

John Paoluccio Consulting Engineers, Inc.

P.O. Box 1316, 5038 Salida Blvd., Salida, CA 95368

Ph: 209-545-1661 Fax: 209-545-3533 Email: johnpaoluccio@sbcglobal.net

California Registrations: Mechanical Engineer ME15046 Fire Protection Engineer FP248

Agricultural Engineer AG309

January 10, 2008

Clerk of the Board
Air Resources Board
1001 I Street, 23rd Floor
Sacramento, CA 95814

Attn: Robert DuVall Ph; (916) 324-5930 rduvall@arb.ca.gov

Attn: Early Action Items, Scoping Plans, and Workshops

Attn: Agriculture Stakeholder Working Group

Attn: Other Departments involved in Global Warming & Climate Change

Attn: Other interested parties relating to Renewable Energy & Air Pollution.

Subject: Climate Change Scoping Plan
Comments to reduce greenhouse gases (GHG) that cause Climate Change.

Comments for review and For The Record and Ideas Submitted:

Please forward copies to the above parties and other appropriate departments. If requested, I can forward copies to any other party of interest.

In order to make a major impact on reducing Global Warming and Climate Change, due to fossil fuel use, it is necessary to look at Global solutions in addition to all the local solutions.

The following is a compilation of specific areas where significant pollution reductions can result in less carbon dioxide, methane and other GHG's including PM10 and PM 2.5 from entering our environment.

These pollution reductions items include the following:

1. Wood Burning – Including Open Burning of Orchard Prunings.
2. TABLE "A" - COMPARISON of CONTAMINATES & PROBLEMS caused by:
OPEN BURNING OF DRY WOOD Versus DECOMPOSITION.
3. Diesel Irrigation Pumps – Avoid electric motors.

4. PM10 & PM2.5 – Encourage non-till agricultural practices.
5. Forest Land – Capture biomass for useful purposes.
6. Agricultural Waste including Belching gases from cows.
7. Energy – Encourage renewable energy in lieu of fossil fuel use.
8. BioCoal Fuel – A brief write up on one potential solution to prevent Global Warming and Climate Change.

1. Wood Burning of Orchard Prunings & Biomass Use

It is recommended that rules on open wood burning be relaxed. The burning of orchard prunings results in considerably less polluting than any other option available today.

Biomass holds the promise of reducing fossil fuel use and can substantially help our energy production and dependency on foreign oil. If all wood burning were stopped, our air quality would get worse not better.

Burning dry wood is natural and good for our environment and is an important part of the cycle of life on earth. Biomass takes in carbon dioxide during growth and gives it up during decomposition. However, when wet wood is burned incomplete combustion occurs with the release of substantial amounts of harmful GHG's. The burning of wet wood should be discouraged.

If wood is allowed to decay by natural means, including decomposition by ants, termites, fungus, etc. Then, methane gas is generated and released along with other GHG's. Methane is one of the major primary airborne contaminant generated on earth.

By burning the wood we simply release the stored solar energy and produce mainly water vapor and carbon dioxide. Better yet, waste wood can be collected, milled into pellets and used in electrical power production.

An earlier Modesto Bee article reported that farm burning of 1.1 million tons of ag wood in the valley accounts for 10 tons of particle pollution daily and about 12 tons of smog making gases.

In this case the percent of methane produced is about 0.4% by weight. The particle pollution is insignificant compared to other sources. The resulting methane generated, if the wood were left to decompose would be many times greater, probably 10 times or more, than from burning dry wood, thereby causing an even greater air pollution problem.

If this renewable wood resource were burned in a biomass plant under ideal conditions, only a very small amount of pollutants would be emitted. We would

derive substantial energy and reduce our dependence of fossil fuels. A win win situation that should be encouraged.

New technologies, inventions and processes that utilize renewable biomass offer many opportunities that can lead to a substantial reduction in fossil fuel use. These include bio-diesel, ethanol, and many others. Note: We are also involved in this effort. As an environmental engineer and inventor of environmental products we have been involved with energy systems, air pollution and converting biomass to practical use for over 40 years. BIOCOAL Fuel is our latest patent pending invention and it holds promise of converting wood into a clean burning fuel. See www.biocoal.net for more information.

Technology and economics do not currently allow for many other practical options for the farmer other than to burn the prunings. Wood chipping and transporting the chips to a pellet mill or biomass plant would be ideal and may soon be practical as soon as efficient biomass conversion to fuel becomes more acceptable. In the meantime, while it is not practical or economic to justify this method of energy conversion, it still best to burn the wood prunings.

Farmers cannot allow prunings to build up year after year, allowing them to become a fire hazard and habitat for rats and vermin in addition to the decomposition gases produced. The practice of wood chipping has had mixed reviews. Some chips add to foreign matter in harvested almonds. To speed breaking down the chips they can be disked into the soil but that is contrary to the non-till practices that helps reduce fuel use and keeps PM10 and PM2.5 dust down. It becomes clear that there are no simple solutions to our many environmental problems but frequently, unnecessary regulations can result in more harm than good.

When dry wood is burned, as in the open burning of prunings, instant smoke and water vapor is visible along with carbon dioxide, carbon monoxide, methane and other GHG's plus ash being emitted. When wood is left to decompose it may take years to break down but over 10 times as much methane may be generated. If one looks at the big picture it becomes clear that burning dry wood is a much more earth friendly choice.

The breakdown of wood products in forests, swamps, wetlands, farms, soil and landfills are some of the main producers of methane gas in our atmosphere. The pollution from farm burning, of hard to handle orchard prunings, is insignificant in comparison.

These no burn laws can result in considerable economic loss to the state, hurt farmers and taxpayers, and the resulting air pollution problem will become worse not better. It is in the best interest of the state that these anti wood burning laws and regulations be delayed, modified or rescinded until practical methods of transferring ag waste prunings to biomass facilities for efficient burning is worked out. In the meantime continued ag burning is far less polluting than not.

Throughout the United States attempts are being made to collect methane gas from landfills, sludge, animal waste, and other biomass sources and convert it into useful energy instead of allowing it to enter the atmosphere..

It is estimated that one pound of leaves and wood are generated each year for each square yard of forest. That equals two tons per acre or the heat value of 30,000 cubic feet of gas per acre. This resource is considered Renewable Energy with a zero net addition of carbon to our environment. California has hundreds of millions of tons of biomass available for future energy use. It is estimated that 1 acre of trees offsets 1 car per year - pollution wise). The practical use of this resource should be encouraged.

In comparison, the burning of gas, oil and coal is considered Non-Renewable Energy and contributes 100 percent carbon to global warming. Therefore, whenever it is possible to use renewable biomass fuel instead of fossil fuels the earth will remain cleaner.

Let's relax open wood burning rules and allow farmers to continue with common sense management practices. This benefits us all with less regulation and less pollution.

2. TABLE "A" COMPARISON of CONTAMINATES & PROBLEMS caused by: OPEN BURNING OF DRY WOOD Versus DECOMPOSITION

<u>ITEM</u>	<u>OPEN BURNING</u>	<u>DECOMPOSITION</u>	<u>COMMENTS</u>
Visible Smoke	<u>More*</u>	Less	Minor Problem
Water	More	<u>Less</u>	
Carbon Dioxide	More	<u>Less</u>	
Carbon Monoxide	Less	<u>More*</u>	
Methane	Less	<u>More*</u>	
Other gasses/ VOC's	Less	<u>Much More*</u>	
Ash	<u>More</u>	Less	
Soil Nutrients	<u>Less</u>	Much More	
PM-10	Less	<u>Much More*</u>	Major Problem
PM-2.5	Less	<u>Much More*</u>	Major Problem
Rodent Habitat /Fleas	Less	<u>Much More*</u>	Major Problem

Fossil Fuel Use	Less	<u>Much More*</u>	Worst Problem
Added Carbon Dioxide	Less	<u>Much More *</u>	Problem
Expenses	Less	<u>Much More*</u>	Problem
Time/Manpower	Less	<u>More*</u>	Problem
Consumer Cost	Less	<u>More*</u>	Problem
Adverse Health Effects	Less	<u>More*</u>	Problem
Energy Policy	Good	<u>Not Good*</u>	Problem

Based on the above chart it would be much wiser to select open burning of dry orchard prunings where mostly water and CO₂ are produced, plus ash & some other gasses. When prunings are stored, chipped, and then disked into the soil much more air pollution and other problems occur. Long range storage increases rat, mice, rodent and flea infestations that migrate to populated areas. Considerable PM 10 & PM 2.5 are generated due to chipping and discing chips into and disturbing the soil. Decomposition leads to the release of many greenhouse gasses. Plus 100% of the pollution from the fossil fuels used is added to our environment. All the collected suns energy is lost that could have been put to good use and a waste of a valuable biomass resource.

3. DUST - PM2.5 and PM10:

Significant increases in fine dust particles enter the air when farm practices are changed from non-till operations to discing in wood chips. The fine dust increase may easily be 10 fold or more. Many farmers have changed to non-till operations and the results have proven to be very beneficial to reducing dust generation. Dust mites and other pest problems are reduced with non-till operations.

According to the University of Nebraska Institute of Agriculture and Natural Resources no-till, national cropland soil erosion has plummeted and the process can reduce soil loss by 90 to 95%.

CROPS: In general, it is beneficial to keep orchards and other ag properties clean of waste biomass and minimize unnecessary equipment use. Excess fuel consumption and putting dust into the air is not helpful to plant tissue.

Farmers are constantly resorting to Best Management Practices, trying and evaluating new tested Methods, and learning how to be good stewards of the land while being more productive.

Farmers appreciate new ideas, research, safer chemicals, safer equipment and improved operations. Farmers should be allowed to decide manage surface prunings by open burning instead of chipping and discing the soil.

It is not helpful to have unnecessary, time consuming, expensive, burdensome and restrictive regulations that take away the creative practices that lead to improvements in farming operations and a cleaner environment. Regulations should be modified to all for ors should relax e

4. Forest Measures:

The environment would be better served if dead forest timber and debris were harvested for commercial use. If left to stand and ultimately decompose or catch on fire, it would produce significant quantities of methane and other GHG's.

By harvesting dead timber and clearing built up debris, new growth will be encouraged. It is new growth that extracts carbon from the air that is generated from the burning of fossil fuels.

Forests generate about one pound of leaves and wood per year per square yard. This equals 2 tons per acre. The 500,000 acres would produce enough growth to reach one million tons of wood growth. Since carbon makes up one half of the wood, 500,000 tons of carbon would be extracted each year from the dirty ambient air.

That does a tremendous amount of short term good in reducing air pollution. And a new healthy forest is generated. It is a win win situation.

New potential breakthrough: One major problem with all forms of carbon sequestering is that when wood decomposes the captured carbon is released back into the air environment and the stored suns energy is lost. What is needed is a method to interrupt the Carbon Cycle to prevent the wood from decomposing for the long term. We have developed a patent pending new processing method to accomplish this with a carbon offset product called BioCoal Fuel. Tests have shown the new bio-fuel is hydroscopic, is resistant to decomposition by insects, ants, termites and microbes. This breakthrough and other new processes that utilize renewable energy biomass offer the best opportunity to solve our air pollution problems as we turn away from fossil fuels. More information is available at www.biocoal.net. It will no doubt take many new energy solutions and it would be very helpful if a practical if the ARB would devise a Product and Process Evaluation Form that lists the pros and cons for any and all new methods to reduce Climate Change. This may include energy input to produce one pound of bio-fuel, heat output available per pound of bio-fuel, gasses generated, ash generated, soil, liquid or gas form, etc.

5. Agricultural Waste including Belching gases from cows

The ag and dairy industry is being blamed for methane and other gases entering the air.

Problem: If cows did not eat the grass, hay and other vegetation this biomass would be left to decay and carbon dioxide, methane gas and other GHGs would still result. It is all part of the cycle of life.

Solution: Encourage biomass energy systems including the capture of methane gas from lagoons and the use of all forms of biomass.

Conclusion: The State has the opportunity to encourage the use of many new biomass projects and techniques for renewable energy use. During the development and testing periods the State should allow flexibility by reducing the strident air pollution regulations to allow for real solutions to make it to the marketplace. Think of the global leadership California would show the world as Global Warming solutions were first presented here.

6. STATIONARY DIESEL ENGINE CONTROL MEASURES

(The conversion of irrigation diesel pumps to electric motors.)

The ARB regulations are intended to reduce diesel exhaust emissions from the estimated 8,600 stationary engines operating Ag irrigation pumps. The regulation would require the old diesel engines to be replaced with more efficient diesel engines or electric motors. Farmers would most likely install electric motors in lieu of the more complex and expensive new type diesel engines. We should make the changeover voluntary.

If and when a large percentage of the 8,600 engines were converted to electric motors, the electric power grid would have to accommodate the additional peak load of all the engines converted. Power plant inefficiencies and transmission losses are several times the end load and that would result in more pollution generated at the power plant.

Throughout the world, most nations use coal as the primary fuel for producing electricity. Coal is the cheapest and the dirtiest of the fossil fuels. California has in recent years shifted more to natural gas for electric power production. Natural gas is expensive and the cleanest burning of the fossil fuels but is limited in supply and the general population depends on it for home heating.

Imported electric power from other states must meet new strict pollution standards that many coal plants have difficulty meeting. California has been known to be a leader in environmental matters and technical advances. However, other states and nations that depend on coal use do not have the option for natural gas use. In order to make a major impact against Global Warming we must reduce mainly coal and other fossil fuel use. As natural gas becomes scarcer California will need to rely on more coal use. California should encourage coal fired plants to utilize co-firing with biomass to reduce the net carbon dioxide emissions to less than natural gas fired power plants.

It is also recommended that a cost analysis and comparison of the pollution generated from leaving the diesel engines "as is" versus, changing them over to

electric motors be conducted, prior to making any changes. The change option should be left to the farmer or pump user.

Most of the diesel pumps are used for occasional pumping and operate a small number of hours per year. Unlike electric power, the diesel powered engine does not have the tremendous transport losses of energy. It is its own power plant. From an energy and pollution standpoint, the diesel engine should generate less pollution than converting the pump to electric power. The use of independent diesel engines is a smart design and puts no strain on our electric grid system.

Results that may occur if diesel engines are converted to electric motors:

- Converting to electric use may end up with more fossil fuel being used.
- Fossil fuel energy is consumed to manufacture the new electric motors.
- Conversion adds significant peak loads to the electric power grid.
- New electric power plants will need to be constructed.
- Additional power will need to be purchased from out of state.
- Peak summer loads would be detrimental to the electric power grid.
- Consider the high cost of replacing pump engines with motors.
- More fossil fuel use results in more carbon dioxide and other pollution.
- The cost for implementing this regulation may run in the billions of dollars.
- Add all the additional paperwork, frustration and manpower.
- Farm product costs will increase and taxpayers will pay more.
- Californian farmers will be less competitive, imports increase and jobs lost.

We should be trying to discourage peak electric power use and encourage conservation and more renewable energy use. The periodic operation of diesel driven pumps keeps the power needs "off" of the electric grid.

We should also encourage farmers to consider using renewable bio-diesel fuel to reduce net air pollution and improve existing engine efficiency.

7. Energy – Encourage renewable energy in lieu of fossil fuel use.

Energy exists in many forms. Most of the energy we use is derived from the sun. This includes fossil fuels, biomass, wind energy and hydroelectric power. Carbon is the building block of life and is in all fossil fuels, wood, and all plant and animal life. Fossil fuels may contain 70 to 95% carbon and wood, trees and plants may have approximately 50% carbon.

The Carbon Cycle on earth, in a simplistic example as follows: plants take in carbon dioxide during growth in sunlight. The carbon from the carbon dioxide gas is changed into a concentrated solid form that includes sugars and other plant tissue. The plant is in essence a solar battery that harnesses the sun's stored energy.

When plants die, decompose or when burned, the captured carbon compounds are released back into the ambient air and the sun's energy is released.

This cycle has been repeating itself for millions of years. Using biomass for fuel offers the most opportunity for the near term solution to reducing Global Warming.

8. BIOCOAL Fuel - A Global Solution to Global Warming & Climate Change.

We wish to share our work on helping solve our global energy and pollution problems.

The following is draft information we will be supplying to energy related companies to help bring the new technology to the marketplace. Commercial production is not available at this time but the importance and timing is critical as this may prove to be the new fuel of the future. Although this was not specifically prepared for the WCI parts may help influence new rules and recommendations.

The following describes our solution to the global energy and air pollution problems. Coal is the most used and it is the dirtiest of fuels. We have developed a new renewable energy fuel to co-fire with and eventually replace coal. We call this new solid fuel BIOCOAL™ Fuel.

BIOCOAL™ Fuel in the preferred form of the invention is an enhanced form of biomass in the form of pellets and treated in a unique way. This new fuel is considered a near term solution and could be brought on line in months to immediately provide renewable energy and reduce pollution.

MARKET POTENTIAL

BIOCOAL™ Fuel claims to be a global solution to the world's energy and pollution problems. Over 8 billion tons of coal equivalent fossil fuel is used each year. The market for this new fuel includes co-firing with coal in the near term and replacing coal in the long term for clean electric power generation. It has immediate application as a long life storable product for "Carbon Offsets". This product allows existing coal fired plants to co-fire with the new fuel to lower greenhouse gas emissions. The global economic energy market is a multi trillion dollar industry. This product has the potential to obtain a significant share of that market.

Coal contains about 15,000 Btu per pound and is the most used but dirtiest fossil fuel used today. No other practical renewable energy fuel exists to replace coal at this time. BIOCOAL™ Fuel has the most promise for replacing coal.

PRODUCT DESCRIPTION

BIOCOAL™ Fuel is a new patent pending solid fuel that is processed using biomass feedstock in a unique way to form a renewable energy fuel to replace coal. No changes to existing coal fired plants are required. The new fuel is friable and can be co-fired at 15 % in the near term and 100% in the long term. In a preferred form of the invention the product is in the form of Enhanced Processed Wood Pellets.

TECHNOLOGY

All fossil fuels, like biomass, contain carbon and hydrogen atoms in long chains. The fossil fuels have high carbon content with little moisture. Wood materials contain high levels of moisture and volatile organic compounds that result in incomplete combustion when burned. That is one of the reasons wood is not generally accepted as a practical fuel for energy production. Through a new processing method this technology can quickly turn biomass into clean burning BIOCOAL™ Fuel. This renewable energy fuel is essentially moisture free with very little VOC's. The heat content is over 10,000 Btu per pound. The products of combustion are mainly water and (neutral) carbon dioxide. The new process produces finished product quickly, efficiently, economically, and with little energy use.

The energy from the sun holds the best promise of solving our global energy and pollution problems. Biomass is the most plentiful source of renewable concentrated carbon but until now, all attempts to utilize this free source of the sun's energy has met with technical difficulty and costly extraction solutions. Bio-diesel and ethanol are examples of the liquid forms of bio-fuels that require complex processing and high energy use to turn the biomass into usable forms of energy. Virtually all other biomass forms of energy have run into similar technical difficulties and that is why they are not used extensively. What has been needed is a breakthrough in converting wood into a practical and clean fuel.

BIOCOAL™ Fuel is one such breakthrough. It is a win win bio-fuel. First of all, it uses biomass feedstock such as prunings, ag waste, landfill wood waste, forest debris, lumber waste, grasses, energy crops such as Switchgrass, and many other biomass sources that would otherwise be left to decay, break down, decompose or be burned. When this occurs we lose all the benefits of the sun's energy plus we allow the re-entry of all the methane, carbon dioxide and other GHG's per the CARBON CYCLE of Nature.

BIOCOAL™ Fuel is processed in such a way as to interrupt the CARBON CYCLE of Nature. This new fuel product will not break down like wood and other plant material. It makes an ideal Carbon Offset because it resists all forms of natural decomposition. Plus it is a clean burning renewable energy fuel.

ENVIRONMENTAL CONTRIBUTION POTENTIAL

Global Warming and Climate Change caused by the burning of "non-renewable" fossil fuels and increases in the atmospheric concentration of Carbon Dioxide are considered the greatest threat to our environment today. Coal is considered the most polluting fuel as it contains many heavy metals, including sulfur, lead, mercury, and radioactive substances. Many countries use very poor grades of coal that contain considerably more toxic substances than the cleaner coal that is becoming scarcer. It may come as no surprise to learn that many of the health problems suffered today may be caused by the pollution from coal fired power plants. It is estimated that California receives over 25% of its air pollution from outside countries such as China and India. It may not be long when most of the most harmful pollution originates from outside the USA. It is to the benefit to all for California to lead the way in showing the world that the use of renewable energy should be a major

priority. We must address the reduction of global coal use if we ever hope to solve our Global Warming and Climate Change problems.

With all the conservation efforts, new liquid bio-fuels being used, and improvements in transportation, the air pollution problem will still get worse until we find a new fuel for producing clean electric energy. The area of greatest need is the development of a new fuel to replace "COAL". BIOCOAL™ Fuel is a renewable energy solid fuel that is designed to replace coal. It can also reduce oil and natural gas use. BIOCOAL™ Fuel is the most practical utilization of the stored sun's energy in biomass. Not only does it burn clean but it utilizes all the waste biomass that if left to decompose, would re-introduce all the methane, carbon dioxide and other carbon compounds back into the environment plus wasting the stored sun's energy. BIOCOAL™ Fuel is a win-win product.

Applicant believes this new energy technology will revolutionize the global energy industry. In addition to putting to use all the available waste biomass, changes will be required in land use issues related to the growing of energy crops such as Switchgrass. New farming practices will put low quality land to use in growing energy crops, harvesting, milling and processing plants will also be needed. New industries would be formed and millions of new jobs would be created.

Applicant believes his new technology has the long term potential of removing over 30 billion tons of carbon dioxide every year from our global environment. Virtually all coal could stay in the ground and we would use oil for new products of the future.

Applicant is seeking a working relationship with a large established firm to bring this technology to the marketplace. Additional information can be provided upon request.

The BIOCOAL™ Fuel website can be viewed at www.biocoal.net.

Sincerely

John A. Paoluccio PE
Engineer, Inventor and Farmer

Work: John Paoluccio Consulting Engineers, Inc. – Mechanical / Environmental
Work: Inventive Resources, Inc. - Environmental Products / BIOCOAL Fuel
P.O. Box 1316, 5038 Salida Blvd., Salida, CA 95368
Ph: 209-545-1661 Fax: 209-545-3533
Email: johnpaoluccio@sbcglobal.net info@biocoal.net
www.JPCE.com & www.biocoal.net
California Registrations: Mechanical Engineer ME15046 Fire Protection Engineer FP248
Agricultural Engineer AG309 and Class "A" General Contractor
Home: Modesto, CA 95368. Farm – Operates a small almond orchard.