Making fuel from food waste

Waltham firm must clear hurdles before capitalizing on leftovers

By Scott Kirsner, Globe Columnist | February 21, 2010

A hungry young company in Waltham is eyeing that half-eaten bagel on your plate, that grapefruit rind, and those first few pancakes that didn’t come out quite right. Harvest Power Inc. looks at leftover food from homes, restaurants, and supermarkets as an underutilized resource.

Today, nearly all of it heads to the landfill. In Harvest Power’s vision of the future - supported by $40 million in funding from investors like venture capital firm Kleiner Perkins Caulfield & Byers of California and the trash-hauler Waste Management Inc. - it has the potential to be turned into compost, electricity, natural gas, or steam for heating.

“Twenty years ago, yard waste wasn’t separated, and it went to the landfill - and the United States produces about as much food waste as we do yard waste,” says Harvest Power chief executive Paul Sellew.

Most cities and towns collect yard waste separately and send it to facilities for composting. There are about 30 such facilities in Massachusetts, according to the state’s Department of Environmental Protection. Sellew would like to see the same sort of shift happen with excess food, and policy makers and planning agencies such as the Boston Redevelopment Authority seem interested. Harvest is set to begin building its first energy-producing plant in Vancouver, Canada, later this year, and is proposing another for San Jose, Calif.

“We’re more active on the West Coast, where a lot of cities are talking about the goal of zero waste - nothing going to the landfills,” says Sellew, “but we want to do something around here as well.”

In Vancouver, Harvest bought an existing 22-acre facility that was already producing compost from food and yard waste. It will add what are called anaerobic digesters. In an airless chamber, lawn trimmings and food scraps are mixed with a variety of bacteria, which first break the material into acids, and then turn the acids into methane, the main component of natural gas. The methane can be used to fuel a combined heat and power system, which generates electricity and also heats water or produces steam. The methane can also be transformed into compressed natural gas, which is useful as a vehicle fuel.

The organic material left over after the anaerobic digestion process is removed from the chamber, kept at a warm temperature, and turned regularly to produce compost. (Those giant egg-shaped structures on Deer Island, which you often see when flying in and out of Logan International Airport, are a similar kind of anaerobic digester that transforms sewage into methane and, later, fertilizer.) Earlier in his career, Sellew founded Earthgro Inc., a Connecticut company that grew into the country’s second-largest maker of compost-based lawn and garden products.

“No one has yet stood out in the business of turning food waste into something of value,” says Rob Day, an energy investor at the Boston office of Black Coral Capital. “Everyone has struggled with how to make the economics work, and there’s no proprietary technology that someone can own - there are tons of anaerobic digestion systems out there.”

Harvest hopes to change the status quo, and become the go-to firm for building big plants that will process food and yard waste, whether from residences or businesses like supermarkets, hotels, and universities.

“Our business model is to design, build, own, and operate facilities,” Sellew explains, adding, “we aren’t looking for public funding.” But municipalities would pay Harvest for accepting food and yard waste - just as today they must pay to operate their own landfills or to deposit trash at privately run landfills. Harvest believes that its approach will save cities money in the long-run.
Harvest seems to have had some productive discussions with the city of Boston. Galen Nelson, the green-tech business manager at the Boston Redevelopment Authority, says the city “strongly endorses” the idea of doing something with food waste other than sending it to the dump.

“Part of the appeal is for the economic benefits of the jobs it would create at the facility, and another aspect is the greenhouse gas reduction,” Nelson says. When food decomposes naturally in a landfill, it can release methane into the environment - a much more potent greenhouse gas than carbon dioxide. Some landfills, including those in Fall River and Lowell, seek to capture this methane as an energy source.

James Coleman, an assistant commissioner at the Massachusetts Department of Environmental Protection, says that “over the past two or three years, there’s been increasing interest in anaerobic digesters to handle food waste.”

But actually building a facility to process it may not be any easier than finding a home for a coal-fired power plant or erecting a couple dozen windmills in Nantucket Sound. Identifying a suitable site, Coleman observes, “can be a long and expensive process” that involves his department, local boards of health, and plenty of community input.

There’s even a statewide ballot initiative this fall, intended to block the construction of facilities that incinerate wood and other “biomass” materials, which could keep Harvest from building a plant anywhere in Massachusetts, the company says.

And establishing a system to collect food waste from all of our homes - not to mention persuading us to separate it from the rest of our trash - is another step. The town of Hamilton ran a small food-waste collection pilot program last winter, with 74 families. The food scraps were composted, but not used for energy production. But Coleman says that households that chose to have leftover food collected in Hamilton would probably pay an extra $70 annually for the privilege, which could limit the idea’s appeal. (Some cities may choose to fold in any extra costs into their ordinary trash collection fees or taxes.)

Still, Nathan Gilliland, Harvest’s chief financial officer, says that the company’s plants would be able to operate profitably without household collection. “Grocery stores and restaurants are the big two food waste producers,” he says.

The company’s pilot plant in Vancouver will use some household scraps, since two municipalities in the metro Vancouver area have already instituted food-waste collection. Gilliland says the Vancouver facility will produce about 2 megawatts of electricity, but a more typical plant will crank out 5 or 6 megawatts. A plant producing 5 megawatts would be able to power roughly 3,750 homes, according to data from the Congressional Budget Office. By contrast, the Brayton Point Power Station in Somerset can produce more than 1,500 megawatts by burning coal, oil, or natural gas.

Harvest is busy working on a proposal for a facility in San Jose, where construction could get underway late next year. And Gilliland says the company has several other projects it can’t yet announce that will probably be built sooner, including a small research and development facility somewhere in the Boston area. (Last summer, London’s mayor called for five plants to be built in his city to turn food and yard waste into power and compost.)

The city of Boston began talking about the food-to-energy concept in early 2008, and has been gathering information from several vendors, including Harvest, Charlestown-based Save That Stuff Inc., and Casella Waste Systems Inc. But Nelson at the BRA says things are still in the “exploratory” stage.

So say goodbye to that half-eaten bagel: still trash today, though potentially fuel tomorrow.

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