April Air Board Meeting to Boost Ethanol in California Fuel Tanks

Valley Voice Newspaper, Tuesday, Feb. 27, 2007

Tulare County - The California Air Resource Board is set to meet in April to set new standards for California motor fuel looking to reduce the hydrocarbons that flow from our tailpipes. The end result is an expected boost in the amount of ethanol blended in California gasoline in coming years as well as other biofuels like biodiesel and biomethane.

Instead of targeting the vehicle makers, this time the target is the fuel itself, says Daniel Sperling a UC Davis expert that just joined the California Air Resource Board as a member of the board of directors in January.

“It is impossible to make and burn gasoline without giving off greenhouse gases, particularly carbon dioxide,” said Sperling, noting that transportation fuels account for 41 percent of California emissions of greenhouse gases.

“We are going to give California's fuel producers incentives to reduce those gases in the manufacture of conventional petroleum fuels and also to supply alternative fuels that produce fewer greenhouse gases.”

Sperling is co-director of the small team of University of California experts charged with drafting California's new Low Carbon Fuel Standard. The team includes two other UC Davis energy experts and a co-director from UC Berkeley.

Schwarzenegger signed the executive order for the new fuel standard in a ceremony at the Capitol. While specifics of the standard will emerge in the next several months, Schwarzenegger has already stated its central objective: to cut the “life cycle” or “well-to-wheel” greenhouse gas emissions from transportation fuels by at least 10 percent by the year 2020.

Sperling said producers' options include: improving the efficiency of their production methods; blending petroleum fuels with biofuels like ethanol; and buying fuels and emissions credits from suppliers of cleaner “alternative” fuels such as electricity, natural gas, hydrogen and biofuels.

The intent, he says, is to create a market for greenhouse gas emissions in a way that stimulates innovation and reduces emissions in an economically efficient manner. Additional benefits of this program are increased fuel diversity, reduced oil imports and improved energy security.

The governor's order to reduce carbon in fuels is the first major step in implementing AB 32, a landmark law passed in fall 2006 by the state legislature. It requires California to reduce total greenhouse gas emissions from all sources, not only transportation, by one-fourth by the year 2020.

Sperling and his co-authors are expected to draft and deliver their Low Carbon Fuel Standard to the California Air Resources Board by April, where it will then undergo public review and board revisions.

It is expected that California's program will be a model for the rest of the world as well.

The ARB seeks to both clean the air and reduce greenhouse gas emissions implicated in global warming. Greenhouse gases include carbon dioxide mostly from burning fuel and about half from cars and trucks as well as methane from dairy cows, both the biggest target to help us reduce just how hot it gets out there.

Greenhouse gases from burning fuel, wood, coal, etc. remains trapped in the upper atmosphere creating the so-called greenhouse effect that is already raising temps creating a host of problems, more smoggy days, rising seas and pest outbreaks to name just a few. Pushed by Governor Schwarzenegger and new state laws, the ARB is proposing a tighter fuel standard that will reduce hyrdrocarbon emissions, says Fuels Manager of the ARB Steve Brisby.

Currently fuel makers in California blend ethanol at a 5.7 percent average statewide that helps meet the current standard. But the new low carbon standard will ask fuel makers to cut carbon emissions and the easy way to reduce the amount of carbon emissions is increase the amount of ethanol.

“We've found that ethanol blended with gasoline does increase some hydrocarbons that emanate from car hoses, for example.” Ethanol advocates say this problem is overrated and that newer car hose systems reduce those emissions. But the ARB's Fuel Manager Brisby says that increasing the amount of

ethanol in each gas tank won't increase those hydrocarbon emissions it will reduce them because we are blending less gasoline and more of the biofuel.

“We believe fuel makers will add more ethanol to blend in California once this new standard is adopted,” says Brisby.

The bottom line of going to a 10% ethanol blend in California from the current 5.7% average is that the state will need an extra 700 million gallons of ethanol to add to the current 950 million gallons we use annually already.

California is the first state that will mandate as low carbon standard that could push the need to 5 billion gallons by 2020 in California about what the entire nation produces right now.

Right now state producers make under 100 million gallons of ethanol a drop in the bucket in terms of the expected alternative fuel needed.

Turning Manure to Cash

Ethanol is non toxic and biodegradable and replaces toxic gasoline components like benzene which is a carcinogen.

Unlike fossil fuel, ethanol is renewable coming from plants that can be grown year after year unlike scarce fossil fuels. A 10% blend of ethanol can reduce greenhouse gas emissions by 12 to 19% compared to conventional gasoline, according to Argonne National Lab. It also cuts particulates from conventional gasoline by 50% - particulates that are implicated in lung disease. Using ethanol cuts carbon emissions by 20%.

Efforts to cut methane emissions from livestock will mean a boost for alternative biofuels like biomethane captured from dairy digesters the reason we have seen an explosion of interest in helping farmers meet new air standards and profit from it in selling power and biomethane to power and gas users.

At the most recent farm show two valley based companies announced plans to join with ethanol producers looking to use biomethane from dairies as a renewable energy supply.

The technologies for converting dairy manure to biomethane are already used at several landfills around the United States and elsewhere. Sweden has made significant investments in biomethane and is developing the capacity to meet 20% of its vehicle fuel demand with biofuels. Already, Sweden has 17 plants producing biomethane and runs 7,000 cars and buses on it.

Currently, methane digesters are used on some U.S. dairy farms to trap the methane released from cow manure and generate electricity. Right now 12 digesters are now operating or under construction, which will generate about $1.6 million in electricity enough to power 2,000 homes. This process will also help divert more than 400,000 tons of manure from 36,000 cows.

These biomethane digesters can be upgraded to convert dairy manure to biomethane, which can be used in place of natural gas to fuel buses and other vehicles.

More Power Plant Projects in Works

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Tulare County - Colorado-based Mega Energy has dusted off plans for two peaker power plants in Tulare County as the result of a request for proposals for Southern California Edison. Both projects are 49.9 megawatts - one located on 198 near Goshen and the other in Tipton.

Scott Hornafius, president of Mega Energy, says he is optimistic SCE will accept the company offer for the power project because of the generous 20 year terms that make it more affordable for Edison.

Hornafius says the natural gas fired Goshen facility on 5 acres on 198 at Rd. 60 just west of Highway 99 is located on land being purchased from Alvin and Betty Faria. The Goshen and Tipton projects have already been approved by the Tulare County Board of Supervisors.

The fast track project could be in operation by the summer of 2009.

Regarding the Tipton plant proposal Hornafius says the company is looking at using a different bidding process with SCE utilizing a renewable fuel source as yet to be determined.

SCE, like all private utilities, are mandated to have 20% of their power portfolio derived from renewable energy sources.

One possibility is that the plant could be fueled by biodiesel or manure derived methane that can be piped.

Hornafius says Mega Energy's partner in the project is Caterpillar who makes the energy efficient reciprocating engines used in the plants.

Mega Energy got the two sites permitted a few years ago because of SCE guidance that the central valley at the north end of SCE's service area is underserved as to supply, particularly in the hot summer months after the peak season of hydroelectric power tails off. Mega Energy has been working on the plan since 2000.

Tulare County Biomass Project Proposed

The California Energy Commission has received a proposal from Fresno-based Central Valley Power to build a large 217 megawatt biomass plant somewhere in Tulare County. CEO of the start-up company, Joe Langenberg, says the company is still seeking financing but plan to build a hybrid plant fueled in part by natural gas and part by manure derived biogas. The company plan calls for building a large receiving facility that would get trucked-in manure from nearby dairy farms every day as a fuel source to make the power. The manure would be put in a large digester not burned, he emphasizes. “We could abate a pollution problem at the same time we make electricity.”

Langenberg says the time is right for this type of project because of the emphasis in the state on using renewable energy, dairies are under the flag to reduce their pollution and a credit system is now set up for companies to buy and sell pollution credits.

“Biomass is unique in that it tends to clean up a mess,” says Langenberg, “plus it is a renewable power source.” The state has said utilities buy 20% of their energy from renewable energy sources, including some from biomass power projects.

Langenberg told the Voice they would seek a special use permit soon but would not disclose the proposed location for the plant except to say it is near dairies.

Langenberg says he has been working on the idea for a long time, but the strong market right now for renewable energy makes it more likely the plant would be built.

Avenal Project Cancelled

The California Energy Commission has cancelled the 600-megawatt Avenal power project that has been on the drawing boards for several years. The big project, formerly owned by Duke and now owned by Federal Power, did not meet Energy Commission deadlines to continue their application, which had been extended four times since 2001. The CEC order could refile now for a new application if conditions change. The small community of Avenal was hoping the big project might be a catalyst for economic development and new jobs as well as be a major new tax base.

New plant coming to Port of Stockton

Wallboard facility to employ 150 people

FROM STAFF REPORTS

Tri-Valley Herald, Tuesday, Feb. 27, 2007

STOCKTON - The U.S. Gypsum Company announced plans to build the world's largest wallboard manufacturing plant at the Port of Stockton.

The plant, expected to open in 2010 and employ about 150 people, will use state-of-the-art technology allowing the company to be competitive in the West Coast's demand for wallboard, better known as Sheetrock.

The facility will use 100 percent recycled paper for the surfaces of the finished wallboard products, and recycle all of its production waste. It will also feature a closed-loop liquid effluent system, requiring no discharge into the Stockton Deepwater Channel.

"When its completed in 2010, the new Stockton plant will replace two high-cost manufacturing lines in California that were closed previously," William Foote, chairman and CEO of USG Corp., said in a news release.

"Most importantly, the new Stockton plant will support the growth of USG's customers in one of the largest markets in the U.S., where wallboard demand over the last decade has been growing considerably faster than the rest of the country," Foote said.

The project's location will allow for easier delivery to California's growing communities - including Tracy, Lathrop, and Manteca where thousands of homes are expected to be built in the next decade - with shorter truck trips, which will lower emissions, according to a company statement.

Fleet Card Fuels to test biodiesel at local pump

BY STACEY SHEPARD, Californian staff writer
Bakersfield Californian, Tuesday, Feb. 27 2007

Biodiesel may soon be available at the pump in the Bakersfield area.

Fleet Card Fuels, a regional fueling company based in Bakersfield, is ready to offer the alternative blend at its Kimber Avenue station near Highway 58 and Weedpatch Highway.

The location would be a test to gauge demand for the fuel in the local market.

"It's like the chicken and the egg dilemma," Mark Del Papa, vice president of supply and wholesale marketing for the company, said Monday. "Will your customers come first or will you not know until you have the fuel available?"

The company's "green team" was charged with exploring options for providing more environmentally-friendly product offerings. The only hang-up now is what blend of biodiesel to offer, Del Papa said.

Pure biodiesel is made from a variety of organic sources, including vegetable oils, animal fats and even restaurant grease. Diesel engines can run on 100 percent biodiesel but the fuel is most commonly sold as a blend with petroleum diesel.

Fleet Card Fuels is deciding between a 5 percent blend, known as B5, or a 20 percent blend, called B20, Del Papa said.

B5 is the most concentrated blend allowed for many engine warranties but B20 has become somewhat of an industry standard because it provides environmental benefits at minimum cost increase.

Del Papa is pushing for the 20 percent blend, known as B20.

"If you're going to be a bear be a grizzly," he said.

However, the company's mission statement stresses quality products and it doesn't want to be responsible for a ruined engine that isn't covered by warranty, Del Papa said.

Sen. Dean Florez also hopes the company will choose the B20 blend. In a series of recently introduced bills aimed at improving air quality, the Shafter Democrat has proposed mandating the use of B20 in government vehicles and requiring engine manufacturers to make their warranties good for up to a B20 blend.

"B20 is where we want to be as a standard in California," Florez said. "At B5, we're really just talking about an additive."

Fleet Card Fuels is hosting an educational meeting on biodiesel for customers, businesses and organizations that may be interested in it later this week. Del Papa hopes feedback during the event will help the company determine which blend the company will provide.

5 Western states announce effort to reduce emissions

Mark Martin, Chronicle Sacramento Bureau
S.F. Chronicle, Tuesday, Feb. 27, 2007

Sacramento -- Five Western states, including California, announced an agreement Monday to create a regional effort to lower greenhouse gas emissions that Gov. Arnold Schwarzenegger touted as illustrating "the power of states to lead our nation addressing climate change."

But officials with the governors of the other states -- Arizona, New Mexico, Washington and Oregon -- indicated that they were not close to adopting the same kind of strong global-warming law that California has in place. The states have largely unenforceable goals to reduce greenhouse gases, and with Arizona and New Mexico still considering building the kind of high-polluting power plants that California forbids, it was unclear how much impact the agreement would have.

One environmental advocate, V. John White of the Center for Energy Efficiency and Renewable Technologies, noted the announcement "may be more sizzle than steak."

Unveiled at a meeting of the National Governors Association in Washington, D.C., the agreement calls for creating a regional goal to reduce emissions and for developing a Western market that could allow companies to buy and sell carbon emission credits. Similar markets operating in the European Union and getting started in the Northeast United States allow companies that dramatically lower their emissions to sell credits to other companies.

Schwarzenegger and the four Democratic governors -- Janet Napolitano of Arizona, Chris Gregoire of Washington, Bill Richardson of New Mexico and Ted Kulongoski of Oregon -- characterized the deal as a Western effort to tackle a problem largely ignored by the federal government. A report released this month by an international panel of scientists predicted that the Western United States would be hit hard by global warming, with temperatures rising by as much as 10 degrees and with an increase in droughts and hurricanes.

Schwarzenegger last year signed landmark legislation requiring the state to lower greenhouse gas emissions by 25 percent by 2020. The state's Air Resources Board has just begun the process of determining which industries will be required to lower emissions and by how much.

Speaking with reporters in Washington, the governor said the regional agreement showed how the state's actions could spur others.

"The idea is not just to clean California, but also to inspire other states and to inspire other countries to go in the same direction," Schwarzenegger said.

Administration officials said the agreement was an answer to criticism from some California business groups that the state's tough emissions law would lead to companies leaving the state for others in the West that lack restrictions.

"This is a huge jump forward from just California going it alone," said Dan Skopec, undersecretary of Schwarzenegger's Environmental Protection Agency.

But it's not clear whether businesses in other states will buy or sell emissions credits if they are not required to lower emissions, and none of the other states has an anti-global warming law similar to California's. The green politics of California -- where polls show widespread support for tackling global warming -- may not translate as easily to other states.

All four governors have signed executive orders that include goals for reducing emissions, but none seems poised to quickly enact regulations with teeth. A spokesman for Kulongoski said Monday that a law requiring reductions in Oregon was likely a few years from enactment.

The states have all made efforts to reduce greenhouse gases in some ways. Washington voters passed an initiative last fall to increase renewable energy, for example, and New Mexico is proposing to create tax credits to help develop alternative fuels.

An environmental advocate in Arizona, Erik Magnuson of the group Environment Arizona, noted that one of his group's top priorities in the state Legislature this year is to enact a law that would stop

neighborhood associations from prohibiting homeowners from installing solar power in their homes. California, meanwhile, is using utility ratepayer money to help install solar panels on 1 million homes.

While Schwarzenegger last year signed legislation banning the state's electric utilities from acquiring new megawatts from power plants that burn coal to produce electricity, both Arizona and New Mexico generate much of their power from coal, which is a heavy greenhouse gas contributor. One power plant in Arizona landed last year on a nonpartisan environmental group's list of the 50 worst carbon dioxide emitters in the country.

Both Arizona and New Mexico are considering proposals for new coal-fired power plants.

White applauded the regional agreement because he said it might prod other states to learn from California's efforts to require more energy-efficient appliances and other emissions reduction strategies, and because he predicted that federal requirements are still a long way off.

"But the question is, what have these governors really agreed to?" he said.

Skopec, one of Schwarzenegger's top energy advisers, noted that the agreement was the beginning of a process that won't work unless the other states eventually emulate California.

"Clearly, it will take all five states agreeing to cap emissions and agreeing on what constitutes an emissions reduction," he said.

States that don't would likely drop out of the agreement, he noted.

States of pollution
Here is a breakdown of the per capita production of carbon dioxide, a major greenhouse gas, by state, in metric tons.
Washington: 12.4
Oregon: 11.4
California: 10.8
Arizona: 15.7
New Mexico: 30
Sources: ESRI, USGS, EPA statistics from 2003, U.S. Census Bureau

Western states agree to set regional emissions cap

California, New Mexico, Oregon, Washington and Arizona will join in a market trade program.
By Janet Wilson and Peter Nicholas, Times Staff Writers
L.A. Times, Tuesday, Feb. 27, 2007

In a plan to curb global warming, five governors from Western states agreed Monday to work together to set a regional cap this year on carbon dioxide emissions, and join forces in a market-based emissions trading program within 18 months.

The agreement came as the largest utility in Texas, TXU Corp., announced that its board had approved a buyout offer of $45 billion, including debt, from private investment firms that called for a national emissions cap and market program similar to those in the Western states.

The governors of Arizona, California, New Mexico, Oregon and Washington signed the agreement at a meeting of the National Governors' Assn. in Washington.

Gov. Arnold Schwarzenegger called the agreement "a very important step…. This is a partnership, just like we have with the Northeastern states, just like we have with England."

New Mexico Gov. Bill Richardson, a Democratic presidential candidate who also signed the agreement, said states were "not waiting for the Congress or the Bush administration or the federal government."

California Senate President Pro Tem Don Perata (D-Oakland), who has criticized Schwarzenegger for rushing ahead on market-based programs outside the state before imposing mandatory regulations here, offered qualified support.

"I applaud the governor for his efforts to help California and other states combat global warming," he said in a statement. "But we must also take immediate steps in our own backyard to clean up our air, reduce greenhouse gas emissions from vehicles, and push renewable energy and alternative fuels."

Not all environmentalists like market-based approaches, but Environment California, the National Wildlife Federation and others praised the multi-state agreement, initiated by Oregon Gov. Ted Kulongoski.

The investors buying TXU Corp. say they can finance the biggest private takeover ever, cut electricity rates, cancel new power plants - and still make money.

Kohlberg Kravis Roberts & Co. and Texas Pacific Group believe they can do this because TXU is the largest electricity producer in a big state that is expected to keep growing at a fast clip.

They also believe that as private-equity firms, they can be patient.

They can spend money upfront and wait for a return on their investment without answering to public shareholders that demand quarter after quarter of rising profit.

TXU announced Monday that its directors agreed to a $32-billion sale to a group led by KKR and Texas Pacific and also including Goldman Sachs, Lehman Bros., Citigroup and Morgan Stanley.

The firms will pay $69.25 a share, a 15% premium over TXU's closing share price Friday, and they will assume more than $12 billion in debt.

Initiative could help governor address critics

By Michael Gardner
San Diego Union Tribune, Tuesday, Feb. 27, 2007

SACRAMENTO - Moving to shape a national policy on global warming, governors from California and four other Western states yesterday signed a landmark collective strategy to curtail greenhouse gas emissions from Santa Fe to Seattle.

"This agreement shows the power of states to lead our nation addressing climate change," said Gov. Arnold Schwarzenegger, who was attending the National Governors Association conference in Washington, where he signed the pact.

The initiative may help the governor address critics who claim that his initial solo approach would accomplish little while driving businesses and jobs out of state.

However, Nevada, the state that has doggedly pursued California companies with promises of lower taxes and fewer regulations, did not sign the pact. Nor did Utah and Wyoming - states that produce significant amounts of energy from dirtier coal-powered plants.

The pact includes Washington, Oregon, New Mexico and Arizona.

"There was a lot of concern about California trying to address this problem alone. We agree that since this is a global problem, we need a global solution," said Linda Adams, the governor's top adviser on the environment. "We all know, however, that California is the place where people want to live and do business."

But the state faces obstacles keeping it that way. Schwarzenegger's hand-picked panel of experts meets today for the first time to begin drafting crucial recommendations on how to implement California's plans to curb global warming without derailing the economy.

"The biggest challenge California has is going it alone because of opportunities companies have to leave the state. The solution to that is to build broader national programs," said panel member Dallas Burtraw, a senior fellow at Resources for the Future, a Washington, D.C., nonprofit foundation.

Schwarzenegger is the only Republican among the governors to sign the pact. The agreement calls for the states to develop a regional target for reducing greenhouse gases within the next six months. A new California law requires the state to gradually roll back carbon dioxide emissions to 1990 levels by 2020, a 25 percent reduction.

More significantly, the multistate pact sets in motion plans to create a regional market-based approach, most likely using a common tool called cap-and-trade. Industries unable to contain emissions could buy the right to pollute more from those companies that significantly reduce pollution. The California Air Resources Board has already begun to explore a program here.

“Today's announcement shows how the West continues to lead the way in addressing the most pressing environmental challenge of our time,” said Oregon Gov. Ted Kulongoski.

Most scientists agree greenhouse gases contribute to climate change.

The West has much to lose if the globe continues to warm, triggering severe climatic disruptions. Lengthy dry spells and more intense forest fires could be on the way. Earlier snow melts could trigger floods. And rising sea levels threaten to chew away coastlines.

Except for Schwarzenegger, the governors were sharply critical of the lack of a national program.

“In the absence of meaningful federal action, it is up to the states to take action,” said Arizona Gov. Janet Napolitano.

Said New Mexico Gov. Bill Richardson, a Democratic presidential hopeful, “States are once again taking the lead on combating climate change while Washington, D.C., sits on its hands.”

In an address to governors yesterday, President Bush stressed that he has called for the nation to reduce gas consumption by 20 percent over the next 10 years by increasing the use of alternative fuels, such as ethanol and battery-powered vehicles.

“Becoming less dependent on oil is in our national security interests, it's in our national economic interests, and will enable us to be better stewards of the environment,” the president said.

Schwarzenegger, acting to calm alarm in the business community that his signature on global warming legislation last year will attract moving vans, supports financial incentives to encourage compliance and lure investment in cleaner energy technologies.

Schwarzenegger said this regional campaign will “provide a powerful framework for developing a national cap-and-trade program.”

Some businesses have been voicing concern, even threatening to move to Nevada or other states. Unless heavy polluters like China and India pledge to make reductions, critics say, California's law is virtually meaningless for the environment while punishing the economy.

“California leading the way doesn't change that it's a global issue,” said Brett Guge, a vice president of Fontana-based California Steel Industries, which employs 1,000.

“We have growth plans. They are going to require us to spend significant capital, create jobs and expand our business as California and the rest of the West continue to grow,” he said. “We'll be there to support that growth - if the rules will allow us. Right now, the rules haven't been made. We have to think about that.”

Members of the governor's panel say they recognize the wariness among businesses but expect this new regional pact to attract additional gubernatorial signatures, building pressure for a national strategy.

“There will be costs to industry, important costs,” Burtraw said. “The lesson is the costs have turned out to be surprisingly lower than were anticipated. That's why we turn to market-based approaches.”

Practical Fusion, or Just a Bubble?

By KENNETH CHANG
N. Y Times, Tuesday, Feb. 27, 2007

LOS ANGELES - Brian Kappus, a physics graduate student at U.C.L.A., tipped the clear cylinder to trap some air bubbles in the clear liquid inside. He clamped the cylinder, upright, on a small turntable and set it spinning. With the flip of another switch, powerful up-and-down vibrations, 50 a second, started shaking the cylinder.

A bubble floating in the liquid - phosphoric acid - started to shine, brightening into an intense ball of light like a miniature star.

The shining bubble did not produce any significant energy, but perhaps someday it might, just like a star. A few small companies and maverick university laboratories, including this one at U.C.L.A. run by Seth Putterman, a professor of physics, are pursuing quixotic solutions for future energy, trying to tap the power of the Sun - hot nuclear fusion - in devices that fit on a tabletop.

Dr. Putterman's approach is to use sound waves, called sonofusion or bubble fusion, to expand and collapse tiny bubbles, generating ultrahot temperatures. At temperatures hot enough, atoms can literally fuse and release even more energy than when they split in nuclear fission, now used in nuclear power plants and weapons. Furthermore, fusion is clean in that it does not produce long-lived nuclear waste.

Dr. Putterman has not achieved fusion in his experiments. He and other scientists form a small but devoted cadre interested in turning small-scale desktop fusion into usable systems. Although success is far away, the principles seem sound.

Other researchers already have working desktop fusion devices, including ones that are descendants of the Farnsworth Fusor invented four decades ago by Philo T. Farnsworth, the television pioneer.

Achieving nuclear fusion, even in a desktop device, is not particularly difficult. But building a fusion reactor that generates more energy than it consumes is far more challenging.

So far, all fusion reactors, big and small, fall short of this goal. Many fusion scientists are skeptical that small-scale alternatives hold any promise of breaking the break-even barrier.

Impulse Devices, a small company in the small town of Grass Valley, Calif., is exploring the same sound-driven fusion as Dr. Putterman, pushing forward with venture capital financing. Its president, Ross Tessien, concedes that Impulse is a high-risk investment, but the potential payoffs would be many.

"You solve the world's pollution problems," Mr. Tessien said. "You eliminate the need for wars. You eliminate scarcity of fuel. And it happens to be a very valuable market. So from a commercial point of view, there's every incentive. From a moral point of view, there's every incentive. And it's fun and it's exciting work."

The Sun produces energy by continually pressing together four hydrogen atoms - a hydrogen atom has a single proton in its nucleus - into one helium atom, with a nucleus of two protons and two neutrons. A helium atom weighs less than the four original hydrogen atoms. So by Einstein's E=mc2 equation, the change in mass is transformed into a burst of energy.

That simplest fusion reaction, four hydrogens into one helium, works for turning a ball of gas like the Sun, 865,000 miles across, into a shining star. But it is far too slow for generating energy on Earth.

Other fusion reactions do occur quickly enough. Most current fusion efforts look to combine two atoms of deuterium, a heavier version of hydrogen with an extra neutron. For reactions that can achieve break even, the researchers look to fusing deuterium with tritium, an even heavier hydrogen with two neutrons.

The appeals of fusion are many: no planet- warming gases, no radioactive-waste headache, plentiful fuel. Even though only 1 out of 6,000 hydrogen atoms in sea water molecules is the heavier deuterium, that is enough to last billions of years.

"One bucket of water out of the ocean or a lake or a river has 200 gallons of gasoline worth of energy in it," Mr. Tessien said. "It's the holy grail of energy technologies, and everybody has the fuel for free."

Tritium, a short-lived radioactive isotope, has to be generated in a nuclear reactor.

The tricky part is heating the atoms to the millions of degrees needed to initiate fusion and keeping the superhot gas confined.

Mainstream science is pursuing fusion along two paths. One is the tokamak design, trapping the charged atoms within a doughnut-shape magnetic field. An international collaboration will build the latest, largest such reactor in southern France in coming years. The $10 billion international project, called ITER, could begin operating around 2025 and is intended to demonstrate that all the scientific and technological challenges have finally been tamed. Commercial tokamak reactors could perhaps follow in 10 years.

The other mainstream approach is blasting a pellet of fuel with lasers, creating conditions hot and dense enough for fusion. The National Ignition Facility at Lawrence Livermore National Laboratory in California is to start testing that idea around 2010. The cost of the center, with 192 lasers, has soared to several billion dollars. Harnessing that approach will also take decades.

The recurrent criticism of fusion is that its promise has always been decades away. The task has proved harder and more expensive than what scientists anticipated when they started in the 1950s. Even if lasers and tokamaks prove technologically feasible, giant, expensive fusion reactors could still turn out to be too expensive to be practical.

So the mavericks ask: Why not take a closer look at some alternative approaches?

“It’s really a shame the Department of Energy has such a narrowly focused program,” said Eric J. Lerner, president and sole employee of Lawrenceville Plasma Physics in New Jersey, another alternative fusion company. Mr. Lerner has received Air Force and NASA financing to explore whether his dense fusion focus might be good to propel spacecraft, but nothing from the Energy Department.

The department is spending $300 million on fusion research this year, and President Bush has asked for an increase to $428 million for next year’s budget. Almost all the increase would go to ITER.

The department supports research for many approaches, said Thomas Vanek, the department’s acting director for fusion energy sciences, but that has to fit within tight budgets. “Since the mid-’90s, it has been a tough environment for fusion energy.”

Some fusion scientists argue that fundamental physics makes these alternative approaches unlikely to pay off. Some agree that financing some high-risk, high-payoff research could be worthwhile.

“I personally think there should be more of these smaller ideas funded,” said L. John Perkins, a physicist at Lawrence Livermore. “Ninety-nine might fail, but one might pay off.”

Robert W. Bussard, an independent scientist, advocates a return to the Farnsworth Fusor, otherwise known as inertial confinement fusion. Farnsworth and Robert L. Hirsch, who later ran the Office of Fusion Energy for the Atomic Energy Commission, developed a fusor consisting of two electrically charged concentric spherical grids. They accelerated charged atoms, or ions, to the center.

“It’s like the electron guns in your TV tube,” Dr. Bussard said.

In the process, positively charged ions fly through the center, slow down as they approach the positively charged outer grid, then stop and fall back toward the center like a marble rolling back and forth in a bowl. Sometimes two ions collide at the center and fuse. But too often the ions run into the grids before they fuse. Dr. Bussard, a deputy to Dr. Hirsch at the Office of Fusion Energy in the ’70s, said he had a design eliminating the grids.

Most fusion scientists doubt Dr. Bussard’s assertion that he has solved all the underlying physics issues with inertial electrostatic confinement and knows how to build a working fusion power generator.

Dr. Bussard’s Navy grants dried up two years ago, and he is looking for investors. Dr. Bussard said he needed a few million dollars to restart his research, and $150 million to $200 million to build a fusion reactor capable of generating 100 megawatts. One megawatt is enough power for 1,000 houses.

Mr. Lerner hopes to harness a phenomenon known as dense plasma focus, which is also an old idea. Take two cylinders, put a gas between them and set off a big electric spark. The jolt heats the gas and generates extremely strong, unstable magnetic fields that compress and heat the gas to fusion temperatures.

Mr. Lerner has a three-year, $1.5 million collaboration with the Nuclear Energy Commission of Chile to research dense plasma focus. After that, $10 million and another three years would be needed for engineering development, he estimated. A result could be a compact five-megawatt generator.

“The whole device would fit inside anyone’s good-size garage.” Mr. Lerner said. “If all goes well, we hope to have our first prototype within six years.”

Skeptical physicists say too much energy is lost along the way in dense focus fusion to reach the break-even point. Mr. Lerner said his calculations showed that the very strong magnetic fields reduced the energy losses..

Dr. Putterman of U.C.L.A. and Mr. Tessien of Impulse Devices are perhaps furthest from success. They have yet to show fusion occurring. The phenomenon of glowing light as the sound-driven bubbles expand and collapse has been known since the 1930s, leading to speculation, but not proof, that the bubbles would perhaps be compressed so violently that trapped atoms might fuse.

In 2002, researchers led by Rusi P. Taleyarkhan, now a professor of nuclear engineering at Purdue University, claimed to have achieved fusion in such a system. That result has yet to be reproduced outside Dr. Taleyarkhan's laboratories.

Neither Dr. Putterman nor Mr. Tessien could duplicate that experiment.

Mr. Tessien, who started his quest for sonofusion 12 years ago, said he had abandoned using Dr. Taleyarkhan's approach and returned to his own designs. Those use steel spheres, allowing high pressures to be exerted on liquids in addition to the forces of the vibrating sound waves. He is confident that he will find fusion.

"There is zero question that fusion is hiding in some system," he said. "I just need to figure out the right recipe."

Dr. Putterman's group experiments with different liquids like the phosphoric acid in the rotating cylinder. Phosphoric acid, it turns out, gives out much brighter light, but so far no fusion.

Dr. Putterman receives most of his financing from the Defense Department, although he has gotten money from novel sources, including $72,000 from the BBC, which was making a program about sonofusion.

He is philosophical about why more money is not flowing, saying the scientists have not given the doubters a reason to stop doubting. "Maybe that's the brutal answer," he said. "People are waiting for it to work. Maybe some explanations are simple."

Field burning benefits lost in cloud of political smoke

Capital Press Weekly, Friday, Feb. 23, 2007

Many Idaho grass seed and wheat producers will have an important tool removed from their tool boxes this year, courtesy of fumbled paperwork.

The 9th Circuit Court of Appeals recently ruled the state of Idaho left out field burning in its 2003 state implementation plan, required by the federal Clean Air Act. As a result, the court found that the practice, though a part of the state's previous air quality plans, cannot be used.

Last week, Idaho Agriculture Director Celia Gould said her department would issue no crop residue burning permits this year.

That means many Kentucky bluegrass and wheat growers in Idaho will have to use other more expensive means to remove residue and control pests and weeds.

Fortunately, many grass seed operations are on the Coeur d'Alene Indian reservation. Because the reservation is a sovereign territory, grass seed farmers there will still be able to burn their fields after harvest.

The Idaho situation appears to have been avoidable. Had field burning been included in the state's implementation plan with other approved practices, farmers would have retained their ability to use it.

As state and federal lawyers ponder what to do now, farmers - who did nothing wrong - must pay the price for that oversight. They must also find other ways to manage their fields.

Field burning has become a lightning rod in some parts of the West. In Eastern Washington, Western Oregon and elsewhere, burning crop residue has been a longstanding subject of debate. In some states

such as Washington and Oregon, effective regulations have been put into place that allow growers to burn their fields with a minimal impact on air quality.

In Oregon, for example, farmers receive a tax credit to mitigate the cost of not burning their fields, the number of acres that can be burned is restricted and atmospheric conditions are closely monitored. Some field residue is baled and exported as animal feed. This regulatory system effectively prevents or reduces problems that existed decades ago.

The use of field burning dates back centuries, to the Native Americans that lived on the Great Plains and in the West, but now it is the target of environmental groups and others that hope to convince judges, legislators and regulators that the practice is outdated.

That appears to be a solution in search of a problem. In fact, when adequately regulated, field burning is a cost-effective means of managing residue, pests and weeds. Any effects on air quality are temporary. Nowadays, wood-burning stoves used to heat houses create more air-quality problems in many areas than does field burning.

According to the Oregon Department of Environmental Quality, field burning contributes less than 2 percent of the total particulate load in the Willamette Valley's air during the summer.

Field burning is a longstanding, effective and natural way for farmers to manage crop residue, control pests and weeds and ensure that the following year's crop grows properly.

As long as it's properly managed, field burning is one tool Northwest farmers should be able to continue to use.

Bay Area trails in use of electronic bridge tolls

ASSOCIATED PRESS
Contra Costa Times, Tuesday, Feb. 27, 2007

SAN FRANCISCO - Bay Area commuters use electronic bridge tolls less than their counterparts in other regions, according to a new study that suggests offering discounts to boost FasTrak usage.

About 40 percent of drivers on the Bay Area's state-owned bridges use FasTrak lanes during peak traffic hours, compared with around 70 percent of motorists on toll bridges in New York, New Jersey and Illinois, according to researchers at San Francisco State University's College of Business.

The study, published this month in the Transportation Journal, found that those three states offer discounts that make it 11 to 50 percent cheaper to use electronic tolls than cash.

More Bay Area commuters enrolled in the FasTrak program when electronic toll users were given a $1 discount in January. But transportation officials should offer permanent discounts if they want to significantly increase use of electronic tolls, which reduce air pollution, fuel consumption and commute times, the study said.

News Analysis in the Valley Voice Newspaper, Tuesday, Feb. 27, 2007:

Green Revolution for Fuels and Power Could Benefit the Valley

by John Lindt

San Joaquin Valley - When irate visitors from the Bay Area and L.A. descended on the Tulare County Board of Supervisors earlier this year to protest the potential construction of a dairy near the rural town of Allensworth, they came to complain about the only thing arguably the valley has going for it economically - cows and crops.

California's big urban areas on the coast have fresh air blowing in their area from the sea every day, and sport universities, sprawling factories, shipyards and oil refineries to employ their people. We get the air from those refineries and factories blowing into our region every day. We do have a pollution problem, mind you, and much of it self-generated.

But now a state of California policy to cut global warming may actually benefit the valley economy, clean our air as well as help our urban friends to avoid predictions of being flooded out by melting glaciers sinking Oakland for example, thanks to our little ol' crops and cows.

That legislation would mandate a cut in greenhouse gas emissions by 20% by 2010 both at the fuel pump for our cars and trucks and at the power plant pushing investor owned utilities to produce 20% of their electricity power from renewable sources by that year. Together the new green state policy is stimulating a flurry of potential projects that will need the wide open space of the San Joaquin Valley to make happen.

Already in Tehachapi the state's largest wind farm is under development and in central California there are plans for production form a dozen new biofuel plants that have spurred the rural economies here and promises to spur new plantings of field crops grown by local farmers to provide at least some of the feed stock. These are new ethanol plants all over of California that will provide 20% of the fuel of the state in a matter of a few years. The use of the fuel will help cut greenhouse gas emissions and other hydrocarbon pollutants that foul everybody's air.

Now in the past few months three separate firms have announced plans to tap manure - a major source of methane that is greenhouse gas and a big perception problem in the valley. It's the stink and flies that this group and plenty of others have complained about. The new dairy-based entrepreneurs promise to use the methane derived from manure to power an ethanol plant. It can be used to make electricity and or used as a natural gas substitute to provide heat. In recent months PG&E announced the purchase of the "real natural gas" to light 50,000 homes. Now a Visalia group and a Bakersfield group are talking about launching "dairy energy parks" that will both mitigate the possible problem and provide a source for boilers used in all kinds of industry. Now manure can make ethanol using methane derived biofuel as the source in a closed loop process.

In the end the cows can make heat and electricity and not just milk.

Dairymen will be motivated by both the carrot and the stick as new regulations mandating they cut methane emissions are closer. The end result should be dairies could be models of environment stewardship with folks looking to locate near them to use the power and heat they produce rather than be as far away as possible. Heat from the proposed dairy could be piped out at Allensworth Museum State Park as well as power to light up the exhibits. Now that would be a win win.

On the power front, we are feeling the benefit of new incentives that could result in power projects in Tulare County using renewable sources, (see story) instead of relying on other areas to send us the power we need.

Sacramento Bee, Guest Commentary, Tuesday, Feb. 27, 2007:

Scott Hubbard and Charles Kennel: The opportunity in climate change

By Scott Hubbard and Charles Kennel

California is in a powerful position to take a leading role on the pressing issue of climate change.

The recent report on global climate by the Intergovernmental Panel on Climate Change states that "the rate of warming between now and 2030 is likely to be twice that of the previous century." The panel is 90 percent certain that we humans are responsible for the climate change we have seen, and says that more is on the way -- from polar ice cap melting to increasingly extreme weather events.

The California Energy Commission has already begun forecasting how climate change will affect California. That forecast led to Gov. Arnold Schwarzenegger's actions on greenhouse gases. Soon, in every part of our state, citizens, businesses and governments will be called upon to decide how we should deal with the coming decades of change. California will need to think globally, predict regionally and act locally.

Global warming will produce many different local effects. Extreme temperatures in different regions may be much higher or lower than normal. Rainfall may be more or less than 100-year extremes. Snowpack in the Sierra Nevada may vary from year to year even as it declines on average. The frequency of wildfires will change.

Sometimes small changes can have large effects. In Yellowstone Park, a slight rise in average temperature may have opened vulnerable ecosystems to predation from insects and diseases, but we need more data to be sure.

Sometimes two things might act together. A storm surge off the Northern California coast could combine with unusually heavy downpours to swamp our aging levee system, threatening the 6 million Californians who live nearby. The risks from such "perfect storms" will slowly increase year by year as sea level rises in the background.

Without global data, everyone is at risk of flying blind as the climate changes. The federal government and our elected officials must provide funding to extend the life of the current Earth Observing System, design a new system and get it built. But that alone is not sufficient.

Regional climate studies are the next frontier of climate research. California should proceed to build specialized computer models and measurement systems covering every part of California and not rely on the few data points from global models.

We need to develop our own measurements of mountain snowpack, river flows, coastal ocean circulation, air pollution and circulation, earthquakes, soil moisture, fire hazard, fish populations and many other things. It may be necessary for us to build and launch a "Cal-Satellite" that could collect specific data to fill in the gaps from the NASA and NOAA missions.

Finally, we must connect what we learn with what we know about our economy and society, to support decisions about insurance, agriculture, finance, tourism and basic infrastructure. (How high should we build those levees so they will be good 50 years from now?)

California has all the tools for this effort. The University of California, Stanford, Cal Tech, the University of Southern California and the state's other world-class universities provide the breadth of expertise needed to understand the human as well as the environmental impacts of climate change. From the UC San Diego Supercomputing Center in the south to NASA Ames and Lawrence Livermore National Laboratory in the north, we have a huge and growing supercomputing capacity.

California industry built, among others, the Earth observing flagship satellites Terra and Aqua, and launched them from Vandenberg Air Force Base. The Jet Propulsion Laboratory in Pasadena designed many important Earth science instruments. Institutions such as the Scripps Institution of Oceanography build major observing systems on land and in the ocean.

Our business climate will be important as well. Despite gloomy predictions that caps on greenhouse gases will lead to job loss, California entrepreneurs are betting that huge new markets for technologies and services are about to emerge. According to a recent study by Joint Venture Silicon Valley, California's investment in clean technology grew 266 percent from 2005 to 2006. "Greentech and cleantech" will provide a new job boom.

By building the climate system we need, California can lead the world in the next phase of climate study and action. Our efforts can keep our state beautiful and our bountiful economy the envy of the world.

Letter to the Editor, Contra Costa Times, Tuesday, February 27, 2007

No to Jones Ranch

America has started learning a "big lesson" from Wal-Mart, one that took years to sink in: Saturated retail markets bring deterioration and decay. With retail sprawl development comes a series of economic and social problems for host communities. Sprawl is often mistaken for economic development, and the people it affects the most are least likely to understand it.

Among the concerns of retail sprawl are:

• It fosters redundant competition between local governments, an economic war of tax incentives.

• The impact of traffic on air quality.

• The loss of open space and unique natural areas.

• The overdependence on automobiles.

• The violation of our personal environment by sprawling retail development leads to an alienation from community, a sense of isolation and disconnectedness.

Concord already has a Costco, Sam's Club, Sunvalley mall, the Willows Shopping Center, Trader Joe's and a struggling Park and Shop.

We need to keep encouraging the growth of real commercial centers such as the new shops and restaurants surrounding Todos Santos Park, which bring a sense of community to the residents of our city.

We need to, as good citizens, create gathering places for people to interact and be a part of our city. Say no to Jones Ranch!

Allie Gramm, Concord

Letter to the Editor, Contra Costa Times, Tuesday, Feb. 27, 2007

Goodman hyperbole

Ellen Goodman in her Feb. 13 column, "Our lights are on, but is anyone home?" wrote that "global warming deniers are now on a par with Holocaust deniers, though one denies the past and the other denies the present and future."

I believe the Earth is warming, and I know we are spewing tons of pollutants into the air every year, but no one can predict what will happen in the future. If you can't predict it with certainty, how you can deny it?

But the absurdity of this statement is not really what bothers me. Why does Goodman feel the need to equate those who don't agree with her to those who deny one of the worst events in human history?

I could list many times in the past where the vast majority of scientists held one belief only to be proved wrong (think Galileo). This hyperbole is not productive and certainly doesn't help advance the debate or help solve the problem. But it certainly eliminates her from the list of columnists that I read on a regular basis.

Bob Kelso, Lafayette

Letter to the Editor, Contra Costa Times, Monday, Feb. 26, 2007:

Share the air

Being sensitive to particulate pollution, I was pleased the Times printed the article, "Regulators propose targeted ban on fires." I hope this will alert subscribers to the necessity of not having recreational fires on "Spare the Air" nights.

Some citizens decry further government regulations and impositions, but I welcome it in this case.

We wouldn't need government intrusion if people would put the needs and rights of their fellow citizens above their individual desires.

During the holidays, I visited a friend in an upscale neighborhood in Central Contra Costa County. That night we decided to take a walk and look at the Christmas lights. The air was so thick with smoke, I had to turn back.

People like the comfort and atmosphere of recreational fires. But we live in an area of dense housing and we all have to share the same air.

If you want to experience what it is like for people like me during a Spare the Air Day or Night, lie on the couch and have someone place 4 bricks on your chest; then spend the next 30 minutes trying to catch your breath! Please, pay attention to the announcements and regulations regarding Spare the Air.

Pat Teschner, Bay Point