsoft Word, is slated to soon become a household word around the globe. Like any emerging technology, the key to the best utilization of biodiesel in your own life or business is by learning about all aspects of it. We're glad for the opportunity to assist you in that regard.

CHAPTER ONE BIODIESEL BASICS

THE DECLINE OF PETROLEUM AND THE RISE OF BIOFUELS

For decades, petroleum has ruled our world. Today, it's intrinsically woven into every aspect of our daily survival even though the byproducts it produces are putting our entire civilization at risk.

Two bio-products, ethanol and biodiesel, are the current frontrunners in providing a viable petroleum alternative. These two emerging technologies, often referred to as 'the twin biofuels,' are being tried by virtually every mobile industry in the world in hopes they will provide an answer to the problems that have become increasingly evident with petroleum.

Because both ethanol and biodiesel are plant-based, clean burning and may be blended with the current petroleum fuels they may someday replace, between them they offer a solution for fueling engines of every kind.

Ethanol can be produced from a wide variety of waste; literally dozens of agricultural products can be used to make ethanol, including corncobs and wheat stalks. Nearly every climate around the world has a byproduct already being produced by local farms that could potentially be used. An important strength of ethanol is that it can be blended with gasoline and can even replace it in engines that have been modified.

Biodiesel has historically been produced from another widely available commodity, vegetable oil. Although biodiesel can be blended with diesel fuel, it can also be used – without engine modification – as 100% of the fuel in diesel engines. For the latter reason, and because diesel is in widespread use worldwide as the fuel that powers the business community, biodiesel is being widely hailed as the frontrunner biofuel for providing near-term change.

Another factor is that biodiesel requires much less energy to produce, per gallon of final product, than does ethanol. For example, using today's technology, soybean biodiesel returns 93 percent more energy than is used to produce it, while corn grain ethanol currently provides only 25 percent more energy. As a further contrast, soybean biodiesel produces 78 percent less greenhouse gas emissions than diesel fuel, whereas corn grain ethanol produces only 12 percent less greenhouse gas emissions than gasoline.

Together, these twin biofuels, ethanol for gasoline and biodiesel for diesel fuel, appear to offer the biggest opportunity currently available for the world to reduce the pace of global warming. Although funds and research for non-combustion engines are ongoing, that will clearly take time that some experts say we simply don't have. Fortunately, the technology needed for both ethanol and biodiesel is here today.

Studies indicate that by replacing fossil fuels with locally grown, plant-based biofuels, we can greatly reduce greenhouse gas-producing emissions from all of our vehicles. They represent our best current technology for reducing the pollutant output of cars, trucks, buses, industrial machinery, boats, planes, military equipment, generators and any other engine that runs on gasoline or diesel.

Biofuels are easily produced with organic-based materials available in every region; they blend with their petroleum counterparts at any ratio and can be used in any vehicle or machine with minor modifications.

Because they are locally grown and produced, biofuels also reduce transportation costs, create regional jobs, increase small farm incomes and reduce our dependence on petroleum-producing countries. This is why virtually every government on the planet is getting involved with biofuel production on both a national and a regional basis, both through sponsored production and via tax and other credits to private enterprise.

Overall, US consumers use more gasoline than diesel, even though gasoline's primarily use is only as a fuel in passenger cars. However, only a gasoline engine that is 'flex-fuel compliant' can use ethanol at any significant ratio. This generally means replacing vehicles, rather than modifying the ones in use, an expensive and time-consuming task. This requirement for widespread retrofitting, as well as other factors, are combining to delay large-scale ethanol usage.

On the other hand, diesel engines can be converted to 100% biodiesel (B100) immediately, with great benefit to the engine as well as to the air. Because that is the case, plus the fact that diesel engines are in widespread usage throughout industry, the remainder of this report focuses exclusively on biodiesel.

BIODIESEL BACKGROUND AND BASICS

The official US federal definition of biodiesel is "mono-alkyl esters of long chain fatty acids derived from vegetable oils or animal fats which conform to ASTM D6751 specifications for use in diesel engines." Biodiesel refers to the product produced via this process prior to its blending with petroleum-based diesel fuel.

In layman's terms, biodiesel is a safe, clean, biodegradable engine fuel primarily made from vegetable oils, although animal fats can also be used. With either raw material, the transformation to biodiesel involves a process called 'transesterification.' In this process, which is much easier to do than to pronounce, a catalyst such as lye (sodium hydroxide) is used, in conjunction with alcohol (typically methanol), to remove the glycerine from the vegetable oil. The glycerine must be removed because it tends to coagulate, or gel, even at medium-cold temperatures. Because in colder climates biodiesel can coagulate even after transesterification, in winter months it is typically blended at a lower percentage of regular diesel.

TERMINOLOGY AND DEFINITIONS: B5, B20, WVO, SVO

When blended with diesel fuel, biodiesel is notated using a number that represents the percentage of biodiesel to petroleum-based diesel (which we'll simply call 'diesel' from now on) in a particular blend. For example, 'B5' denotes a 5% biodiesel/95% diesel mix, 'B20' is 20% biodiesel/80% diesel, etc. Straight biodiesel, or 'B100,' is also referred to as 'neat biodiesel.'

Biodiesel made from waste frying oil, typically obtained from restaurants or factories, is called (waste vegetable oil) WVO. Straight vegetable oil, prior to transesterification, is called 'SVO.' A minor number of enthusiasts have modified their vehicles in order to use SVO as a fuel. This is not biodiesel. Because of its high glycerin content, which coagulates very easily, the only way to use straight vegetable oil (SVO) is by installing a dual tank and fuel heater system. Such usage requires extensive engine modifications that make it impractical on a large scale.

In the United States, biodiesel is approved for use in diesel engines by the Environmental Protection Agency (EPA), Department of Energy (DOE) and the US Department of Transportation (DOT). It also meets the stringent clean diesel standards established by the California Air Resources Board (CARB). The US National Biodiesel Board approves biodiesel to a certification ASTM D6751 and awards a BQ9000 rating to companies meeting that standard.

Biodiesel use has also been approved by nearly every developed nation on earth, including the European Union, China, Japan, South Africa, Indonesia, Iceland and all of South America.

Rudolph Diesel

A LITTLE HISTORY

Biodiesel is nothing new. At the turn of the 20th century, Rudolph Diesel created the diesel engine and showcased it at the 1900 World's Fair in Paris, France. At the unveiling, he ran his engine on pure peanut oil, saying, "The use of vegetable oils for engine fuels may seem insignificant today. But, such oils may become in course of time as important as petroleum and the coal tar products of the present time."

For many of the same reasons we are exploring them today, Diesel's vision was to create new uses for seed oils. These included the renewability aspect of the fuel and the independence that use of biodiesel as a fuel provides to our nation and to its farmers. The original design of the diesel engine was actually intended to support economic independence in the farming community. It was Diesel's goal to give farmers an engine that would run on fuel they could grow, freeing them of the crippling dependence on petroleum and coal.

In 1913, Rudolph Diesel died in a controversial accident that still provides fodder for the conspiracy theorist gristmill. For whatever reason, biodiesel completely disappeared for the next 50 years as petroleum products became the fuel of choice for internal combustion engines.

Rudolph Diesel's engine has become the primary motive force in virtually every sector of industry, from trucks to boats, planes and generators, as well as the primary motive force in farming equipment. However, the use of biodiesel to run the engine he invented didn't reappear until the 1970's when the oil crisis brought it out as a self-sufficiency option. Even then, until the 1990's biodiesel production was limited to a few 'home brewers' who made it from waste vegetable oil (WVO) collected from restaurants.

A factor that bodes well for biodiesel's future is that making it is a simple process anyone can perform if they have a garage, good instructions (which are widely available on the Internet), and the right tools and ingredients. Home biodiesel processors are currently selling like hotcakes, and some neighborhoods have begun working together successfully to share the labor and expense of biodiesel production.

Using historically discarded vegetable oil from nearby restaurants, some individuals in the US claim they are able to produce biodiesel for as low as 70 cents per gallon (as of 11.06). However, making it at home is not without controversy, something that will be addressed in upcoming chapters.

On the other end of the spectrum, biodiesel can also be produced corporately in giant processing plants. At the time of this writing, processing plants were already producing millions of gallons of biodiesel for commercial use, primarily using vegetable oils that have been locally grown. Current production cost is about $2.20 (USD) per gallon. The resulting fuel is both non-toxic and biodegradable, and the byproduct from making it is, simply, glycerine soap.

One of the targeted byproducts of diesel is sulfur emissions. Regular diesel has as much as 500 ppm of sulfur content. Recently, in an effort to reduce greenhouse gas emissions, many nations have ruled that all petroleum-based diesel must have a sulfur content of less than 15 ppm. However, low sulfur diesel has very little lubricity and should not be used in an engine without an additional lubricant being added.

Switching to biodiesel is predicted to create a significant reduction of greenhouse gases. That's because, when used in a diesel engine, a blend of just 20% biodiesel (B20) reduces emissions by a whopping 78%! Biodiesel offers the needed lubricity at even a 2% usage ratio (B2) and has little-to-no sulfur content of its own. The emerging sulfur removal policies being enacted have served to move biodiesel into the forefront, and it has now become a component in nearly all diesel on the global market.

Compared to 'regular' diesel, biodiesel is actually good for an engine. Since biodiesel cleans out the sludge left by regular diesel, use of even B20 biodiesel has been cited as a way to double an engine's life. At the same time, it will run smoother and with less repairs. The 'knock' common in a diesel engine is also reduced, helping it to run quieter.

Though no engine or other modifications are needed with biodiesel, a small amount of additional maintenance to the engine is required. Because biodiesel does dissolve engine sludge, initially the fuel filter must be changed often to prevent clogging. Because some uninformed users changed to biodiesel without increased change-out of their fuel filters, resulting publicity on stalled engines tarnished biodiesel's early reputation.

A clogged fuel filter is almost always the reason that engines fail when run on biodiesel. As long as biodiesel users are aware of this factor, it becomes an insignificant downside that's hardly a problem. Plus, it's also something that needs to be done only in the short term if biodiesel continues to be the regular fuel.

Biodiesel's solvent qualities are also slowly corrosive to rubber hoses, so these must be changed (sooner or later) to ones that are not sensitive to biodiesel – a simple, inexpensive procedure. Users also need to use the correct biodiesel blend in cold weather, since using more than a B60 blend can coagulate in cold temperatures.

So far, the typical satisfaction level has been very high for those who have switched to this clean and safe alternative to diesel. The payback appears to be enormous: Engines that run biodiesel get better mileage and current studies show up to a doubling in lifespan because of the dual benefit of lubrication and cleaning. Biodiesel more than makes up for its initial minor level of added maintenance expense by extending the life of the engine, improving mileage, reducing repairs and smoothing the ride. Some truckers have claimed to get 1 million miles on their truck engines when they run on biodiesel.

REDUCED EMISSIONS

According to the US National Biodiesel Board, "A 1998 biodiesel lifecycle study, jointly sponsored by the US Department of Energy and the US Department of Agriculture, concluded biodiesel reduces net carbon dioxide (CO2) emissions by 78%, as compared to petroleum diesel. This is due to biodiesel's closed carbon cycle. The carbon dioxide released into the atmosphere when biodiesel is burned can be utilized and assimilated by growing plants.

"Is biodiesel safer than petroleum diesel? Scientific research confirms that biodiesel exhaust has a less harmful impact on human health than 100% petroleum diesel fuel. Biodiesel emissions have decreased levels of polycyclic aromatic hydrocarbons (PAH) and nitrited PAH compounds, both of which have been identified as potential cancer-causing compounds. Test results indicate PAH compounds were reduced by 75 to 85 percent, with the exception of benzo(a)anthracene, which was reduced by roughly 50 percent. Targeted nPAH compounds were also reduced dramatically with biodiesel fuel, with 2-nitrofluorene and 1-nitropyrene reduced by 90 percent, and the rest of the nPAH compounds reduced to only trace levels."

To quote the US Department of Energy: "Some PM and HC emissions from diesel fuel combustion are toxic or are suspected of causing cancer and other life-threatening illnesses. Using B100 can eliminate as much as 90% of these 'air toxics.' B20 reduces air toxics by 20% to 40%.

"The effects of biodiesel on air toxics are supported by numerous studies, starting with the former Bureau of Mines Center for Diesel Research at the University of Minnesota. The Department of Energy (DOE) conducted similar research through the University of Idaho, Southwest Research Institute, and the Montana Department of Environmental Quality. The National Biodiesel Board conducted Tier I and Tier II Health Effects Studies that also support these claims.

"Recently, the Department of Labor's Mining Safety Health Administration (MSHA) tested and approved the use of biodiesel in underground mining equipment where workers are exposed to high levels of diesel exhaust. Switching to biodiesel blends is believed to reduce the risk of illness and life-threatening diseases in miners."

As emerging scientific studies impressed the concept and causes of global warming into the public eye, Germany and Brazil were among the first to introduce biodiesel at their pumps. Germany, a country with a passenger car fleet that is almost entirely diesel-driven, had outstanding results from running B100 in their pumps. Brazil's impetus was to explore if biodiesel was a route to reduce dependence on imported petroleum. Others have since followed suit. Sweden, Iceland, Israel and many other countries have already begun withdrawing from oil dependence by investing in alternatives, biodiesel in the forefront among them.

Unfortunately, it took the US-Iraqi petroleum wars of 1991 and then 2003, which were followed by skyrocketing oil prices, to push other world powers to take the biodiesel alternative seriously. Unprecedented damage by natural forces, such as earthquakes, hurricanes and tsunamis, have confirmed the seriousness of global warming and sped things along. Today, in 2006, the blending of biodiesel and petroleum-based diesel is required by law in nearly every developed nation. Local, small-scale, biodiesel producers have cropped up everywhere even as governments and multi-national corporations race to monopolize production.

Over 95 production plants are now up or under construction in the United States alone, with similar or, in many cases, a much higher level of activity taking place in other parts of the world. If it hasn't already, biodiesel will soon be available in your neighborhood. By the reviews biodiesel usage has garnered to date worldwide, that's a very good thing.

A GLOBAL LOOK

Following are some news clips from the alternative energy news website, Green Car Congress (www.greencarcongress.com). These illustrate why the growth of biofuels is predicted to occur so quickly worldwide:

France: French Prime Minister Dominique de Villepin announced an initiative to increase the blending of biofuels in petroleum-based fuels in France to 10% by 2015. The French government has initiated two invitations to tender since 2005 to support the building of 16 new biofuels plants, representing $2.6 billion of investment, according to the Prime Minister.

India: The Indian State of Chhattisgarh will plant 160 million jatropha saplings in all its 16 districts this year with the aim of becoming a biofuel self-reliant state by 2015.

Australia: Australia has signed two contracts and a Memorandum of Understanding to provide more than 200 million liters of biofuels to Australian consumers per annum by 2008.

Spain: YPF SA and Acciona Energía have reached an agreement to invest more than $365 million in the construction of up to six biodiesel plants in Spain, with a combined potential production capacity of more than 1 million metric tons per year (302 million gallons per year), beginning in 2007.

Germany: Lurgi AG, a subsidiary of the GEA Group, has won five new contracts worth approximately $82 million to build biodiesel plants in Germany. In addition, the plant engineering contractor has signed a contract worth $118 million to build the Panda Energy ethanol plant in Hereford, Texas.

Canada: Rothsay, a division of Maple Leaf Foods, Canada's largest independent rendering company, has opened the country's first commercial biodiesel plant, to produce 35 million liters (9.2 million gallons) annually. Rothsay uses animal fats and recycled cooking oils as the feedstock for the plant.

Malaysia: Malaysia's switch to biodiesel will begin next year, at least one year ahead of schedule. Three federal ministries – Transport, Defense, and Primary Enterprises and Commodities - have volunteered to pilot the use of a B5 palm biodiesel blend.

Japan: Matsushita Electric Industrial, one of the world's top consumer electronics companies, is piloting a project that uses waste vegetable oil from the canteens at the Matsushita group's plants in Kusatsu, Shiga Prefecture, and refine it to biodiesel. A growing number of local municipalities-such as Aito Town, Yokkaichi City, Imazu Town, and Shin-asahi Town in Shiga Prefecture-are recycling waste oil into biodiesel, as do some companies, such as Japan's hamburger chain Bikkuri Donkey. In addition to Aburatou Shoji, Someya Shoten in Tokyo, Tohoku Eco Systems and Ishibashi Petrol all collect cooking oil waste and convert it into biodiesel at their plants for their own consumption and for sale.

South Africa: D1 Oils, the rapidly expanding UK biofuel refiner, has agreed to terms with Rolls-Royce to finance a refinery in Durban, South Africa. The D1 20 modular biodiesel refinery is designed to produce 8 million liters per year of biodiesel (2.1 million gallons US).

Saudi Arabia: UK firm D1 Oils is creating a 50-50 joint venture with a Saudi firm to create biodiesel for the world's largest exporter of crude oil. The biodiesel refinery will use jatropha grown on 5,000 hectares of land in Saudi Arabia, with a further 100,000 earmarked for the future.

China: D1 Oils is entering into a joint venture with Chinese Chuan Technology Company Ltd, Chengdu. D1 Oils China will include a refinery, currently under construction, with a capacity of 20,000 tons (6.1 million gallons) of biodiesel per year. The joint venture will have rights over an estimated 200,000 tons of existing jatropha nuts and two million hectares of land dedicated to future jatropha growth.

Finland: Fortum, a Finnish energy company serving the Nordic markets, is building a biodiesel plant at its Porvoo oil refinery. The plant, which is due to come online in the summer of 2007, will have an annual capacity of approximately 170,000 tons of biodiesel – roughly 3,500 barrels per day.

One of the most visible supporters of biodiesel in the US is Willie Nelson. The singer's celebrity has made his voice heard during his single-handed campaign urging truckers to make the switch.

This list of benefits is from his BioWillie.com website:

Willie Nelson's Benefits of Biodiesel

The main benefit derived from using biodegradable, low-toxicity biodiesel comes from the reduction in emissions it generates. Perhaps most importantly, these emissions benefits are all gained from using a fuel that is made from a fully renewable energy source that can be grown right here in the USA.

- Biodiesel reduces carbon dioxide exhaust emissions by up to 80%.
- Biodiesel produces 100% less sulfur dioxide, the major component of acid rain, than petroleum-based diesel.
- Biodiesel reduces exhaust smoke (particulates) emissions by up to 75%, so the usual black cloud associated with a diesel engine can be eliminated.
- The smell of the biodiesel exhaust is far more pleasant than petroleum-based diesel, sometimes smelling like popcorn or doughnuts if the fuel is made from a waste vegetable oil feedstock.
- Biodiesel smells better than diesel fuel, so it is a more pleasant experience re-filling a vehicle's tank.
- Biodiesel is much easier to handle and does not require mechanics to use barrier cream on their hands to protect the skin from cracking or redness.
- Biodiesel is much less dangerous to put into a vehicle's fuel tank, because the flash point of biodiesel is ± 150°C (300°F), in contrast to petroleum diesel which has a flash point of ± 70°C (150°F).
- Biodiesel degrades about four times faster than petroleum diesel after spillage, with most of a spill broken down after just 28 days.
- Biodiesel provides significant lubricity improvement over petroleum diesel fuel so engines last longer; with the right additives, engine performance can also be enhanced.
- Low Sulfur and Ultra Low Sulfur Diesel (ULSD) require additives to add the lubricity back into the fuel. Biodiesel is a totally renewable additive for this role and complements the use of ULSD.
- Biodiesel reduces the classic diesel engine 'knocking noise.'
- Biodiesel does not require any changes to the existing storage infrastructure, so can be used immediately in any tank or storage facility.
- Biodiesel can be mixed in with existing diesel to create various desired mixtures, e.g., B5 or B20 blends.
- A diesel-engined vehicle does not need to be modified in any way in order to use biodiesel.