



# On the Air

## Energy and Our Air Alternatives and Tradeoffs

**E**nergy production and use impact our air and our earth directly and indirectly. The burning of fuels pollutes the air with particles, toxic chemicals, and the nitrogen oxides and hydrocarbons that form ground-level ozone, a principal component of smog. Burning of fossil fuels also produces emissions of greenhouse gases, which trap heat in the Earth's atmosphere, accelerating the rate of climate change (see article page three).

Cost and environmental tradeoffs of fuels and technologies are difficult to assess. The amount of pollution created varies by the type of fuel, process, and controls used. Some energy sources are finite—while others are renewable. Some fuels can be recovered from sources that would otherwise be considered waste. Some processes use expensive



*Dan Ringstmeyer (left) and Norm Teixeira of Santa Maria-based Solar Power Systems, pictured in front of solar panels used to power water pumps at Teixeira Farms, on land north of Guadalupe. Completed in July, the solar installation provides power to run two 50-horsepower farm irrigation pumps, and one 60-horsepower pump. Believed to be one of the largest solar agricultural installations in the country, the 756 175-watt solar panels have a generating capacity of 112 kilowatts of electricity. The system is connected to the electrical grid, and during times when there is less solar power available, power from the grid can be used for the pumps.*

materials, or involve pollution and additional energy use in fuel extraction, transport, or storage.

The recent federal Energy Bill identifies tax credits for solar and fuel-cell installations, and the state

has several energy initiatives, including the "Flex Your Power" program encouraging energy conservation, and a renewable energy program that establishes incentives and sets targets for the state to get more of its energy from renewable energy sources.

California's "Million Solar Roofs" initiative currently under review aims to provide consumers with incentives to build a million solar power systems over ten years. Locally, a "Million Solar Roofs" initiative in Santa Barbara County, led by the Community Environmental Council, is bringing together agencies, organizations, and businesses, to find ways to overcome barriers to solar installations.

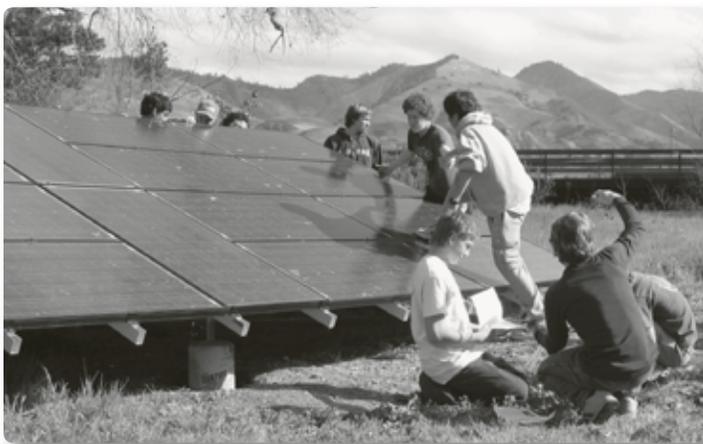
California also has a plan to develop a "Hydrogen Highway" network of fueling stations to support development and use of vehicles fueled by hydrogen (either internal combustion engine vehicles, or fuel cell vehicles).

Hydrogen has received attention as the fuel with perhaps the greatest potential to be used in the same range of applications as petroleum-based fuels. Fuel

cell power plants using hydrogen can provide quiet, non-polluting distributed power generation, and most major auto manufacturers are working to develop fuel cell vehicles. However, hydrogen also presents a good example of complex cost and environmental tradeoffs.

The most abundant element in the universe, hydrogen is the lightest in weight, and the simplest in structure: just one electron and one proton. It typically exists as two atoms, or H<sub>2</sub>, and is rarely found alone. It combines with oxygen to form water, and with carbon to form hydrocarbons, including petroleum-based fuels. Hydrogen's unusual chemical properties affect its use as a fuel. Highly flammable, it has a very high energy content for its weight (nearly three times as much as gasoline). When burned, it

*(continued on page two)*



*Chemistry students at Midland School in Los Olivos help install a 3-kilowatt photovoltaic system that will meet four to five percent of the campus's electricity needs. Funded in part by BP's "A+ for Energy" program, this unit in chemistry led by teacher Lise Goddard focused on conserving energy and generating clean energy. Students learned how photovoltaic panels work, installed compact fluorescent light bulbs throughout campus, visited a power plant, and learned the environmental impacts of burning fossil fuels. The project was highlighted in the July/August 2005 issue of the magazine Solar Today.*

### Inside...

-  **Climate Change and California**
-  **Gas Station Workshop**
-  **Air Pollution and Development Projects**
-  **Summer Camp Presentations**
-  **Fuel Economy**

## Energy and Our Air (cont'd)

produces almost no air pollution. Inside a fuel cell, it reacts chemically to produce electricity without air pollution, and the only by-products of the reaction are water vapor and heat.

Hydrogen can be extracted from fossil fuels; it can also be produced from renewable sources, and extracted from waste products, including methane gas emitted from landfills and waste treatment plants.

Even with its potential benefits, hydrogen presents complex challenges. While it is possible to extract hydrogen from water through electrolysis, using a renewable energy source, hydrogen is also often extracted from fossil fuels in processes that produce some pollution and greenhouse gas emissions. Compression, storage, and transport of hydrogen are costly and technically challenging, and involve additional energy use. In addition, platinum, the material commonly used as the catalyst inside a fuel cell, is costly and scarce.

A recent Stanford University study examined scenarios of use of hydrogen-fueled vehicles, and methods of hydrogen extraction and associated tradeoffs, and concluded: "Converting all U.S. on-road vehicles to hydrogen fuel

exhaust. Wind and natural gas hydrogen fuel cell vehicles offer the greatest potential health benefits and could save 3700 to 6400 U.S. lives annually. Wind hydrogen fuel cell vehicles should benefit climate the most."



*APCD Engineer Lisa Kiehl stands in front of one of two new fuel cells installed at the City of Santa Barbara's El Estero waste treatment plant. The fuel cells generate 500 kilowatts of power, providing electricity and heat for the facility's wastewater treatment system. At the same time, the system is reducing methane emissions from the plant, as the hydrogen that fuels the fuel cells is extracted from waste methane emitted by the plant.*

cell vehicles may improve air quality, health, and climate significantly, whether the hydrogen is produced by steam reforming of natural gas, wind electrolysis, or coal gasification. Most benefits would result from eliminating current vehicle

technology in the world, according to the National Renewable Energy Laboratory of the federal Department of Energy. In the past 10 years, global installations of wind energy systems have grown significantly—from a total capacity of 2.8 gigawatts in 1993 to almost 40 gigawatts at the close of 2003.

Wind energy is one of a range of renewable energy solutions that qualify for incentives under California's Emerging Renewables and Self Generation Incentive Programs. These systems are often connected to the electrical grid so that excess power can be provided back to the grid, and supplemental power can be pulled from the grid during times when less power from the renewable energy source is available.

Currently, 10.6 percent of California's energy is from renewable sources (solar, wind, geothermal, biomass, etc.). The state has set a target to get 20 percent of the state's energy from renewable sources by 2010, and a third from these sources by 2020.

However, the study did not examine factors that affect the siting of wind-power facilities.

Wind energy is the fastest growing electricity-generating technology in the world, according to the National Renewable Energy Laboratory of the federal Department of Energy. In the past 10 years, global installations of wind energy systems have grown significantly—from a total capacity of 2.8

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For more information on state rebates and incentives for renewable energy, see [www.consumerenergycenter.org](http://www.consumerenergycenter.org). For energy-conserving ideas, see [www.fypower.org](http://www.fypower.org). For more on local alternative energy initiatives, see [www.communityenvironmentalcouncil.org/energyprograms](http://www.communityenvironmentalcouncil.org/energyprograms).

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## Casa Nueva Building Recognized



Casa Nueva, the county building that houses APCD and other county agencies, recently received the "Award of High Honor" in the Savings by Design Energy Efficiency Integration Design Award Program. Eight California buildings were honored, with the Casa Nueva Building the only one to receive the highest award. The award announcement highlighted energy-conserving features of Casa Nueva, including day lighting, trellises with vines that shade the building in summer, use of sustainable materials, and more. See [www.sbcpd.org/grnbldg.htm](http://www.sbcpd.org/grnbldg.htm).

## WWW.sbcapcd.org New On The Web

- ❖ Local permits calculator for agricultural businesses  
See "Agricultural Permits"
- ❖ Pages for gas station operators  
See "Permits and Engineering/Gasoline Stations"

## Climate Change and California

### APCD Board Roundup

Following are the highlights of the June Board meeting.

#### June

- ♻️ Reappointed David Van Mullem to the APCD Hearing Board for a three-year term. Reappointed David Schmarje to the APCD Hearing Board.
- ♻️ Adopted the Santa Barbara County APCD proposed budget for Fiscal Year 2005/2006.
- ♻️ Held hearing and adopted Implementation Schedule for SB 656, addressing particle pollution.

### What One Person Can Do about Climate Change

You are responsible for approximately 6.6 tons of greenhouse gas emissions per year (average for U.S. residents, according to the U.S. Environmental Protection Agency). An estimated 82 percent of your contribution comes from your use of electricity, and your use of your car. So what can you do?

Here are some ideas:

- ♻️ Conserve energy. Buy energy-efficient appliances and use compact fluorescent lights.
- ♻️ Consider renewable energy sources such as solar power.
- ♻️ Drive less. (Walk, bike, carpool, vanpool, or take the bus or train, more.)
- ♻️ Buy a fuel-efficient car. (This doesn't have to be a hybrid; look for the highest ratings.)
- ♻️ Keep your vehicle tuned-up to run as cleanly and efficiently as possible.
- ♻️ Keep your tires properly inflated to improve gas mileage.
- ♻️ Plant a tree. Trees remove carbon dioxide from the atmosphere.
- ♻️ Reduce, re-use, recycle—and you'll cut emissions associated with waste transport and storage.
- ♻️ Buy local. Purchase locally grown foods, and locally produced items, and you'll help reduce emissions from transportation of goods.
- ♻️ Educate yourself. See [www.sbcapcd.org/sbc/climatechange.htm](http://www.sbcapcd.org/sbc/climatechange.htm) for more information and links.

In June, at the World Environment Day celebration in San Francisco, California's Governor, noting that the state is particularly vulnerable to the effects of climate change, announced goals to reduce greenhouse gas emissions in California, with the following targets:

- ❖ A reduction of greenhouse gas emissions to 2000 levels by 2010.
- ❖ A reduction to 1990 levels by 2020.
- ❖ A reduction to 80 percent below 1990 levels by 2050.

Greenhouse gases, including carbon dioxide, methane, nitrous oxide, and hydrofluorocarbons, trap heat in the Earth's atmosphere in a "greenhouse" effect. The Intergovernmental Panel on Climate Change has concluded that the global climate is changing at a rate unmatched

in the past one thousand years, and that this change is due to human activity, primarily the burning of fossil fuels, producing a buildup of greenhouse gases, and an associated warming effect.

A 2001 report by the California Environmental Protection Agency noted several indicators of climate change, including a rise in sea level off the California coast (see graph) and a reduction in the size of the Sierra snow pack over the last 100 years. It is difficult to predict localized impacts of global climate change, and to determine how fast changes will occur, or when particular "tipping points" may be reached, as factors combine. For example, increases in surface temperature lead to less sea ice and snow cover, raising temperatures more, and reducing reflection of the sun's heat. As more water evaporates, the water vapor acts to increase temperature. Increased temperatures may lead to more smog formation, as ozone

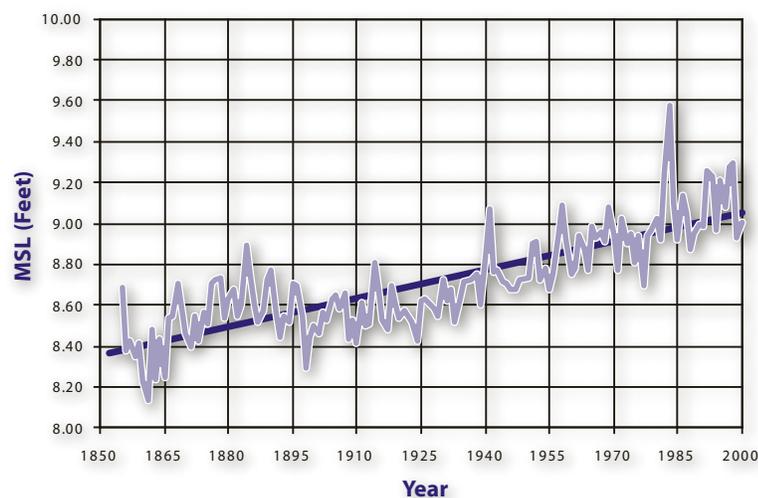
forms more readily in higher temperatures.

Steps to reduce greenhouse gas emissions in California include: greenhouse gas emission reduction requirements for vehicles sold in the state starting in 2009; targets and incentives to increase the amount of energy the state gets from renewable sources; and a voluntary greenhouse gas registry for businesses and organizations, with plans for a comprehensive greenhouse gas emissions inventory.

APCD does not regulate greenhouse gases, although measures designed to reduce particle and smog-forming pollution, which APCD does regulate, will also result in some greenhouse gas emission reductions.

For more information, and links, see [www.sbcapcd.org/sbc/climatechange.htm](http://www.sbcapcd.org/sbc/climatechange.htm).

### Rise in Sea Level Along California Coast San Francisco Yearly Mean Sea Level (1855-2000)\*



\* Source: California Environmental Protection Agency, *Environmental Protection Indicators for California, 2001*

One predicted outcome of global warming/climate change is a rise in sea level. The San Francisco data from the Golden Gate show the sea level rising at an accelerating rate. From 1855 to 1997, the rate is about 0.47 ft./century, but during just the 1925 to 1997 time period, the rate is much higher, 0.75 ft./century, nearly identical to the 0.74 ft./century trend at La Jolla over the same period. This agrees with tide gauge data that show that the global average sea-level rose between 4 to 8 inches during the 20th century.



# APCD Board Calendar

## Board of Directors

- Supervisor Salud Carbajal  
*First District  
Santa Barbara County*
- Supervisor Susan Rose  
*Second District  
Santa Barbara County*
- Supervisor Brooks Firestone  
*Third District  
Santa Barbara County*
- Supervisor Joni Gray  
*Fourth District  
Santa Barbara County*
- Supervisor Joe Centeno  
*Fifth District  
Santa Barbara County*
- Mayor Russ Hicks  
*City of Buellton*
- Councilmember Donna Jordan  
*City of Carpinteria*
- Councilmember Margaret A. Connell  
*City of Goleta*
- Mayor Lupe Alvarez  
*City of Guadalupe*
- Councilmember Will Schuyler  
*City of Lompoc*
- Councilmember Dan Secord  
*City of Santa Barbara*
- Councilmember Marty Mariscal  
*City of Santa Maria*
- Mayor Pro Tem Brian Baca  
*City of Solvang*

All meetings start at 2 p.m. For final meeting agendas, call the APCD Board Clerk, 961-8853.

### October 20

Board of Supervisors  
Hearing Room  
105 East Anapamu Street  
Santa Barbara, CA 93101

### December 15

Board of Supervisors  
Hearing Room  
105 East Anapamu Street  
Santa Barbara, CA 93101

## Community Advisory Council

The APCD Community Advisory Council meets the second Wednesday of every month at the Days Motor Inn in Buellton. The public is welcome. For more information, call Linda Beard, 961-8853.



APCD Public Outreach Intern Kirsten James (on left) leads an exercise with kids at the Boys & Girls Club of Santa Maria Valley summer camp to raise awareness of how to treat our Earth with care. APCD visits classrooms, summer camps and after school programs to teach kids about our air and how we can keep it clean. To find out more, see [www.sbcapcd.org/teachers.htm](http://www.sbcapcd.org/teachers.htm), or call (805) 961-8800.

## Fuel Economy: the Good and Bad News...

On July 28, EPA published its annual report on the fuel economy and performance characteristics of vehicles.

**The good news:** Model year 2005 vehicles are estimated to average 21.0 mpg, 0.2 mpg higher than 2004.

**The bad news:** This is five percent below the fuel economy peak average of 22.1 mpg achieved almost 20 years ago in 1987.

**Why?** One main reason is that light trucks and Sport Utility Vehicles (SUVs) are more popular today than they were in 1987, and these vehicles are less fuel efficient.

**More info:** [www.epa.gov/otaq/fetrends.htm](http://www.epa.gov/otaq/fetrends.htm).



### Main Office

260 N. San Antonio Rd. Suite A  
Santa Barbara, CA 93110-1315

### Business Assistance

(805) 961-8868

### Daily Air Quality Report

[www.sbcapcd.org](http://www.sbcapcd.org)

### Complaints/Public Information

(805) 961-8800

### World Wide Web

[www.sbcapcd.org](http://www.sbcapcd.org)

### E-Mail

[apcd@sbcapcd.org](mailto:apcd@sbcapcd.org)

**On the Air** is a quarterly newsletter published by the Community Programs Section of the Santa Barbara County Air Pollution Control District.

For further information on items in this newsletter, or to be added to our subscription list, please call Bobbie Bratz, 961-8890 or Email [bratzb@sbcapcd.org](mailto:bratzb@sbcapcd.org).



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Our Vision  Clean Air

## Reducing Emissions of Harmful Gasoline Vapors at the Pump

**G**asoline vapors are harmful to breathe. They are made up of reactive organic gases, which can react to form ozone, a principal component in smog. The vapors also include benzene, an air toxic that can cause cancer and other health effects. Vapor recovery systems at gasoline stations, including special nozzles, and devices inside the pump, significantly reduce emissions of vapors. In fact, the California Air Resources Board recently estimated that vapor recovery systems in the Los Angeles area's South Coast Air Basin are reducing emissions of reactive organic gases there by approximately 108 tons per day — more than the reductions obtained through use of either low-emission vehicles or cleaner burning gasoline.



*Cindy Castronovo, Staff Air Pollution Specialist with the California Air Resources Board, with APCD Inspector Supervisor Mike Broughton.*

In Santa Barbara County, APCD's permitting and inspection programs implement state

regulations for these systems. APCD inspectors test and inspect vapor recovery systems and respond to complaints if a system is not working properly. In July, APCD hosted a workshop on the state's new requirements for vapor recovery systems. APCD Air Pollution Inspector Supervisor Mike Broughton reported that gas station owners,

agency inspectors, and consultants attended to hear representatives from the state outline the new regulations.

Said Broughton, "The information presented answered many of the questions that we have heard from the station owners. Implementation dates and deadlines were clearly laid out for the various phases of the state's gas station regulations, including enhanced and onboard refueling vapor recovery and in-station diagnostics. This information should help the various operators, contractors and regulators better understand and plan for the future, thus reducing construction costs and station downtime."

Cindy Castronovo, Staff Air Pollution Specialist with the

California Air Resources Board (ARB), led the workshop. She noted that the in-station diagnostics specified in the new guidelines provide continuous monitoring. Said Castronovo: "The system alerts the station operator when a problem is detected, so that repairs can be made quickly, preventing more emissions. Currently, many defects in the vapor recovery system do not interfere with gasoline dispensing, and a problem may not be found until the next field test or inspection, which could mean many more months of excess emissions before the problem is corrected."

Castronovo noted that California is a leader in the regulation of vapor recovery systems, and the ARB certification of these systems is considered the standard for most other states and many countries around the world.

*For more information on the new state requirements and deadlines, see [www.sbapcd.org/eng/compliance/gasoline/gasoline.htm](http://www.sbapcd.org/eng/compliance/gasoline/gasoline.htm).*

### 10 Millionth Passenger



*MTD and the City of Santa Barbara recently marked a major milestone for the Downtown-Waterfront shuttle: arrival of the 10 Millionth Passenger to ride the shuttle.*

### Pollution Prevention Week

*Celebrate Pollution Prevention Week September 19-25 by visiting [www.greendifference.org](http://www.greendifference.org). Find out what you can do to make a green difference -- at work and at home! On Friday, September 23rd the Green Award Consortium will honor the 2005 Green Award winners. The Green Award Consortium is made up of the APCD, SBCAG/Traffic Solutions, County Water Agency, County Resource Recovery and Waste Management Division, and the Community Environmental Council.*

# Business Focus

## Air Pollution and Development Projects: URBEMIS

**U**nder the California Environmental Quality Act (CEQA), APCD and other local air districts are responsible for reviewing Environmental Impact Reports and providing guidance for mitigating adverse impacts to air quality from development projects.

In June, APCD conducted a training session for area planners on URBEMIS (the Urban Emissions Model), a software tool used to estimate air pollution from development projects. The model calculates vehicle emissions from trips generated by the projects, and can also estimate construction emissions and emissions from other potential pollution sources, such as natural gas and wood burning fireplaces associated with the development.

Emissions estimates from traffic associated with an individual project's build out are based on trip generation rates, fleet mix, trip lengths, speed, the latest emission factors published by the California Air Resources Board specific to the county or air basin, and other factors.

First developed by the California Air Resources Board in the 1980's, URBEMIS is updated on an ongoing basis by a state-wide working group of air agencies. In June, APCD Air Quality Specialist Vijaya Jammalamadaka trained more than twenty planners and consultants on the latest version of the software.

Said Jammalamadaka, "This version benefits from the application of new research on travel behavior and land use.

The model can now estimate the benefits of urban design and measures to reduce air quality impacts from traffic associated with development projects. We hope all planners will become familiar with this tool and use it as a starting point to encourage more livable communities."

For more information, see [www.sbcapcd.org/apcd/landuse.htm](http://www.sbcapcd.org/apcd/landuse.htm).



APCD Air Quality Specialist  
Vijaya Jammalamadaka

## Amtrak Wins Award for Rail 2 Rail Program

**A**mtrak recently won a 2005 Travel Industry Association of America Odyssey Award for its Rail 2 Rail program, a cooperative project with Metrolink, Southern California's regional rail authority. As noted in the award announcement, the Rail 2 Rail Program features an outstanding

level of cooperation and coordination of schedules, fares, and special marketing programs between two large and distinct transportation companies. Amtrak is a partner in the Santa Barbara Car Free Project, a cooperative partnership led by APCD to encourage car free transportation

for cleaner air. Amtrak and the Rail 2 Rail Program have regularly featured Santa Barbara Car Free in materials encouraging car free trips to Santa Barbara.

For more information, see [www.santabarbaracarfree.org](http://www.santabarbaracarfree.org).



### APCD Grants for Local Businesses

#### Close to \$ 1 Million for Cleaner Engines

Applications for APCD grant funds for cleaner engines are now available. Equipment that is eligible for grants for repowers or retrofits includes:

**On-Road Vehicles**

**Off-Road Vehicles/ Equipment**

**Agricultural Water Pumps**

**School Buses**

**Marine Engines**

**Other (Forklifts, Locomotives and more)**

Contact Information:

Gary Hoffman at  
(805) 961-8818,  
[gah@sbcapcd.org](mailto:gah@sbcapcd.org) or

Anthony Fournier at  
(805) 961-8874  
[adf@sbcapcd.org](mailto:adf@sbcapcd.org).

For more information visit:  
[www.sbcapcd.org/itg/itg.htm](http://www.sbcapcd.org/itg/itg.htm).

### APCD's Business Assistance Program



Our Business Assistance Representatives offer help to businesses over the phone and by email, and we also provide educational site visits to help owners understand and comply with our rules and requirements. The site visits are educational, not regulatory, and are conducted by a business assistance representative, not an APCD inspector. A site visit can help business owners: understand and comply with our permit conditions, rules and record keeping requirements; learn about new regulations that might be coming up; and find out about ways to prevent pollution.

#### Find out more:

Visit this page on our website: [www.sbcapcd.org/biz/business.htm](http://www.sbcapcd.org/biz/business.htm)

Call the Business Assistance Line at 961-8868, Email [business@sbcapcd.org](mailto:business@sbcapcd.org).

### Don't Top Off!

Topping off your tank can harm the vapor recovery system. Stop fueling when the pump shuts off automatically! For more information, and to receive a copy of the Don't Top Off video, see [www.sbcapcd.org/edu/dont-top-off.htm](http://www.sbcapcd.org/edu/dont-top-off.htm).