

March 21, 2008

**ENVIRONMENT**

## Garbage In, Energy Out

Governments and companies are on a quest to turn trash into power

By **JONATHAN SHIEBER**  
 March 21, 2008; Page R15

Facing rising energy prices and growing concerns over global warming, governments and businesses are trying to turn trash into treasure.

They're pursuing different "waste to energy" conversion technologies that generate power by burning garbage -- everything from banana peels to sewage sludge to tree trimmings. This method not only cuts down on the use of fossil fuels, but also reduces the amount of junk consigned to landfills -- and slashes emissions of methane, the potent greenhouse gas that garbage dumps generate.

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1

Green thinking is at the core<sup>2</sup> of thousands of new communities. Here's a look at some of the approaches. Plus, as the renewable-power industry takes off<sup>3</sup>, so does the demand for green-collar workers.

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"Waste is a resource," says Mark Pytosh, chief financial officer of **Covanta Holding Corp.**, a Fairfield, N.J., energy company that uses waste to generate power. "A lot of people think, 'Ahhh, get rid of it!' But waste has an energy value, and our question is, how do you get the most energy value from waste?"


**Saved From the Scrap Heap**

Generating power from waste first came into vogue in the U.S. during the energy crisis in the late 1970s, according to Alex Klein, a senior energy analyst at Emerging Energy Research, an industry analysis and consulting firm in Cambridge, Mass. The industry continued to grow throughout the 1980s, but saw a decline in the 1990s as municipalities became more sensitive to issues around emissions from burning waste.

Since then, however, the waste-to-power industry has invested in technology to reduce its emissions, easing public concerns. In addition, at least 24 states have renewable-portfolio standards in place requiring utilities to generate a certain portion of their power from alternative sources. As a result, cities are once again turning to the technology.

Most of the projects that utilities have pursued have been solar and wind-development deals, but Mr. Klein says that an increasing number of utilities will turn to some version of waste-to-energy projects, particularly in areas without good wind or solar resources.

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There are two basic types of waste-to-energy conversion technologies. The traditional method uses thermochemical processes like combustion and gasification to burn any kind of garbage available to make power. Another technique, anaerobic digestion, uses microbes to break down only organic waste. Since the 1980s there have been advances in technology on both fronts, but the traditional method often faces a public-image problem -- people see it as less clean than the organic method.

Currently, traditional projects dominate the waste-to-energy market in many parts of the country, including the Northeast. Companies such as Covanta, Veolia Environmental Inc., and **Waste Management Inc.**'s Wheelabrator Technologies Inc. subsidiary, are by far the largest players in the industry.

#### GOING FOR THE BURN

**The Situation:** Rising energy prices and global-warming fears are driving the search for new energy sources.

**The Comeback:** Converting trash into power -- an idea popular in the wake of the 1970s oil crisis -- is beginning to see a resurgence.

**The Applications:** Businesses and governments are coming up with plans to turn everything from banana peels to sewage sludge into power.

Making the technology even more compelling: Some experts say traditional waste-to-energy projects -- combined with waste management -- are the most effective way of combating the greenhouse-gas emissions associated with disposing of most types of waste.

#### A Plentiful Resource

But more parts of the country are focusing on converting organic waste, known as biomass, into power. States in the Southeast are particularly interested in biomass: They lack wind and solar resources but are rich in woody waste resources, including waste from the forestry industry, which has a big presence there.

Atlanta-based utility **Georgia Power** has signed 50-megawatt power-purchase agreements with biomass waste-to-energy project developers including Rollcast Energy Inc. of Charlotte, N.C., and Yellow Pine Energy LLC, of Fort Gaines, Ga.

The projects are minimal in size compared with the nearly 16 million kilowatts of capacity the utility produces, but they represent early steps in bringing biomass waste-to-energy projects online.

Meanwhile, Progress Energy Florida, a subsidiary of **Progress Energy Inc.** of Raleigh, N.C., has signed a 20-year power-purchase agreement with the privately held Biomass Gas & Electric LLC of Atlanta for 75 megawatts from a waste-wood-to-energy plant. Again, the number pales in comparison to the 21,000 megawatts the company produces in North Carolina, South Carolina and Florida, but it represents an important early step for biomass.

Other utilities have already deployed biomass resources and are counting on them to help meet renewable-portfolio standards. In Virginia, Richmond-based **Dominion Resources Inc.** is taking power from the largest biomass facility operating on the East Coast to date, an 80-megawatt power plant in Hurt, Va., which produces enough electricity to power up to 21,000 homes.

Despite all the activity in the Southeast, the state that has taken the lead in developing biomass projects is one that has an abundance of wind and solar resources: California.

The state has the most aggressive renewable-portfolio standard in the nation -- 20% of state utilities' power needs to come from renewable sources by 2010. And at least 20% of that

renewable energy must come from biomass or traditional waste-to-energy projects.

But public concerns about burning trash have made traditional projects untenable in California, even though they have low emissions.

"We have never received a proposal for a municipal solid-waste plant in our service area," says Michael R. Niggli, chief operating officer of San Diego Gas & Electric and Southern California Gas Co., the regulated utilities of **Sempra Energy Inc.**

That means lots of opportunities for biomass power companies like Bull Moose Energy LLC in San Diego, a start-up that has raised \$72 million from investors including Morgan Stanley. Bull Moose uses "waste products -- primarily construction wood, wood pallets and tree clippings -- and they will then convert that and burn it and produce a decent amount of power," says Mr. Niggli.

His company, San Diego Gas & Electric, has signed a purchase agreement to buy 20 megawatts of power from Bull Moose's first facility.

### **Coming to America**

Some of the most innovative work in waste-to-energy is being done in Europe. High energy costs have contributed to the development of a vibrant market in waste-to-energy projects. Regulations restricting landfills and greenhouse-gas emissions have been another big factor; for instance, the European Union has issued a directive that would cut the volume of waste disposed in landfills by 60% of 2001's volume by the year 2020.

"In countries in Central Europe, as well as places like Japan and Hawaii, for instance, landfilling isn't an option," says Mr. Klein of Emerging Energy Research. "In those areas, there's been an emphasis on developing waste-to-energy projects, to generate energy and avoid destroying land."

Some European ideas are finding their ways to the U.S. through a newly formed European-U.S. joint venture called Schmack BioEnergy LLC -- a partnership between Schmack Biogas AG, a privately held German biomass-to-energy company, and Kurtz Bros. Inc., a U.S.-based environmental-services firm.

Schmack BioEnergy has signed an agreement with an undisclosed large West Coast utility and an undisclosed prominent Internet company to develop 150 megawatts of waste-to-energy projects, which could power about 40,000 homes. In addition, Schmack BioEnergy has signed agreements with multiple utilities to develop as much as hundreds of millions of dollars of waste-to-energy projects, says Mel Kurtz, chief executive officer of the Cleveland-based company.

"This is going to be a really, really big market," Mr. Kurtz says, "and it's going to be a really good market."

--Mr. Shieber is a reporter in Jersey City, N.J., for Clean Tech Investor, a Dow Jones & Co. publication.

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