

A LONG with its status as being the nation's most densely populated state, New Jersey has the distinction of having a large percentage of affluent residents. These two factors translate to a state filled with food industry establishments: Farms raising products which appeal to specialized tastes; Processors who prepackage salads and other convenience products for supermarkets and restaurants; and Distributors serving the retail industry.

As the 21st century started, the state seemed poised for a revolution in food residuals recycling since it had a variety of promising options. American Soils had waged a long regulatory campaign and had won the right to compost vegetative and bread food residuals, largely from supermarkets, in open-air windrows. Woodhue (now Woodhue/Eastern Organics Resources), adjacent to Fort Dix in southern New Jersey, had followed suit, beginning with the composting of some processing residuals streams (cranberry and coffee production) and moving slowly into the supermarket stream. Enviro-Feed, which had been started by a well-established New Jersey waste company, used processes developed in Florida and perfected in New Jersey to convert food residuals into pelletized animal feed. Tests showed the resulting product to have consistently high levels of protein and many of the other elements necessary to raising productive livestock. Wilenta Feed Co. based in Secaucus, New Jersey, rounded off the top four with its traditional hog feeding and its promising evaluation of in-vessel composting systems.

These available options could accommodate a wide range of food residuals types, from strictly vegetative/produce — largely preparation and processing residuals — and bread to “plate waste,” leftovers from notoriously large portions served at restaurants and other food service establishments. Accordingly, the New Jersey Department of Environmental Protection (NJDEP) funded the Solid Waste Policy Group at Rutgers University (SWPG) to develop and deliver to food residuals generators a presentation designed to motivate them to begin recycling their food residuals with one of the identified markets. A side benefit of this campaign was expected to be the creation of a climate favorable to attracting additional food residuals recycling markets.

As the SWPG prepared its presentation and began pursuing potential audiences in the food industry, the food residuals recycling infrastructure began to change. Rob Young, founder of American Soils, sold his company and site, and the new owners did not continue the food residuals composting he had initiated. Enviro-Feed first floundered, then went out of business without actually having formally gone beyond being a pilot project. Wilenta ceased marketing an in-vessel composting system, and did not pursue other efforts to increase the amount of waste it could accommodate, by hog feeding or otherwise.

POLICY/PROCESS IN NEW JERSEY

FOOD RESIDUALS RECYCLING IN THE MOST DENSELY POPULATED STATE

With funding from the state Department of Environmental Protection, the Solid Waste Policy Group at Rutgers University identifies what it takes to develop a significant support system.

Priscilla Hayes

New Jersey regulations restrict food residuals that can be composted outdoors to vegetative and bread waste only. Waxed corrugated and soiled paper can be included in the loads.

Woodhue was left as the sole remaining market of the top four food residuals recycler markets in New Jersey. Under its permit, Woodhue could accept a limited range of feedstocks — notably, meats, fats, and plate wastes were excluded. The market Woodhue



could chiefly serve, then, was supermarkets and processors which could segregate vegetative and grain/bread residuals. Restaurants and other food service operations like the Hilton of Short Hills, previously served by EnviroFeed, were now only served by the increasingly limited livestock feeding options in the state or the region, most of whom were not taking on further customers, because of herd size limits.

EVALUATING VIABILITY OF RECYCLING

Recognizing that this development made it far too difficult to proceed with a campaign of marketing food residuals recycling to its generators, the food industry, NJDEP asked the SWPG to change the focus of its work, and to assess the viability of food residuals recycling in the state — particularly to identify the factors which were currently keeping food residuals recycling from being successful in New Jersey. The focus of the study was limited to two selected forms of food residuals recycling: composting and conversion to dry/pelletized animal feed. As noted, both of these options had been present in the state, but had encountered considerable challenges to being successful there. The SWPG studied other states and nations to isolate what had been successful in promoting and sustaining the development of food residuals recycling markets. Specifically, SWPG did literature reviews, studied regulations, and interviewed regulators and those successfully engaged in either composting or conversion to dry/pelletized feed in selected states. Investigation of what had been effective in other countries



in encouraging development of these options, or food residuals recycling in general was largely limited to web and library research.

THE BAD NEWS ABOUT CONVERSION TO FEED

Our study confirmed that Enviro-Feed was not the only casualty in the field of converting food residuals to animal feed. We had trouble locating any feed plants using food residuals anywhere in the country, and those which had existed were now out of business.

The reasons were a mixture of regulations, economics and public opinion. As a regulatory matter, only about half of the states allow feeding of food residuals at all; those who do place various requirements related to protection against transmission of diseases, the most serious of these being bovine spongiform encephalopathy (BSE) (“Mad Cow Disease”), one of a group of transmissible spongiform encephalopathy (TSE) diseases. BSE, at least, can be transmitted to humans by eating certain portions of an infected animal.

Animal feed created from food residuals must compete economically against corn and soybeans, traditionally selling at relatively low prices, and sometimes subsidized. Enviro-Feed’s process, which involved some hand removal of contaminants and addition of wheat midds, proved economically unfeasible.

Perhaps the most critical factor was public opinion climate — more specifically the perceived risk of transmission of BSE. There was a reluctance to purchase feed made from food residuals (even though it is legal), which only added to the economic troubles plants manufacturing such feed faced already. There is an ongoing debate at the federal level over whether to continue the “plate waste” exemption for animal feeding; the Food and Drug Administration issued a notice of proposed rulemaking in 2002 which occasioned impassioned comment on both sides; a formal draft of a rule is expected, which would surely occasion additional heated comment. The most telling evidence of this climate was a series of frantic telephone calls and e-mails in which a Pennsylvania farm featured as a food residuals recycler on the SWPG website called and threatened legal action if all mention of the farm and residuals feeding were not immediately removed.

Conversion of food residuals into animal feed, then, is facing seemingly insurmountable barriers, with potential exceptions being conversion of such eminently safe material as unwanted bread products, already a high value product for feeding even if not converted in any way.

THE MIXED NEWS ABOUT COMPOSTING

Our study used issues faced by food residuals composters in New Jersey as the starting point for looking at the regulatory and other conditions existing in other states and countries. In New Jersey, farms may compost a restricted volume of material (e.g. leaves received from municipalities) without a permit; similarly composting of materials generated on-site is exempted from permitting. All other composters are required to have a Class C

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permit, which carries testing as well as other requirements and restrictions which will be discussed separately, below. This permit, which is new, has been somewhat difficult to get, with delays of two or more years from application date to permitting. While the NJDEP takes the position that it preempts the municipality's zoning and planning authority, considerable roadblocks have been placed by both municipalities, and even more, by counties. With regard to counties, compost facilities are not only required to be accepted into the county solid waste plan, but NJDEP seeks county approval by plan inclusion for most changes or additions of materials, e.g. additional carbon-based materials. This has proven to be a considerable obstacle where counties are slow to act.

New Jersey food residuals composting operations are required to maintain a 1,000 foot buffer to adjacent residences; in other states examined, the broadest buffer required was 500 feet.

As noted above, New Jersey regulations restrict food residuals that can be composted outdoors to vegetative and bread waste only. Maine and Texas allow inclusion of other food residuals when composting outdoors; Maine does require a higher level of permitting and stricter permit conditions if seafood or other residuals with a carbon to nitrogen ratio of less than 15 to 1 is included. Massachusetts allows composted food residuals to include a small quantity of nonvegetative wastes such as meats or oils from plate wastes (this allows outdoor composting of restaurant residuals).

In New Jersey, all privately-owned Class C Recycling Centers may be required to submit a performance bond or letter of credit as "evidence of financial assurance in an amount determined by the Department as necessary to effectuate the proper removal, transportation and disposition of all materials which may be abandoned on a recycling center site." Pennsylvania composters have identified the bonding requirement as one of the primary factors inhibiting the use of composting.

New Jersey's regulations contain a provision which requires the "floor" of a compost-

The Woodhue/Eastern Organic Resources windrow composting operation has a Class C permit. It is the sole remaining food residuals project out of several described in this article.

The most comprehensive support system for food residuals recycling projects is the one created in Maine.

ing "structure" (a term not defined or used elsewhere in the regulations) to be impermeable to 10-5 cm/sec or greater; this had been interpreted to require an impervious surface below food residuals composting windrows. This interpretation has been abandoned due to the unclear wording of the regulation.

SUPPORT SYSTEMS FOR PROJECTS

A final decisive element is the existence and comprehensiveness of support systems. Across the country, the SWPG found a variety of models, more or less formal, which worked to provide the combination of regulatory, technical, policy, organizing, and entrepreneurial services which food residuals recycling needs to become successful.

The most impressive and comprehensive system is that created by Maine. In 1990, the state created the Compost Team, a collaborative effort between the University of Maine Cooperative Extension, the Maine Department of Agriculture, the Maine Department of Environmental Protection, and the Maine State Planning Office, which has been committed to the betterment of the compost industry through education and other support functions. Through its week-long, very hands-on, Compost School, hosted by the University of Maine Cooperative Extension at least annually, the team has been successful in educating Maine's individuals, municipalities, and businesses on the benefits of using composting as a preferred method of organic waste disposal.

Through coordinating private enterprise, government agencies, and educational institutions, barriers that would have otherwise existed are overcome through increased cooperation and communication. Faced with problems such as the dwindling rendering industry, and its effects on the ability to deal with mortalities and meat processing waste, the Team will arrange pilot trials and allow experimentation that they hope will result in the creation of Best Management Practices (BMPs) for that material/situation.

Maine couples this support with a tiered approach to regulation. Requirements, such as whether an impervious pad need to be built, are based on the putrescibility of the material, i.e. its carbon to nitrogen ratio. Tiers also reflect the quantities being composted.

The success of the Maine Compost Team and the tiered approach to regulation can be seen in the number of composters. There are approximately 74 total composters, with 25 of those handling food residuals. These numbers are quite impressive considering Maine's relatively small total land area (30,861.55 square miles, which ranks 39th out of the 50 states) and population (1,228,000 people, 38th out of the 50 states).

Texas makes a variety of resources available to food residuals composters through state government and its Compost Advisory Council, which is a nongovernmental organization and subsidiary of the Recycling Alliance of Texas. During the permitting process, a prospective composter may receive

notification of technical deficiencies, and be provided with the opportunity to sit down and discuss these with the agency. If there is any ambiguity in the rules or permit based thereon, the agency will clarify the issue(s). Significant training and technical assistance are available through the Texas Commission on Environmental Quality (TCEQ).

Texas representatives felt what most creates a stable compost industry is a favorable regulatory environment. In addition to providing assistance during the permitting and certification periods, TCEQ provides compliance assistance and permit exemptions. One such assistance program is TCEQ's composting refund, where the operator of a public or privately owned municipal solid waste facility is entitled to a refund of up to 15 percent of solid waste fees if the refund is used to lease or buy equipment for composting yard trimmings; Composting operations are performed; and The end product is "returned to beneficial use."

In Texas, a compost facility can fall under one of four different categories: 1) Exempt 2) Notification 3) Registration or 4) Permitted. TCEQ encourages most composters to operate under notification or registration in order to avoid the regulatory requirements that would otherwise be experienced under permitting such as soil tests and water quality plans. The cost of permitting is prohibitively expensive. Therefore, facilities operate under a more relaxed regulatory environment (i.e. narrowed buffer zone requirements) under exemption, notification, or registration. Those facilities composting only vegetative food residuals do not even have to give notification of their activities. As with Maine's tiered approach to regulation, instead of adopting a one size fits all regulatory environment, certain "levels" of regulation are created based on size and type of feedstock. Additionally, the Texas Compost Advisory Council has a legislative committee whose task it is to consider legislation that may affect the composting industry.

In New Jersey, permit-specific support may be forthcoming from NJDEP during the (often lengthy) permitting process. There is a required training course for all compost operators at Class C facilities; in the past, this has included neither any discussion of food residuals composting, nor any hands-on compost training for dealing with material of any kind.

The SWPG has provided a variety of assistance to individuals and entities seeking to establish food residuals recycling operations in the State. This assistance has included: Arrange technical assistance on an ad hoc basis from Rutgers University; Arrange or attend regulatory meetings of the NJDEP on behalf of the food residuals industry or individual members thereof; Provided entrepreneurial or marketing help; Work with policymakers.

The SWPG is limited by funding in the services it can provide. While substantial support has been offered by the government in other states with well developed state sup-

port systems (Maine and Texas, described above; also New York, Massachusetts, North Carolina and other states discussed in the report), New Jersey has had limited funding to support food residuals recycling.

KEY POLICY ISSUES

The policy issues identified in the SWPG report are:

- Diverting food residuals away from landfills to either composting or anaerobic digestion reduces anthropogenic greenhouse gases emitted, and assists the state in meeting its greenhouse gas reduction goals.

- Conversion of food residuals to fuel via anaerobic digestion or other processes can reduce dependency on foreign oil and produce decentralized sources of energy, less susceptible to large terror strikes.

- Encouraging food residuals recycling markets within New Jersey can reduce the costs and effects, including air pollution and greenhouse gas contributions, of transporting heavy, wet food residuals. Additionally, this can reduce the costs of disposing of residuals for the food industry, which has narrow profit margins.

- Composting, and anaerobic digestion produce organic soil amendments vital to good soil health. Good soil health, in turn, is vital to: Plant development and especially reducing inputs of pesticides and fertilizers; and Reducing soil compaction and promoting soil health to allow adequate groundwater recharge and water filtering properties of soil, avoiding later costs of water purification and the cost of overstripping our water supplies.

- Much of the future of New Jersey's agriculture lies in its position as primary provider of landscape plants to the Mid-Atlantic region and catering to growing niche markets such as the demand for organic produce. For the latter, especially, inputs of acceptable fertilizers and pesticides are becoming increasingly cost-prohibitive. The organic soil amendments produced by composting or anaerobic digestion can help reduce other necessary costly inputs.

- Similarly, compost and compost tea could help the state's schools achieve their new requirements for Integrated Pest Management on school property.

- Creation of cleaner fuels, particularly those which can replace diesel fuels, could enable New Jersey to improve its air quality by new models of vehicles which traditionally run on diesel to incorporate engines which utilize the cleaner fuels. This could be especially important to decreasing particulate matter in those areas disproportionately exposed to sources of such pollution; the New Jersey Environmental Justice Alliance has made reduction of diesel engine pollution a priority.

REALIZING THE POLICY IMPLICATIONS OF THE REPORT

New Jersey has a number of new food residuals recycling initiatives which could potentially be operating within the next two

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or three years:

- Dr. Stephen Paul of Princeton University is working to establish Trenton Fuel Works, which would use a patented chemical process to make automobile fuel or a substitute for fuel oil.

- The County of Middlesex has already amended its county solid waste plan to allow development of an aerobic digestion plant which is intended to create a fertilizer product.

- Rutgers University is considering anaerobic digestion to fully utilize the University's food and other organic residuals.

In addition to these new operations, two existing operations are seeking to expand. Terracycle, a vermicompost operation, needs to produce more product to meet demand. Eastern Organics/Woodhue is looking to set up an in-vessel composting system at its existing site.

Along with the policy report for the NJDEP, the SWPG also completed a mapping effort, which can be viewed on the SWPG website: <http://www.swpg.rutgers.edu>. Using data collected in a lengthy series of interviews and other research, generators are mapped, with links to contact and other more specific information available by clicking on the mapped point. We will be working to add additional points, since only a portion of the generators supplied information.

For New Jersey to successfully welcome these operations and others, both govern-

ment and the private sector must make a commitment to support food residuals recycling. The NJDEP has already made this commitment in its draft solid waste management plan. Various governmental agencies can create economic incentives. New Jersey already has one of the best systems of incentives for those seeking to generate electricity from greener energy sources, such as solar; it needs to create similar incentives for creation of alternative fuels. The NJDEP should look to create an incentive, whether a tax break or some other financial program to reward those who make beneficial use of food residuals and other organics, such as Texas has.

Food residuals generators need to commit to recycle with an appropriate option; such commitments may be a critical factor in whether the option they select is able to secure the investments necessary for it to be built and opened. Haulers need to be able to create flexible collection and hauling systems.

The SWPG is working with support from NJDEP to coalesce these various groups into a support system which will help food residuals recycling realize its enormous potential in New Jersey. ■

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