

Waste Conversion and Air Pollution

Waste conversion technologies, or processes that treat and convert municipal solid waste, reduce the amount of trash that has to go to a landfill, often producing useful energy or fuel at the same time. But how much and what kind of toxic air pollution do they create in the process? And how well can this pollution be controlled? APCD is receiving a grant of \$400,000 from the California Integrated Waste Management Board to study these questions.

Processes to be studied include: gasification, which uses heat, pressure, and steam (but not fire) to produce liquid and gaseous fuels from waste materials; and dilute acid hydrolysis, which uses dilute acid and a fermentation process to break down compounds and produce liquid fuel. The grant funds will be used to support staff and consultant time in overseeing the project; the companies participating in the study will fund the testing at three pilot facilities.

Peter Cante, Manager of APCD's Engineering and Compliance Division notes, "This is emissions information communities and agencies need. Our mission is the protection of the public's health from the effects of air pollution. Before we can recommend whether or not one of these conversion systems should be installed, we need to know that their emissions can be successfully controlled, and that the systems are safe from a public health standpoint."



APCD Engineer Robin Cobbs, who is working on the waste conversion study.

Cante continues, "Our intent here is to maintain the highest technical standards while remaining dispassionate and unbiased. We have no axe to grind. If a system is not safe, we'll say so. If we think it CAN be safe, we'll say that, too."

The waste conversion emissions study grew out of a comprehensive strategic assessment of countywide waste disposal performed by the Multi-Jurisdictional Solid Waste Task Group. This group is made up of elected officials, and representatives from city and county agencies, including APCD, with a role in waste disposal; it is tasked with identifying long-term waste disposal strategies for the county.

A key consideration of any disposal strategy is the Tajiguas Landfill, which takes waste from the South Coast and Santa Ynez Valley. The landfill is fast reaching

capacity, and areas are already operating aggressive recycling programs to reduce the need for landfill disposal.

Says Cante, "As we looked at it, we realized, we can't just keep filling up the canyon with waste. We have three options: we create a new landfill, we ship waste out of the county, or we innovate and find new ways to reduce what's going into the landfill. Siting new landfills is extremely difficult these days, and shipping waste long distances is expensive, and polluting."

As the task group investigated waste conversion methods, it found that there is little available information on toxic air emissions from these technologies. The APCD project was created to begin to fill the information gap, and the California Integrated Waste Management Board (CIWMB) is funding the study.

George Eowan, a former head of the CIWMB, is a consultant helping with the project. He notes, "Santa Barbara County had done the background work, and had already taken a pretty thorough look at the technologies that might fit the county. And the Waste Board needed to develop more information in this area that would be applicable in California—so it was a good fit."

Eowan is not aware of any full-scale gasification or acid hydrolysis waste conversion facilities in the U.S. He remarks, "The hope is that this study will go a long way towards providing answers to some of our most fundamental questions in this area."

The APCD study will assess air emissions from three small-scale facilities. One in Idaho uses gasification, producing electricity through a turbine at the end of the process. One in Arkansas also uses gasification, producing ethanol fuel as a byproduct.

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Waste Conversion and Air Pollution (cont'd)

A third facility in Ohio uses dilute acid hydrolysis, which converts cellulosic material (papers, cotton, wood) and green waste to sugars and starch using diluted sulfuric acid and heat. The sugar and starch mixture is fermented and the product distilled to create ethanol. These facilities and processes were identified by the task group based on their expected effectiveness in reducing the volume of waste going to the landfill, the usefulness of the fuels or energy created, and the companies' willingness to participate in the study.

The study will proceed in several phases. First, the waste itself, known in the business as "feedstock," will be characterized

to make sure it's representative of Santa Barbara County waste. Says APCD Engineer Robin Cobbs, "You have to have a good idea of what's going in, to help in evaluating the emissions data on the other side, and to verify that the facilities are all processing the same type of waste. Believe it or not, solid waste varies in make-up from one region to another, so we need to make sure the information we collect will represent the waste that goes into the Tajiguas Landfill."

After the waste is characterized, testing points and methods will be established, and 100 tons of county waste will be shipped to each location. A key challenge will be to configure the tests at all three facilities to incorporate the

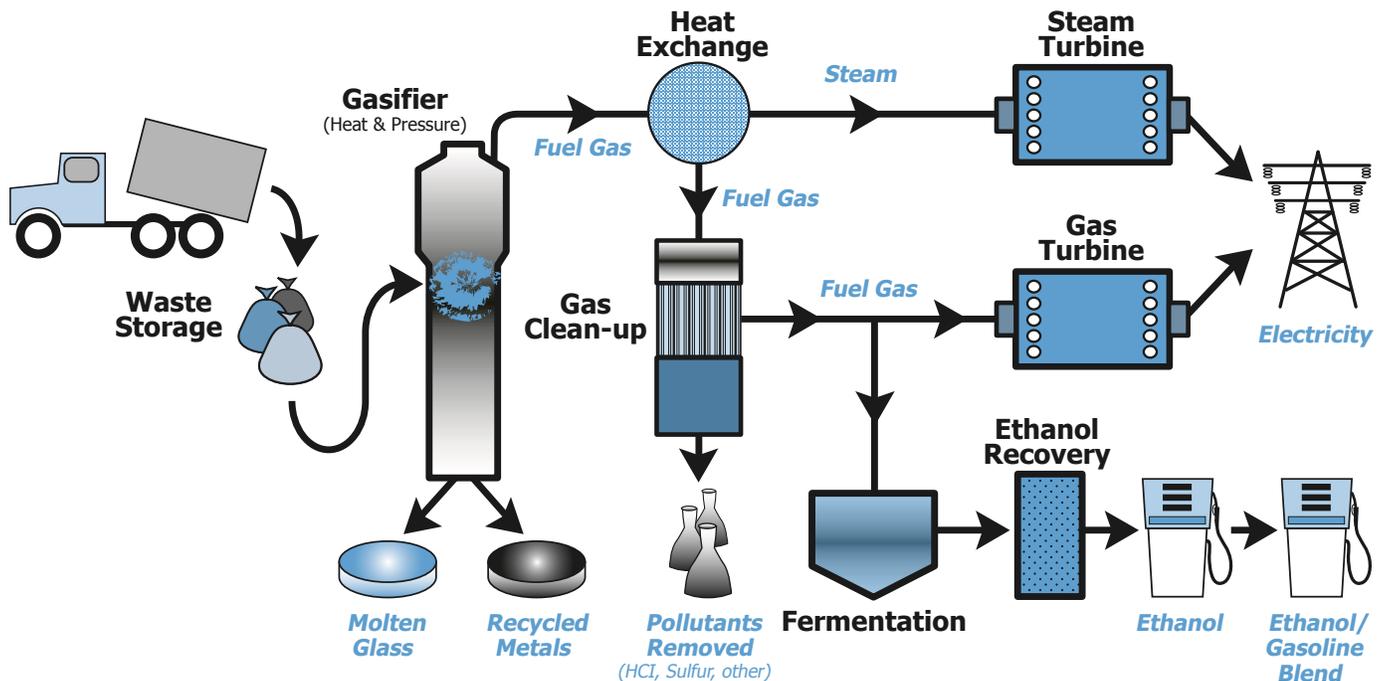
types of pollution controls that would be required if the facility were operating in Santa Barbara County. Testing will assess levels of "criteria" pollutants such as nitrogen oxides, and will include a complete breakdown of the toxic air pollutants present.

Notes Cobbs, "A wide range of pollutants could potentially be emitted, due to the vast assortment of trash being processed by the conversion technologies. We will be testing for dozens of the most toxic pollutants, as well as for less potent contaminants that we expect to see." Toxic substances that may be present include dioxins and furans — chlorinated cyclic organic compounds—and polycyclic aromatic hydrocarbons.

These highly toxic pollutants could be emitted from the heating of plastics. Metals from batteries and other potentially toxic contaminants from household hazardous waste may also be emitted.

Once the data are available, Cobbs will perform health risk assessments to determine potential health risks from a hypothetical facility in the county. These assessments will be reviewed by the California Office of Environmental Health Hazard Assessment. Cobbs sums up: "The more technically rigorous we can make every aspect of this study, the more useful the results will be — for us, and for the community."

Waste Treatment through Gasification



After recyclables are removed, and the waste is shredded, the waste is injected into the gasifier. Under high temperatures, the organic material is transformed into a gas—it does not burn because there is no flame or oxygen. As the gas exits, the heat can be used to generate high-pressure steam that produces electricity through a turbine. The inorganic materials such as metals, soil, glass, silica, etc., are liquefied under the high temperatures. All inorganic matter, other than the metals, becomes vitrified or molten glass. After the metal and glass are removed from the reactor, they are quenched in a water bath. After the fuel gas has left the heat exchanger, the particulates are removed in a cyclone. The gas then goes through a scrubber where the hydrochloric acid, hydrogen sulfide, and other pollutants are scrubbed out. The fuel gas can be sent into a gas/steam combined cycle turbine where it is used to produce electricity, or the fuel gas can be fermented and distilled to produce ethanol.

R2P2 Returns to Santa Maria Valley Discovery Museum

APCD Board Roundup

Following are the highlights of the December and January Board meetings.

December

- Approved additional \$200,000 for the on-road engine emission reduction grants program, and additional \$300,000 for the agriculture water pump grants program.
- Authorized the Air Pollution Control Officer to renew insurance contracts.
- Presented Resolutions of Appreciation to Dr. Dan Secord and Brian Baca for service on the APCD Board.
- Received a report on fees the APCD will charge beginning in 2008 for permit reevaluations of emergency standby diesel-fired engines.

January

- Elected Margaret A. Connell as Chair and Will Schuyler as Vice Chair of the APCD Board for 2006.
- Reappointed Donald Ward to the APCD Hearing Board.
- Approved participation in the FY 2005/2006 Carl Moyer Memorial Air Quality Standards Attainment Program.
- Selected Board members Margaret A. Connell, Marty Mariscal, and Will Schuyler to serve on the APCD Executive Committee during 2006.
- Appointed Board member Donna Jordan to serve as the representative to the South Central Coast Basinwide Control Council.
- Selected Salud Carbajal, Marty Blum, Russ Hicks, Will Schuyler, and Marty Mariscal to serve on the APCD Hearing Board Nominating Committee during 2006.
- Gave the Director the authority to execute a \$400,000 grant agreement with the California Integrated Waste Management Board to test air pollution emissions from waste conversion technology facilities.

In February, R2P2, APCD's Robot Resource for Pollution Prevention, returned to the Santa Maria Valley Discovery Museum, complete with a range of additional features designed to help kids learn about our air.

Says Museum Manager Renee LaRocco, "The kids love him. They're really enjoying playing with all his new features. All the ages that come to the museum are really enjoying him."

Museum Executive Director Cindy Ransick adds, "R2P2 is a lot of fun to have around! I sometimes feel as I walk through the museum he is calling to me to come and learn something

new." The Museum attracts about 25,000 visitors a year, and she expects that number will grow as the museum continues to add exhibits.

R2P2's new interactive choices include information on health effects of air pollution, including excerpts from the California Air Resources Board video, "With Every Breath: Health Effects of Smog," as well as games that show kids where air pollution comes from, and what they can do to help keep our air clean.

R2P2 is made of recycled equipment that can cause air pollution: his cap is the top of a charcoal grill; his eyes are aerosol

cans; his torso is an old gas tank; his arms are older gas pump nozzles; and his base is a gas lawn mower. His body is coated with powdered paint – more environmentally friendly than spray paint.

To visit R2P2, see address and hours information on the Santa Maria Valley Discovery Museum here: www.smvdiscoverymuseum.org. For more information on R2P2, visit this page on our APCD website: www.sbcapcd.org/r2p2.htm.



Cindy Ransick (left), Executive Director, and Terri Paniagua welcome R2P2, APCD's Robot Resource for Pollution Prevention, to the Santa Maria Valley Discovery Museum.

Celebrate!

Earth Day in April,
Clean Air Month in May,
and World Asthma Day
May 2nd!

See www.sbcapcd.org for
info and links.

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APCD Board Calendar

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

March 16
Board of Supervisors'
Hearing Room
511 East Lakeside Parkway
Santa Maria, CA 93455

May 18
Board of Supervisors'
Hearing Room
511 East Lakeside Parkway
Santa Maria, CA 93455

June 15
Board of Supervisors'
Hearing Room
105 East Anapamu Street
Santa Barbara, California 93101

August 17
Board of Supervisors'
Hearing Room
105 East Anapamu Street
Santa Barbara, California 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.

Santa Barbara County Bicycling

In February, world-class professional cycling teams came through Santa Barbara County as part of the Amgen Tour of California bike race. APCD's Santa Barbara Car Free project shared a booth with the Santa Barbara Bicycle Coalition at the festival held at the Stage 5 finish in Santa Barbara.



Photo courtesy of Santa Barbara Bicycle Coalition

Santa Barbara County is a popular place for cycling, and several professional cycling teams regularly train in the Santa Ynez Valley. Data from the 2000 Census researched by the Santa Barbara Bicycle Coalition also shows that the county has some of the highest rates for bicycle commuting to work in the U.S. Out of 3126 counties, Santa Barbara County ties for 14th place in bicycle commuting, with 2.7% of workers traveling to work by bicycle. Out of 58 California counties, Santa Barbara County is the second highest after Yolo County, which was number one in the U.S. for bike commuting, with 7.5% of workers commuting by bike to work.

Bicycles are also making a comeback worldwide. In the 1950s and '60s, it seemed car production would outstrip bicycle production, but the trend began to change in the 1970s. Today, approximately three times as many bikes as cars are manufactured worldwide.

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www.sbcapcd.org

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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.

Recycling Construction Waste

Construction activities produce a high volume of waste every year—filling up landfills around the country and the world. Much of that waste can be recycled. Last year, Santa Barbara – based MarBorg Industries, Inc. recycled some 200,000 tons of construction waste. MarBorg Business Manager Derek Carlson estimates that this represents about four times the tonnage of waste recycled from all the household and business recycling programs on the South Coast combined.

In the process, the company also retrieved hazardous materials (paints, pesticides, electronic equipment and other materials) that would otherwise have potentially contaminated air, soil and water around a landfill, and sent them off for appropriate disposal in a hazardous waste facility.

Noted Carlson, “We pull out every single nail, every bit of waste wood, or concrete, or drywall, and every scrap of PVC pipe, and recycle everything we can.” Approximately 80 percent of the construction waste is recycled overall. Much of the concrete and rubble is recycled for use in road base and other paving operations locally. Wood



Construction and demolition waste at MarBorg's facility is sorted and recycled.

goes to a company that processes it for re-use as plywood, particle board, or other wood byproducts. Plastic, metal, and drywall are sent to companies that recycle them for re-use, and green waste is composted, or chipped for ground cover.

MarBorg has been recycling construction waste since 1995, and in October of 2005, the company opened the doors of a new Construction and Demolition (C & D) facility that will allow it to recycle even more construction waste. Said Carlson, “We anticipate we will probably be recycling 50,000

more tons in 2006 through this facility—and if some large construction projects get underway this year, that number will be even higher.”

MarBorg has received the Green Award for its extensive recycling programs and environmental leadership. In fact, it is one of only two companies in the county that have received the Green Award twice—in 1996 and 2001. The Green Award recognizes voluntary activities by companies and organizations in Santa Barbara County that result in cleaner air or water, less waste, less traffic, conservation of energy

and natural resources, or reduced use of hazardous materials. The award is given by the Green Award Consortium, made up of APCD and the following agencies and organizations: Community Environmental Council, Santa Barbara County Resource Recovery & Waste Management, Santa Barbara County Water Resources Division and SBCAG/Traffic Solutions.

The C & D facility has received much attention, and MarBorg has provided tours for visitors representing municipalities all over the country and the world. Recently, representatives from the Tri-County Pollution Prevention Committee, representing Santa Barbara, Ventura, and San Luis Obispo Counties, toured the C & D Facility. Carlson remarks, “Everyone now is facing the need to divert more trash from the landfill and meet state requirements, so they’re looking at creating more facilities like this one in their home cities.”



Nominations for the 2006 Green Award will be accepted from April 23 to June 24.

Information and nomination forms will be available at www.greendifference.org.

Green Gardener Certification Classes start in April.

Training (in English and Spanish) in resource efficient, less-polluting landscaping.

More info: www.greengardener.org or 805-564-5460.

Cuyama School District Receives Low-Emission School Bus

In December, Cuyama Joint Unified School District welcomed a new, low-emissions school bus, made possible with funding from APCD and the California Air Resources Board Lower-Emission School Bus Program.

uses ultra low sulfur diesel fuel, and its emissions are about 90 percent cleaner than the bus it is replacing. In the past few years, APCD has funded the replacement of 5 school buses in the county with cleaner buses, at the Orcutt, Blochman, and Goleta school

more than fifteen tons of nitrogen oxides and particulate matter from diesel school bus exhaust since 2001.

APCD is continuing to work with school districts to reduce diesel exhaust emissions, and has funds available to replace additional school buses and purchase particulate trap retrofit devices in the coming year. Interested school districts are encouraged to contact APCD staff for more information on how they can take advantage of available funding to help protect the health of the children riding the school buses.

Says APCD Engineer Anthony Fournier, "These school bus projects are a high priority because they help us reduce the exposure risk to children from these very harmful pollutants. We want to work with the local school districts to make them aware of the risk from exposure to diesel exhaust, and help them identify ways to reduce the emissions generated by their school bus fleet."

For more information, contact Anthony Fournier at fourniera@sbcapcd.org, or 961-8874.



APCD Engineer Anthony Fournier with the new low-emission school bus at Cuyama Joint Unified School District.

This program is designed to replace and retrofit diesel powered school buses to reduce children's exposure to diesel exhaust, which is considered the number one airborne carcinogen in the state. Older diesel-powered school buses not only pollute outside air—studies have shown that they also significantly pollute the air inside the school bus with harmful exhaust. Children are more susceptible than adults to harm from air pollution in general. Their lungs and respiratory systems are still developing, and they breathe more times a day than adults.

The new 2005 school bus is replacing a 1982 school bus at the Cuyama District. The new bus

districts. An additional sixteen buses operated by Cuyama Unified School District, Goleta Union School District, Carpinteria Unified School District and Student Transportation of America have been fitted with particulate traps, which reduce the harmful emissions in the diesel exhaust. Taken together, the school bus projects have cut

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 or

Anthony Fournier at (805) 961-8874 adf@sbcapcd.org.

For more information visit: 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

Call the Business Assistance Line at 961-8868, Email business@sbcapcd.org.