



Conversion tech

By Karen E. Weber

Waste-By-Rail, conversion technology, additional recycling and more will be needed to replace Los Angeles County's landfills when they close and closure is sooner than you might think.

The county's largest landfill, the Puente Hills Landfill, is due to close in just five and half years, on Nov. 1, 2013. Puente Hills is permitted for about 13,000 tons of trash a day.

"It takes in one-third of the wastestream of Los Angeles County," said Coby Skye, associate civil engineer with Los Angeles County Public Works.

When Puente Hills closes, the trash is going to have to go elsewhere.

"In 30 years, there will be no landfills open in Los Angeles County," said Skye. The calculation was based on the current permits of today's landfills.

The Sanitation Districts of Los Angeles County and Los Angeles County Public Works are already planning for that day. They are working on Waste-By-Rail projects and conversion technology.

The Sanitation Districts' Waste-By-Rail project is a key component of waste management in the future. Trash will be loaded into closed containers, which will then be placed on rail cars for transport to the Mesquite Regional Landfill, a fully permitted site in Imperial County.

"The Mesquite Regional Landfill is permitted to receive 20,000 tons per day for about 100 years," said Janet Coke, Waste-By-Rail section head for the Sanitation Districts. "After we purchased the site in 2002, we began to develop plans to put the infrastructure in place." There are many steps involved in creating this complex project — more steps than the planners realized at first. The Mesquite Regional Landfill has to be constructed in Imperial County, the transfer facilities have to be built here and both have to be connected to the United Pacific rail lines along with all the Environmental Impact Reports, permits, contracts and other paperwork involved. But progress continues, building momentum like a freight train gathering speed. The biggest project waiting is the construction of the intermodal yard in City of Industry where the trains will be loaded.

Under the Waste-By-Rail project, trash will trucked to the Puente Hills Landfill area as it is now. Trucks will enter through the same gate, but will head to the Puente Hills Materials Recycling Facility instead. Completed in 2005, the MRF was the first spike driven in the Waste-By-Rail system. Trash is sorted there and recyclables are separated from the waste stream and sent to recycling companies. The MRF is important to Waste-By-Rail because there's no point in sending valuable recyclables to a landfill, especially one as far away as Mesquite. It would be a waste of time, energy and cargo space.

"Right now the MRF operates at 500 tons per day. It's permitted for up to 4,000," Coke said.

That's the amount of waste they can take into the MRF for sorting at full-scale operation.

Today the residual trash is taken to the Puente Hills Landfill. Under Waste-By-Rail, it will be loaded into railroad containers. The sealed containers will be taken to the intermodal yard to be loaded onto the trash train.

The Sanitation Districts have an option to purchase a piece of property for the intermodal yard from the City of Industry Urban Development Agency. The project is now in the permitting process.

Coke hopes the permitting process will be completed by May. Construction could begin in 2009 to be completed in 2011 or 2012. The Sanitation Districts are also working with the Union Pacific on contracts that will set rates and schedules for the trash trains.

Visible progress is being made on the Imperial County end. "We're still making progress on the construction of the infrastructure we need to start landfill operations," Coke said. "The roads and drainage project has been completed, a large water tank has been constructed, and power and communications are being brought to the site."

Work on the operations facilities is expected to be completed this fall, Coke said. This includes administration offices and maintenance facilities and a water distribution system that will provide water to

control dust at the landfill as well as supplying the buildings.

Coke estimated that the Mesquite Regional Landfill itself will be ready in late 2008 and the rail construction and spur line will be completed by the end of 2010 or the beginning of 2011. Waste-By-Rail trains will be ready to roll before the Puente Hills Landfill closes.

Waste-By-Rail alone can't handle all the county's trash. Coke estimated that the county puts out 40,000 tons of waste per day. A fully operating Mesquite landfill will take only half of that — five, 4,000-ton trains per day. When the Sanitation District's intermodal yard is complete, it can process 4,000 tons per day through its MRF. The intermodal yard could handle another 4,000 tons per day, but the waste will have to go through a MRF located elsewhere where non-recyclables would be placed in containers.

Conversion technology is a hot new topic in the U.S., though it's been active in Europe and Japan for years. Under the direction of the Los Angeles County Solid Waste Management Committee/Integrated Waste Management Task Force, of which the Sanitation Districts and Los Angeles County Public Works are members, a demonstration project is being encouraged for the development of conversion technology to prove its feasibility in Southern California.

"We think this is one of the most cutting edge projects in the country," Skye said.

Conversion technology takes waste and turns it into energy, fuel or some combination of the two without burning it, Skye said.

He said Public Works is promoting a demonstration project in order to create a pathway for these projects to develop on a private basis. "It sends a signal to the marketplace that these technologies are viable and not only viable, but profitable," he said. "We're developing these demonstration projects with some assistance from the county; then when they get to commercial scale operations, they can operate without subsidies."

For the demonstration projects, the county had to find companies with resources in Southern California. Skye said the county has identified as many as four companies that have technologies that meet the county's screening criteria and that are willing to partner with the county in a project.

Skye said one of the companies uses anaerobic digestion and the other three use thermal technologies, either pyrolysis or gasification.

Anaerobic digestion is in common use in U.S. wastewater treatment plants, but using it to treat municipal solid waste will be new. In the process, waste is put together with high concentrations of naturally occurring bacteria in a closed container that has little oxygen in it. The bacteria basically eat the waste and leave behind biogas that can be burned as a fuel and a sludge that can be used as compost or a soil amendment. In solid waste, the organics will come primarily from leftover food and yard waste.

"The soil amendment we get from these organics is more marketable," Skye said. In sewage treatment, the sludge requires further treatment.

Skye said the anaerobic digestion process will begin with a water separation system to remove such things as plastics, rocks, metals and other non-organic materials.

"We will be able to separate recyclables from the trash," he said. He said the material will be sorted for recycling first, but the water separation system will catch anything that's missed. "It will be recovering items that otherwise would have been landfilled."

Two generations ago, backyard incineration was the typical way of disposing household trash. People just burned trash in their back yards, polluting the air and leaving waste ash. Pyrolysis and gasification use heat to break down trash in an entirely different fashion. The systems are not exposed to the outside air, do not have open flames and do not burn trash itself. Instead, they heat it up to break the bonds between molecules.

"This is recycling at a molecular level," Skye said.

In traditional recycling you separate glass from paper, Skye said. In these thermal processes, you separate carbon and hydrogen from oxygen. Then you can combine the carbon and hydrogen to create fuel. He said the thermal systems are similar. Pyrolysis uses a lower

temperature and eliminates oxygen almost entirely. Gasification uses pure oxygen to break down material at a higher temperature, Skye said.

In both cases, as in all conversion technologies, "You pull out components from waste and turn it into something useful," Skye said. Now that four companies have been approved, conversion technology demonstration projects will take their next step toward reality. "We will be getting site specific proposals from them in May of this year," Skye said.

These will be detailed, specific proposals for building projects at specific locations, Skye said. He said all three projects could go forward if they're good. Projects that are OK'd will begin the design and permitting phases before construction can begin. Skye said optimistically, the projects could be finished with testing and ready to operate by 2011.

He said the demonstration facilities are expected to take in between 300 and 500 tons of trash a day.

"A minimum of 100 tons a day and no more than 1,000 tons a day," he said.

This is a drop in the bucket, but Public Works hopes that the development of the demonstration projects will encourage larger projects to get started.

"We hope by 2015 there will be a few thousand tons per day capacity in Los Angeles County," Skye said.

But a few thousand tons per day will only meet part of the county's needs. Landfills will still be needed. The Sanitation Districts are working hard to implement the Waste-by-Rail project and utilize their new landfill in Imperial County.

Conversion technologies will face many of the same problems as the Waste-by-Rail projects did, Coke said. It may be as difficult to find a site for a conversion project as it is to find a site for a new landfill. And conversion technology projects are just getting started.

"None of these systems are in place. Waste-By-Rail has been planned over 20 years," Coke said. "It has the ability to handle significant quantities of waste in the near term."

She added that the Mesquite landfill will have a form of conversion technology itself. The Sanitation Districts' landfills collect landfill gas and use it to generate electricity.

Waste-By-Rail, conversion technologies, recycling and more will be needed to meet the county's waste disposal needs in the future.

"We have to keep up with the closing landfills," Coke said. "We have to make sure there's some way to manage our waste."

Skye said we need to think about what happens when the huge resource of local landfills is no longer available and we have to take our trash somewhere else.

"Even with conversion technology going full speed and Waste-By-Rail, we will still be exporting waste out of L.A. County at significant cost," Skye said.

"Everything must be reduced, reused and recycled, or shipped out of the county to remote landfills, or converted, which is a new way of recycling waste. We clearly won't have enough facilities up and running five years from now, but we want to soften the blow. We need to take responsibility for our waste. There are so many reasons to do it," he said.

All these projects will create new jobs. It's one of the reasons that Imperial County has supported the Mesquite landfill. Skye said conversion projects will create high-tech, private sector, local jobs. "You can't export them to China," he said.

Conversion technologies could also reduce pollution, including greenhouse gases, produce fuel and energy and reduce our dependence on foreign fossil fuels, Skye said.

"It meets long-term, renewable energy goals," he said.

Coke said Waste-By-Rail will be the first piece of the waste disposal puzzle, then everyone will see how conversion technologies fit in. "There's plenty of trash to go around," she said.